



KUDZ ZE KAYAH PROJECT

RECLAMATION AND CLOSURE PLAN

REV 06

May 2026

BMC MINERALS LTD.

This Management Plan has been developed to meet the appropriate subject objectives based on existing regulatory requirements, current or planned site activities, existing and expected site conditions, and designed outcomes at the time of writing. Operational processes/practices for achievement of licence terms and conditions may be updated from time to time as appropriate due to changes to relevant legislation and regulations, changes to site activities or conditions, differences from expected objective outcomes, or improvement of management practices. All rates, capacities, dimensions, weights, volumes and durations in text or figures are based on current feasibility level designs and are subject to change based on final design, licence conditions or site conditions encountered. Updates will be resubmitted to government authorities and/or stakeholders as required.

LIST OF REVISIONS

Issue Date	Revision Number	Description of Revision
September 10, 2020	Rev 00	For Issue to Agencies
November 19, 2020	Rev 01	Updated for with commitments and Final Screening Report Recommendations
January, 2021	Rev 02	Updated with revised closure costs (Appendix E [202012_BMC_ClosureCostEst_Rev01]) based on feedback from YG Energy Mines and Resources and Yukon Water Board Secretariat (YWBS). Specific cost numbers removed from body text (Section 9).
July 18, 2022	Rev 03	Updated with responses to Yukon Water Board Secretariat Information Request #2 and 3 and 4; and final edits from BMC review.
November 14, 2023	Rev 04	Updated with responses to Interventions on the Type A Water Licence Application & responses to Information Requests on the QML Application.
September 19, 2024	Rev 05	Updated in response to Yukon Mineral Resources Branch Information Request 6.
May 20, 2026	Rev 06	Updated in response to Term 47 in the YESAA Decision Document dated April 10, 2026.

SUMMARY OF REVISIONS

Information Request	Document	Exhibit	Section	Revision
Revision 02				
n/a	Reclamation and Closure Plan	1.29.1	9	Removed Tables 9-1 and 9-2 from Rev01
Revision 03				
YWBS IR-2.31	Reclamation and Closure Plan	1.29.1	Glossary	Added definition of “Permanent Closure”
YWBS IR-3.1	Reclamation and Closure Plan	1.29.1	5.1	Replace Figure 5-1 with sealed drawing
YWBS IR-3.1	Reclamation and Closure Plan	1.29.1	5.1	Replace Figure 5-2 with sealed drawing
YWBS IR-2.32	Reclamation and Closure Plan	1.29.1	7.4.1	Revision to clarify second paragraph
YWBS IR-2.32	Reclamation and Closure Plan	1.29.1	7.4.1	Updated Table 7-7 with quantities consistent with Closure Cost Model
YWBS IR-2.32	Reclamation and Closure Plan	1.29.1	7.4.1.1	Updated Table 7-9 with quantities consistent with Closure Cost Model
YWBS IR-2.33	Reclamation and Closure Plan	1.29.1	7.4.2.1	Updated Table 7-12 with quantities consistent with Closure Cost Model
YWBS IR-4.5	Reclamation and Closure Plan	1.29.1	7.6.1	Table 7-17 Updated WQO for Lead and Nitrite
YWBS IR-2.46	Reclamation and Closure Plan	1.29.1	7.9.1	Updated Table 7-24 with physical monitoring frequency consistent with T19-NPV-EOM of Closure Cost Model
YWBS IR-2.39	Reclamation and Closure Plan	1.29.1	8.1	Added clarification on road reclamation during Active Closure
YWBS IR-2.43	Reclamation and Closure Plan	1.29.1	9	Indirect costs revised from 10% to 15%
YWBS IR-2.43	Reclamation and Closure Plan	1.29.1	9.2.16	Indirect costs revised from 10% to 15%
YWBS IR-2.44	Reclamation and Closure Plan	1.29.1	9.2.17	Contingency revised from 20% to 15%
Revision 04				
LFN Intervention (Exhibit 5.6.4): Memo- WQ Model, WTP Predictions, WQO's Report, EQS.pdf	Reclamation and Closure Plan	1.29.1	2.3.1	Added details on proposed establishment of Kaska / BMC Environmental Management Advisory Committee

Information Request	Document	Exhibit	Section	Revision
Please provide additional information on wildlife management considerations, how First Nations and stakeholder concerns have been considered in the plan, and how wildlife management considerations will be considered during reclamation planning.			2.3.5	Added detail on other committees to be established under the proposed modernized SEPA (Management Oversight Committee, Heritage Management Committee) with Kaska and BMC membership. Added BMC's commitment to funding and using Kaska Land Guardians as part of overall environmental management for the project. Also noted the requirement for establishment of the Finlayson Caribou Herd Oversight Committee.
QML IR5A-B	Reclamation and Closure Plan	1.29.1	2.4.4	Updated citation to reference most recent 2023 ARD/ML report.
LFN Intervention (Exhibit 5.6.4): Memo- WQ Model, WTP Predictions, WQO's Report, EQS.pdf Additional sampling of vegetation tissue to characterize elemental composition prior to construction, during operations, and during post-closure is required. Species of cultural importance should be identified and included in the sampling program	Reclamation and Closure Plan	1.29.1	2.5.2	Text on engagement and collaboration with Kaska on revegetation research amended to specifically state "including seeking advice on species of cultural importance that should be included in studies and research". Sampling of vegetation tissue to characterize elemental composition has already been completed as part of baseline environmental assessments, and will continue to be undertaken periodically through the life of the Project.
QML IR5A-B	Reclamation and Closure Plan	1.29.1	2.5.3, 7.6.2.1	Updated citation to reference most recent 2022 water quality model report. Updated modelled water quality in Table 7-19.
QML IR5A-B	Reclamation and Closure Plan	1.29.1	2.5.4	Updated citation to reference most recent 2022 water quality model report and updated wording to be consistent with recent changes to the water quality model.
LFN Intervention (Exhibit 5.6.4): Memo- WQ Model, WTP Predictions, WQO's Report, EQS.pdf Table 3-1: Fundamental Mine Reclamation and Closure Objectives (YG, 2013) in the Reclamation Plan excludes Land Use requirements that "site access is consistent with community land use expectations."	Reclamation and Closure Plan	1.29.1	3.1	Added additional land use objective that had been inadvertently excluded from Table 3-1.
QML IR5A-B	Reclamation and Closure Plan	1.29.1	4.2	Updated to include data from 2019 – 2023 from Ensero Baseline Hydrometeorology report.
QML IR5A-B	Reclamation and Closure Plan	1.29.1	4.3.1	Updated to include data from 2019 – 2023 from Ensero Baseline Hydrometeorology report.
QML IR5A-B	Reclamation and Closure Plan	1.29.1	4.3.2	Updated to include data from 2019 – 2023 from Ensero Baseline Surface Water report.
QML IR5A-B	Reclamation and Closure Plan	1.29.1	4.4	Updated to include data from 2019 – 2023 from Ensero Baseline Hydrogeology report.
QML IR5A-B	Reclamation and Closure Plan	1.29.1	4.6	Updated to add data from 2019 – 2023 from Ensero Baseline Ungulate report and 2023 site characterization plan (Rev 3). Updated data in sections 4.6.1 and 4.6.2

Information Request	Document	Exhibit	Section	Revision
QML IR5A-B	Reclamation and Closure Plan	1.29.1	5.2.1	Updated citation to reference most recent 2023 ARD/ML report.
LFN Intervention (Exhibit 5.6.4): Memo- WQ Model, WTP Predictions, WQO's Report, EQS.pdf Confirmation that all soil disturbed by mining activities will be salvaged for use in reclamation is required	Reclamation and Closure Plan	1.29.1	5.2.1	Added statement confirming that all soil disturbed by mining activities will be salvaged for use in future reclamation activities.
QML IR5-73	Reclamation and Closure Plan	1.29.1	6.6, 7.6.1, 7.9.2, 7.10.2, 9.2.15	Updated reference to the Environmental Monitoring, Surveillance, reporting and Adaptive Management Plan to either the 2023 Environmental Monitoring Plan or 2023 Adaptive Management Plan.
LFN Intervention (Exhibit 5.6.4): Memo- WQ Model, WTP Predictions, WQO's Report, EQS.pdf Table 7-1: General Reclamation and Closure Objectives and Measures identifies Ecological Conditions and Sustainability as the primary value and states, "Revegetation strategies are informed by a comprehensive terrestrial ecosystem mapping inventory of pre-existing conditions. Revegetation prescriptions for disturbed areas will balance the objectives of restoring like ecosystems with erosion stabilization and stability monitoring objectives." The revegetation prescriptions should also consider traditional foods and medicines and input from the Kaska.	Reclamation and Closure Plan	1.29.1	7.1	Added suggested revegetation prescription to Table 7-1.
LFN Intervention (Exhibit 5.6.4): Memo- WQ Model, WTP Predictions, WQO's Report, EQS.pdf The Proponent states that stockpiled topsoil and overburden materials were assumed to be nutrient poor based on experience at other metal mines in BC and Yukon. A site-specific soil survey is required to address this data gap.	Reclamation and Closure Plan	1.29.1	7.1.2	Clarified that this has also been confirmed through baseline soil sampling and referenced relevant baseline report.
LFN Intervention (Exhibit 5.6.4): Memo- WQ Model, WTP Predictions, WQO's Report, EQS.pdf The Proponent states: "Ideally, storage of soil in low berms, less than 1 m deep, re-vegetating stockpiles, and staging progressive reclamation to minimize soil storage times help retain soil nutrients and biota and improves revegetation success (Strohmayer, 1999). However, stockpile depth needs to be balanced with minimizing the footprint of surface disturbance." Additional details and confirmation that berm height can be achieved are required to ensure that the already limited soil nutrients and biota will be retained to ensure revegetation success.	Reclamation and Closure Plan	1.29.1	7.1.2	Added additional information on principles that BMC will adopt for management of topsoil to promote maintenance of topsoil health until reused in reclamation.

Information Request	Document	Exhibit	Section	Revision
YG Intervention (Exhibit 5.2) Recommendation 60	Reclamation and Closure Plan	1.29.1	7.9.2	Added monitoring stations KZ-5 and KZ-5D to summary of closure period surface water table 7-25.
LFN Intervention (Exhibit 5.6.4): Memo- WQ Model, WTP Predictions, WQO's Report, EQS.pdf Vegetation assessments required to evaluate the success of reclamation activities must also include: -Evaluation of soil and vegetation tissue for metal content; -Evaluation of soil establishment; and -Study of biodiversity, wildlife use, and/or sightings,	Reclamation and Closure Plan	1.29.1	7.9.3	Updated text to specifically note monitoring of soils for metal content and soil establishment.
Revision 05				
QML IR6-1 Provide definitions or explanations for the following terms used throughout the plan: a. Passive water treatment technology b. Semi-passive water treatment technology c. Reclamation d. Restoration e. Inert materials f. Non-inert materials g. Landform	Reclamation and Closure Plan	1.29.1	Glossary	Necessary terms have been added to the glossary, while unnecessary terms have been removed from the document.
QML IR6-8 Table 7-2 provides post-mining land use conditions, provide a similar table that describes pre-impact conditions of the site. This table should be added to Section 4 of the RCP.	Reclamation and Closure Plan	1.29.1	4.5	Added more details of baseline vegetation conditions, including a table describing pre-impact conditions.
QML IR6-5 The definition for Permanent Closure should not include "and all other activities as authorized" as reclamation and closure of the site is an activity that is authorized.	Reclamation and Closure Plan	1.29.1	Glossary	This definition has been revised.
QML IR6-16 Where an alternative was listed as being preferred for "amenability to reclamation" was not chosen as the closure method, provide additional rationale for why an alternative was chosen. (Table 2-4).	Reclamation and Closure Plan	1.29.1	2.4.3	Additional information has been included supporting the selection of the preferred alternative.

Information Request	Document	Exhibit	Section	Revision
QML IR6-18 The alternatives considered for waste covers do not show how each alternative was rated and screened against the stated criteria. Provide more detail on how each alternative was assessed based on the stated criteria and the rationale for the chosen method.	Reclamation and Closure Plan	1.29.1	2.4.4	Provided additional information on the assessment of each alternative against the stated criteria and the rationale for alternative selection.
QML IR6-23(l) Risk No 11.1: The mitigation identified is inconsistent with what is presented in the RCP. RCP states that placement of a 0.25m to 0.50m isolation cover would be an appropriate practice but it is not clear that there is a commitment to do this.	Reclamation and Closure Plan	1.29.1	6.3	Provided clarification of the proposed Class A and Class B cover in the event of temporary closure.
QML IR6-24 Aspects of the closure plan that require further research or development to demonstrate effectiveness require timelines for the implementation of the relevant research/development and, where applicable, expected completion. Timelines should include expectations of when results would become available and how these results will be incorporated into future iterations of the plan.	Reclamation and Closure Plan	1.29.1	2.5	Provided additional details of research timelines and incorporation of results into RCP updates.
QML IR6-26 Section 7.1.2, and Table 7-2, describe how waste management facilities will be revegetated to promote conditions similar to baseline conditions, with varying vegetation across facilities. Provide a description of how the research program will be tailored to understand the how the proposed cover systems will support the vegetation species proposed and identify additional closure measures to achieve objectives.	Reclamation and Closure Plan	1.29.1	7.1.2	Provided additional details of how research programs will evaluate potential revegetation approaches for the waste management facilities.
QML IR6-29 Section 2.5.3 and Appendix C of the RCP describe the studies that have been completed in relation to in-pit water treatment. Details are not provided for ongoing research and pilot studies to confirm the expected performance, optimize designs, and ensure timely implementation as is required in Decision Document term 3. Provide additional detail with respect to program design and timing for the ongoing research of in-pit treatment.	Reclamation and Closure Plan	1.29.1	2.5.3	Additional details and clarification added regarding ongoing data collection and studies to support design and implementation of in-pit water treatment.

Information Request	Document	Exhibit	Section	Revision
QML IR6-30 Decision Document term and condition 31 requires that types of treatment alternatives and their implementation timelines be provided an Adaptive Management Plan. This is required to include a modelling and monitoring approach including trigger values for when alternatives must be implemented and, if monitoring shows exceedances and alternative treatment is implemented, how discharges will be addressed until new water treatment becomes operational. Provide details on how the AMP will inform the reclamation research program and future revisions of the RCP.	Reclamation and Closure Plan	1.29.1	7.2	Added an Adaptive Management Initiative for ABM Lake water treatment.
QML IR6-38 A temporary isolation cover is identified as 'the most appropriate practice' to minimize risks from Class A and B material in a temporary closure scenario. Additional information is required to understand the proposed actions in a temporary closure scenario. a. Provide clarification whether this is a commitment BMC is making in any temporary closure scenario. b. Provide additional information on when this would occur in a temporary scenario (i.e. immediately upon closure, within a specified timeframe etc.) c. If there are specific thresholds that must be met to warrant the placement of an isolation cover, provide details of these thresholds and how they were developed	Reclamation and Closure Plan	1.29.1	6.3	Provided additional text for clarification.
QML IR6-42 Reclamation and closure measures for roads and trails are not specified in the RCP. Provide information on the removal and reclamation of roads and trails. This should include the sequence of removal to illustrate which roads will be required for the closure of the site itself and the timing for removal of roads based upon closure phases.	Reclamation and Closure Plan	1.29.1	7.9	Reclamation and closure measures for roads and trails have been added to the Plan. The expected timing for closure and reclamation of the Access Road and Site Roads has been added to the Plan.
QML IR6-44 Table 7-20 is missing Chemical Stability as a value; this is an important value in the context of contaminated soils and foundations in the industrial area and areas where mobile equipment and fuel are stored. Include chemical stability as a value in this table.	Reclamation and Closure Plan	1.29.1	7.7	Chemical Stability has been added as a value to Table 7-23.

Information Request	Document	Exhibit	Section	Revision
QML IR6-47 If concrete footings, foundations, and slabs will be closed in place, provide additional information on the confirmatory sampling that will occur prior to closure to ensure migration of contaminants beneath the infrastructure has not occurred.	Reclamation and Closure Plan	1.29.1	7.7.2.2 and 7.7.2.9	Commitment added to the Plan that confirmatory sampling will be completed prior to covering with suitable growth media.
QML IR6-50 The RCP notes that material remaining on the run of mine pad and in low grade ore stockpiles do not 'necessarily require relocation' and would be encapsulated within the Class B facility at closure. It is not clear if there are thresholds, whether based on volumes present at closure or the grade and geochemistry of material, that would indicate if relocation to other facilities such as the Class A facility or the open pit would be warranted.	Reclamation and Closure Plan	1.29.1	7.5.1	Provided additional text for clarification.
QML IR6-54 The post-closure water management infrastructure is not clearly outlined in the RCP, Table 7-8 indicates that there will be "appropriately sized drainage diversions around the facility to reduce up slope run-on waters" while Table 7-16 indicates that all infrastructure will be removed. Provide clarification on the water management infrastructure that will be in place post-closure, particularly around the Class A and Class B facilities.	Reclamation and Closure Plan	1.29.1	7.4 and 7.6	Removed unclear wording and added additional text for clarification.
QML IR6-69 During Active Closure the requirement for annual physical monitoring will remain unchanged. Update Table 7-24 to reflect an annual requirement for physical monitoring.	Reclamation and Closure Plan	1.29.1	7.11.1	Revised monitoring frequency during Active Closure.
QML IR6-70 The Transition Closure phase will be the first stage to monitor physical stability following the implementation of the closure plan. Annual physical monitoring will remain a requirement in this phase until continued physical stability is demonstrated. Update Table 7-24 to include an annual requirement for physical monitoring for this stage.	Reclamation and Closure Plan	1.29.1	7.11.1	Revised monitoring frequency during Transition Closure.

Information Request	Document	Exhibit	Section	Revision
QML IR6-73 Brushing of deep rooting vegetation species is identified as a maintenance measure to protect covers placed. Provide clarification of the species being planted on site that may have rooting depths that would negatively impact cover systems and describe the revegetation practices that will be implemented to reduce the likelihood of this occurring.	Reclamation and Closure Plan	1.29.1	7.11.3	Removed discussion of deep rooting vegetation from the RCP, as no such vegetation is planned or expected.
QML IR6-76 Update the monitoring and maintenance activities associated with wildlife to reflect the caribou effects monitoring and mitigation program (Decision Document term 38) and the late-winter moose monitoring survey (Section 110E).	Reclamation and Closure Plan	1.29.1	7.11.3	Added a reference to the Wildlife Protection Plan.
QML IR6-77 Provide clarification on Table 7-2 with respect to revegetation objectives and the potential for wildlife use and how these uses will be monitored to inform the success of the closure measures.	Reclamation and Closure Plan	1.29.1	7.1.2	Added details of how potential for wildlife use was assessed in Table 7-2.
Revision 06				
YESAA Decision Document Term 47 Financial security for the Project should be based upon the peak liabilities in a 5-year period from the point of determination and should not account for revenues generated during the closure period.	Reclamation and Closure Plan	1.29.1	9.3 and Appendix E	Provided a calculation of the peak liabilities in a 5-year period from the point of receipt of a Quartz Mining Licence and a Type A Water Licence.

LIST OF ACRONYMS AND ABBREVIATIONS

AEG	Alexco Environmental Group Inc.
AMI	Adaptive Management Initiative
AMP	Adaptive Management Plan
ARD	Acid Rock Drainage
BC ENV	British Columbia Ministry of Environment and Climate Change Strategy
BMC	BMC Minerals Ltd.
CCME	Canadian Council of Ministers of the Environment
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COPI	Constituents of potential interest
CWTS	Constructed Wetland Treatment System
EMP	Environmental Monitoring, Surveillance and Reporting Plan
EMR	Energy, Mines and Resources
FMEA	Failure Modes Effects Assessment
FWQG	Federal Water Quality Guidelines
ha	Hectares
HDPE	High-density polyethylene
HPM	High Precious Metals
Kaska	Kaska First Nations
KP	Knight Piésold Ltd.
KZK	Kudz Ze Kayah
L	Litre
LFN	Liard First Nation
LGO	Low Grade Ore
LWMP	Lower Water Management Pond
masl	metres above sea level
ML	Metal Leaching
mm	Millimetres
Mm ³	Million cubic metres
m/s	Metres per second
MRP	Management Response Plan
NPV	Net Present Value
PAG	Potentially acid generating
PCCMM	Post-closure care, maintenance, and monitoring
QML	Quartz Mining License
RCP	Reclamation and Closure Plan
ROM	Run of Mine
RRDC	Ross River Dena Council
TK	Traditional Knowledge
TLU	Traditional Land Use
UWMP	Upper Water Management Pond
WQO	water quality objective
WTP	Water Treatment Plant

WMF	Waste Management Facility
YESAB	Yukon Environmental and Socio-Economic Assessment Board
YG	Yukon Government

GLOSSARY

Ablation: The removal of snow and ice by melting or evaporation.

Active Closure: Post mining removal of Water Management Ponds, Overburden Stockpile, collection ponds, removal of all pipeworks and structures, and the removal and re-grading of all access roads, ditches and borrow areas not required during closure phases.

Authigenic: Authigenesis is the process whereby a mineral or sedimentary rock deposit is generated where it is found or observed.

Bench-scale: Testing of materials, methods, or chemical processes on a small scale, such as on a laboratory worktable.

Biological Soil Crust: Early successional communities composed of bacteria, cyanobacteria, algae, mosses, liverworts, fungi and lichens.

Brunisol: A weakly developed mineral soil with a sufficiently developed B horizon that distinguishes it from a regosol.

Colluvium: Material that accumulates at the foot of a steep slope.

Construction Phase: Project phase that will last approximately 2 years and includes Project site preparation and clearing and establishment of Project infrastructure.

Contact Water: Surface water or other water that comes into contact with disturbed surfaces in the Mine site footprint and associated infrastructure.

Cryosol: Permafrost soils.

Decommission: To take facilities out of service.

Ecoregion: Ecoregions represent smaller areas of ecozones characterized by distinctive physiography and ecological responses to climate as expressed by the development of vegetation, soil, water, and fauna.

Ecosite: An area of vegetation association related to a combination of moisture and nutrient regimes specific to an ecoregion.

Ecozone: Ecozones are large and generalized ecological units characterized by interactive abiotic factors. Five ecozones are recognized in Yukon: Southern Arctic, Pacific Maritime, Taiga Plain, Boreal, and Taiga Cordillera.

Edatopic Grid: A grid of moisture and nutrients used to define the variability of soil and vegetation types for a given region.

Effluent: Liquid waste discharge.

Fluvial: Of or found in a river.

Fungi: A general term used to denote a group of eukaryotic protists, including mushrooms, yeasts, rusts, molds, and smuts, etc., characterized by the absence of chlorophyll and by the presence of a rigid cell wall composed of chitin, mannans, and sometimes cellulose.

Geochemical: The related chemical and geological properties of a substance.

Graminoid: Herbaceous plants with a grass-like morphology, includes the families Poaceae (grasses), Cyperaceae (sedges), and Juncaceae (rushes). Graminoids are often dominant in open habitat comprising grasslands, marshes, and alpine meadows.

Growth Media: A combination of overburden and topsoil media demonstrated to facilitate growth.

Heterogeneity: The uneven distribution of features and/or species in an area.

Hydraulic: Denoting, relating to, or operated by a liquid moving in a confined space under pressure.

Infiltration: The process by which water on the ground surface enters the soil.

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin, pond, or treatment plant.

Inoculation: The act of introducing microorganism or suspension of microorganisms (e.g., bacteria) into a culture medium.

Kaska (i.e., Kaska First Nations): Transboundary Nations involving Kaska people from the Ross River Dena Council and Liard First Nation in southeastern Yukon, and Daylu Dena Council, Dease River First Nation and Kwadacha Nation in northern British Columbia.

Landform: A feature on the Earth's surface that is naturally formed, or mimics naturally formed features.

Liability: The state of being responsible for something, especially by law.

Mesic: An environment or habitat characterized by a moderate amount of moisture.

Microenvironment: The immediate small-scale environment of an organism or a part of an organism, especially as a distinct part of a larger environment.

Operations Phase: Project phase that will last approximately 10 years and includes open pit ABM open pit and underground development, and ore processing.

Overburden: Rock or soil overlying bedrock or other underground feature.

Passive Water Treatment Technology: Water treatment technology that does not require regular human intervention to operate.

Permafrost: Soil, rock or sediment that is frozen for more than two consecutive years. In areas not overlain by ice, it exists beneath a layer of soil, rock or sediment, which freezes and thaws annually that is called the “active layer”.

Permanent Closure: Means the closure of the Undertaking, with no intent for restart, as evidenced by notice from the Licensee, or the cessation of all mining and ore processing activities for any period of time longer than six (6) consecutive months, that is not a Temporary Closure.

Pilot-scale: A small scale, preliminary study or test conducted to evaluate feasibility, time, cost, adverse events, and effect size in an attempt to predict results and improve upon the design prior to performance of a full-scale study or operation.

Post-closure Phase: Project phase that is assumed to begin once all physical activities have finished onsite and will continue until active monitoring is no longer required.

Prill: A small aggregate or globule of a material, most often a dry sphere, formed from a melted liquid.

Project Area: Refers to the general Project location and surrounding area.

Project Footprint: Refers to the area in which the Project Infrastructure will be located and is the area of direct disturbance from the Project activities.

Reclamation: The process of returning the land impacted by Project activities to a state that is compatible with a healthy environment and traditional land use activities.

Regosol: A very weakly developed mineral soil in unconsolidated materials often in mountainous regions.**Slaking Systems:** A system for slaking, the process, by adding water, of turning the traditional building material lime from calcium oxide into calcium hydroxide.

Soil Amendment: any material added to a soil to improve its physical properties, such as water retention, permeability, water infiltration, drainage, aeration and structure.

Solifluction: The gradual movement of wet soil or other material down a slope, especially where frozen subsoil acts as a barrier to the percolation of water.

Subaqueous: Under water.

Tailings: The material remaining after processing of ore to remove the valuable minerals in the ore.

Temporary Closure: closure of the undertaking as evidenced by the cessation of development and production authorized by the QML and Type A Water Licence for a period longer than six (6) consecutive months and is not expected to last longer than five years and can include both planned and unplanned closure (Yukon Energy, Mines and Resources, 2013).

Till: Unsorted material deposited directly by glacial ice and showing no stratification.

Transition Closure: The period when the ABM open pit is filling with water, and reclamation activities have been completed for the Class A, B and C Storage Facilities. A Constructed Wetland Treatment System will be constructed in Geona Creek and collection ponds will be removed.

Upgraded Tote Road: The widening, re-grading of the Tote Road between the Camp and the ABM Deposit.

Vegetation Association: Group of plant species that occur together on a given area of land with a similar nutrient and moisture regime.

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1 INTRODUCTION

BMC Minerals Ltd. (BMC) is the owner of the Kudz Ze Kayah (KZK) Project (the Project). Since acquiring the Project in 2015, BMC has actively engaged in assessing historical work, optimizing design, resource drilling, economic assessment, baseline environmental studies, and First Nations and community engagement as well as the successful completion of the Executive Committee Screening by the Yukon Environmental and Social-Economic Assessment Board.

The Reclamation and Closure Plan (RCP) presents a methodical approach designed to deliver sound, appropriate, and responsible closure of the Project that meets predetermined goals and objectives.

The following planned Project closure goal is grounded in responsible stewardship, consultation with stakeholders and appropriate end land use considerations:

- To return the Project site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with Traditional Land Use (TLU) activities.

The RCP is based on Yukon Government's (YG) guidance document *Reclamation and Closure Planning for Quartz Mining Projects* (YG, 2013). The RCP is presented at a level of detail appropriate to ensure that closure measures:

- Support the Project's planned closure goals and objectives;
- Are technically feasible and practical to achieve;
- Support the evaluation of potential environmental and socio-economic effects from the Project in the Closure and Post-closure phases; and
- Are defined adequately to support the cost estimate of the reclamation and closure liabilities.

The RCP addresses the entire planned Mine development footprint excluding the Access Road (the updated Tote Road from kilometer 0 at the Robert Campbell Highway to kilometer 18.88 just south of the Finlayson Bridge crossing). The Access Road is excluded as it is not part of the Quartz Mining Licence Application and instead is permitted under a separate Yukon Government Lands Lease.

The RCP presents progressive reclamation and reclamation research plans that will be undertaken leading up to and through Construction and Operations. Closure measures are presented regarding decommissioning and reclamation work in the Active Closure period, and subsequent reclamation and water management measures specific to the Transition Closure and Post-closure periods. Monitoring and maintenance programs spanning all closure periods are also outlined in this RCP.

During the reclamation and closure planning to support Mine design decisions, a key design feature included physical segregation of non-potentially acid generating (NPAG) and low Metal Leaching (ML) materials and non-processing activities on the eastern slope of the Geona Creek Valley, while all processing activities and PAG/ML waste material are designed to be contained on the western slopes of the Geona Creek Valley.

2 RECLAMATION AND CLOSURE PLANNING

The overall strategy for the RCP is to ultimately provide a closure condition that requires minimal management and maintenance to deliver, with Mine facilities decommissioned and reclaimed, and monitoring conducted until mitigation measures have achieved the Closure objectives. The focus of the RCP is to guide the site to appropriate and functional ecosystems, while meeting agreed key end land use objectives.

This section outlines the framework adopted and utilized to establish a specific set of closure goals, objectives, criteria, and measures for the Project, and explains the distinctions and linkages between them.

2.1 CLOSURE OBJECTIVES, PRINCIPLES, AND REGULATORY GUIDANCE

The closure guidance document (YG, 2013) contains direction on the level of detail, information required and processes necessary for developing the RCP. The guide has the following objectives:

- Describe the context for Mine closure planning in Yukon and the rationale for requirements to submit RCPs and liability estimates;
- Describe the principles, philosophy, and broad objectives for closure planning for Yukon mining projects;
- Describe the information expectations for RCPs and liability estimates;
- Provide draft text that will be included in the regulatory submission documents; and
- Identify key sources of additional guidance for preparing RCPs and liability estimates.

Principles and approaches presented by the guidance document include fundamental reclamation and closure objectives, community and regulatory engagement, reclamation and closure principles, and principles for estimating liability (YG, 2013). The guidance document identifies the following global principles for reclamation and closure planning for mining projects in Yukon:

- Design for closure;
- Reducing impacted water;
- Source control (contaminant);
- Progressive reclamation;
- Minimize long-term activities, plan for long-term monitoring and maintenance; and
- Adaptive management is not a reclamation plan.

Specific Project closure measures need to be demonstrably linked to sound goals and objectives for overall closure of the site. These measures will be adjusted over time to consider new information that may become available during the operating and closure periods of the Mine life to support achievement of the key objectives. Principles and approaches for reclamation planning at the Project begin with following the YG guidance document (YG, 2013).

Section 2.3 provides a high-level summary of BMC's engagement with Kaska to date as it relates to reclamation and closure. Dialogue and involvement of Kaska representatives will be ongoing throughout all Project phases and therefore, the closure goals and objectives (Chapter 3) and closure measures (Chapter 7) are expected to be refined from time to time as a result of this ongoing engagement.

Reclamation planning for the Project is based upon the establishment of specific closure goals, objectives, criteria, and monitoring programs for the Project. These are defined by environmental conditions, site conditions, and company and community expectations. Project reclamation planning considers the global principles presented above for all stages of Mine closure.

The closure goals of the RCP guide the selection of clear, specific objectives for all Project components. A set of closure measures that could achieve the objective are developed and its success or appropriateness is monitored over time. Where required and based on the ongoing monitoring of results, closure measures may be adjusted for efficacy. Measurable closure criteria (design or performance) define success in achieving the specific closure objective, as determined through the associated design and monitoring initiatives.

Figure 2-1, adapted from the *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories* prepared by the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada (MVLWB/AANDC, 2013) provides an overview of this approach to the development of the RCP.

Details defining this approach are presented in Section 2.2 and Chapter 3. Sources are cited where information was gathered from additional authors.

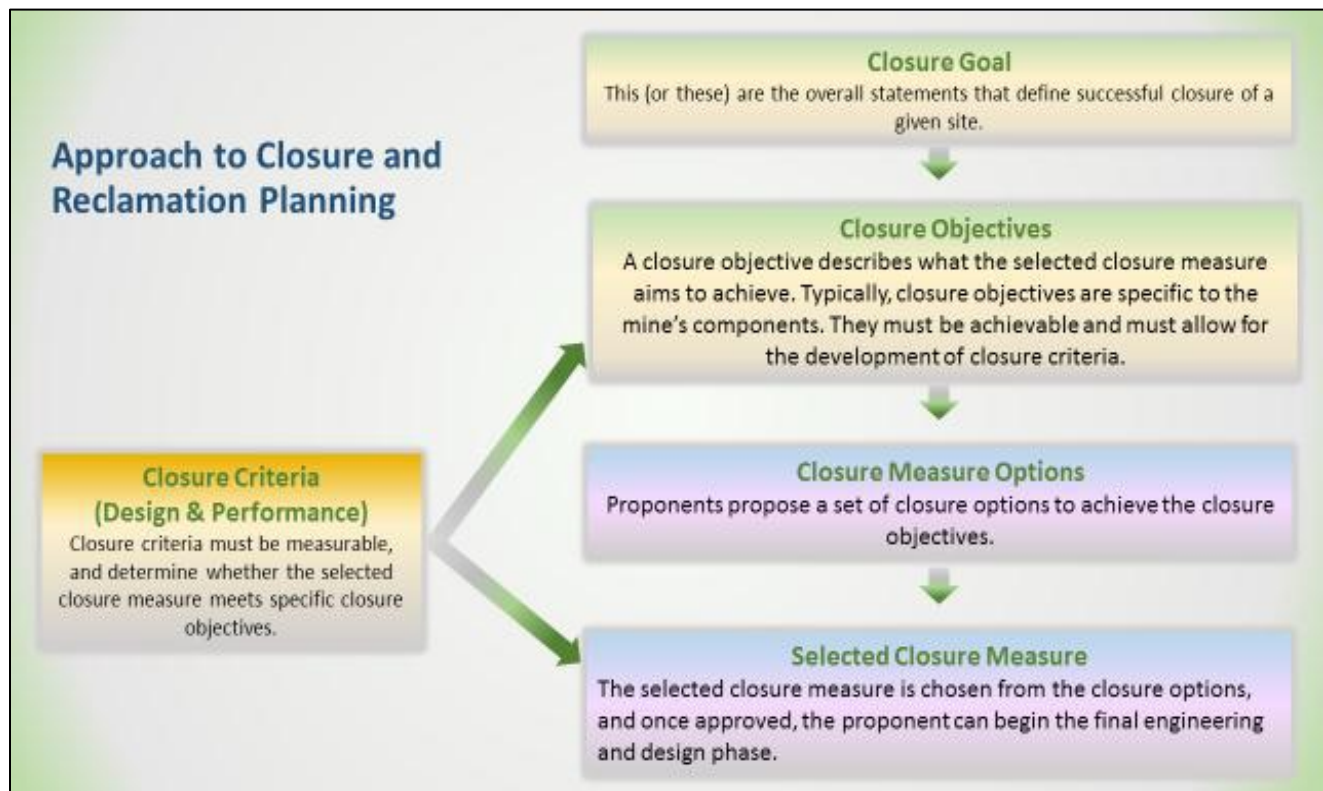


Figure 2-1: Approach to Closure and Reclamation Planning

2.2 PROJECT CLOSURE GOAL

The closure goal is the guiding statement and starting point for closure and reclamation planning. The purpose of establishing this goal is to ensure the long-term success of the program by developing a clear and executable plan. The closure goal is achieved once the proponent has satisfied closure objectives.

The following Project closure goal is grounded in responsible stewardship, consultation with stakeholders and appropriate end land use considerations:

- To return the Project site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with Traditional Land Use (TLU) activities.

2.3 FIRST NATION AND STAKEHOLDER ENGAGEMENT

BMC has developed a Consultation and Engagement Plan which sets out the tools, techniques and context for consulting with the entire suite of governments (including First Nation governments), agencies, boards, organizations and stakeholder groups with whom BMC will continue to engage through licensing, operation and closure of the Project. Techniques described in the Consultation and

Engagement Plan will ensure that licensing, operations, and closure of the planned Project is supported by thorough, formal consultation.

Beyond the activities and approaches set out in the Consultation and Engagement Plan, BMC has worked extensively with affected First Nations, governments and other interested parties to ensure there is broad public understanding and support for the Project.

2.3.1 Ross River Dena Council

BMC has had extensive engagement with Ross River Dena Council (RRDC) including community meetings in Ross River, Elders Oversight Committee Meetings, meetings with Chief and Council and engagement with RRDC's wholly owned environmental consultancy, Dena Cho Environmental and Remediation Inc. (Dena Cho). Key concerns, as they relate to Closure and how BMC has addressed those concerns, are summarized in Table 2-1. It is noted that many of the concerns were addressed as part of the Failure Modes Effects Assessment (Appendix A) in which both Dena Cho and two Elders nominated by RRDC participated. Prior to this RCP being finalized Dean Cho conducted a detailed independent review of the draft RCP. Issues raised during the Dena Cho review were addressed collaboratively through a number of workshops and where appropriate the RCP was amended and additional commitments added.

Table 2-1: Summary of Consultation with RRDC on Closure Plan

Concern	BMC Response
Efficacy of the Constructed Wetland Treatment System	Improvements to the liners and covers of the Class A and B Waste Storage Facilities have resulted in the Constructed Wetland Treatment Systems being a contingency measure rather than relying on them for the long-term treatment of water. All water quality predictions show that the water will meet the guidelines during Closure phases. Although the wetlands are now considered a contingency measure, BMC has initiated a comprehensive program to design, test, optimize, implement and maintain constructed wetlands in a site-specific manner for the Post-closure phase.
Efficacy of the ABM lake Water Treatment	Off site testing was initiated in 2018 and is ongoing. Given the duration it will take to fill the ABM open pit, there are many years available for monitoring to ensure the treatments are working and if not, additional or amended treatments can be added to the plan. The water treatment plant (WTP) will remain in place during the Active and Transition Closure phases and will not be decommissioned until satisfactory in situ treatment has been demonstrated in the field. This contingency measure will ensure that downstream water quality is not adversely affected during the implementation of the Closure mitigation plans.
Draw down of water in South Lakes and adaptive management strategies	Management strategies to reduce the effects from a reduction of flows and water levels in the receiving environment of South Lakes, once Fault Creek is diverted back to its original path, will be based on the amount of reduction observed during monitoring. Management options may include a partial diversion of Fault Creek both to the ABM open pit and to the South Lakes. As there is currently minimal winter flow into the upper South Lakes, negligible impacts to fish and fish habitat are predicted to result from a reduced winter flow during the Active and Transition Closure phases. Further, although a slightly reduced volume of groundwater entering the uppermost lake is predicted, lake levels are primarily controlled by very old beaver impoundments and therefore any reduction in lake surface area, due to the reduction in groundwater inputs, would be considered negligible.
Reduced flows in creeks compared to baseline	The greatest reduction in streamflow in Finlayson Creek is predicted to occur during Active and Transition Closure. Flows in Finlayson Creek are predicted to decrease from baseline in the range of 12% at monitoring station KZ-15 and 5% at KZ-26 during these phases due to groundwater and surface water flows filling the ABM lake. Once the pit is filled (i.e., after the Transition Closure phase) flows in Finlayson Creek will return to baseline conditions.

Concern	BMC Response
	The Post-closure phase begins in approximately Year 24 and is characterized by the beginning of ABM lake outflow, which will recommence contributing flow to Geona Creek, thereby reconnecting Fault Creek and the other south diversion areas to Geona Creek.
Impacted groundwater flowing south from the pit into the South Lakes watershed	The ABM open pit will be a groundwater sink during the Operations phase, which means that groundwater will flow radially towards the open pit and no seepage will leave the open pit during this phase. In Post-closure, groundwater modelling indicates that groundwater will continue to flow into the ABM lake from the South Lakes watershed and will then flow north from the ABM lake into the Geona Creek watershed.
The preferred tailings management technology is for dry stack tailings; RRDC does not support submerged valley tailings with dams in the long term	BMC has committed to encapsulated dry stack tailings as part of the closure plan.
Monitoring the performance of the Class A Storage Facility during closure	BMC has committed to ongoing monitoring for 10 years Post-closure and as per the agreements with Kaska, all reports will be provided to their chosen consultant for review.
Vegetation and soils monitoring during closure	During Active Closure the site will be reclaimed and monitored to ensure soils and vegetation meet the relevant standards or site-specific health-based values.
Bonding	Security Bonds will be provided to YG.
Reclamation of Access Road	During community meetings and Elders Oversight Committee meetings some RRDC members requested that the Access Road not be reclaimed but left open for traditional land use purposes. BMC's lease for the road requires that it be fully reclaimed; however, BMC made a commitment to participate in multi-party discussions (i.e. RRDC, Yukon Government, stakeholders) on this matter as the Project progresses.

BMC and RRDC are both signatories to an agreed Traditional Knowledge (TK) protocol. In accordance with the TK Protocol, when new Traditional Knowledge is shared, both parties will collaboratively identify any new potential effects as well as any additional mitigation measures that may be required over the life of the Project. This RRDC elder-specific Kaska TK information may also help inform the Closure objectives.

BMC and Ross River Dena Council (in its role as lead community for the Kaska Nations, including Liard First Nation) are parties to an existing Socio-Economic Participation Agreement (SEPA) for the KZK Project. In 2019, BMC and RRDC signed a Letter of Intent committing the parties to a modernization process for the existing SEPA. In March 2021, BMC proposed a modernized SEPA to all Kaska leadership. The proposed SEPA includes provision for establishment of a Kaska/BMC Environmental Management Advisory Committee (EMAC). Under the current proposal before Kaska, this committee will be tasked with, among other things, reviewing and providing input into environmental management plans, reporting on implementation of those plans, reviewing monitoring plans/results, and reviewing incident reports and reporting back to Kaska members.

2.3.2 Liard First Nation

Since 2015 BMC has held community meetings in Watson Lake, met with Liard First Nation (LFN) Chiefs and Councils when possible, and hosted site tours with LFN government representatives and LFN Elders.

BMC signed an agreement with LFN in June 2019 that provided a mechanism for BMC to fund LFN activities, ranging from Project plan review to collection and sharing of non-confidential TK and TLU

information. The agreement provided funding to LFN to support a formal technical review of the Project, as well as the preparation and sharing of a summary TLU/TK report as well as an opportunity for BMC to review draft technical reports prior to submission to YESAB. At the time of preparing this RCP, LFN had not yet provided BMC with the draft TLU/TK report; however, LFN had provided YESAB with a detailed review of the Project Proposal and provided additional input to YESAB as follow-up to BMC's responses to YESAB. The original funding agreement has now ended, and BMC has offered additional capacity funding for LFN's continued participation in the licensing review process.

LFN's key concerns with respect to Closure, as expressed throughout the YESAB process, related to the potential for the site not to be reclaimed as per the Conceptual Reclamation and Closure Plan (presented in the Project Proposal (BMC, 2017)). The concern was that the land and water would not be returned to a state where Traditional land use activities could be resumed. BMC addressed the concerns through correspondence during the Environmental Assessment process and through efforts at ongoing consultation directly with LFN. In addition, this RCP provides additional details with respect to ensuring chemical stability of the site in the Closure and Post-closure phases of the Project. Based on the detailed information presented herein, BMC is confident that the defined Closure Objective "*To return the Project site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with Traditional Land Use (TLU) activities*" will be achieved.

As part of LFN's ongoing review of the Project, in November 2020 BMC's technical hydrology team met with LFN's technical hydrology consultants and much of the discussion focussed on the passive treatment systems described in this RCP.

BMC has committed to utilizing any LFN input made either directly to BMC, through the ongoing licensing process (as has been done arising from LFN's intervention response to the Project's Type A Water Licence application), or through the EMAC to inform detailed Project management plans and site operations over the life of the Project. Any additional commitments or modifications can be added to the next iteration of this RCP as per the two-year requirement for it to be updated.

2.3.3 Federal and Territorial

Engagement with Yukon and Canadian government agencies has been ongoing since acquisition of the Project in 2015. Between 2015 and 2024 staff from various territorial regulatory agencies, including Department of Energy, Mines and Resources (EMR), Yukon Water Board, Water Resources and Major Projects, as well as federal representatives from Fisheries and Oceans Canada and Northern Projects Management Office, participated in site visits.

Meetings with EMR around consultation processes for the Quartz Mining License (QML) took place prior to BMC submitting its application for the QML. BMC also met with staff from Water Resources to provide updates on the Project that have occurred since the original Project Proposal submission to the Yukon Environmental and Socio-Economic Assessment Board (YESAB) in 2017.

BMC has a regularly scheduled monthly meeting with Energy Mines and Resources to discuss the QML application and issues arising in the review process. The Executive Council Office Major Projects group also participate in these meetings.

2.3.4 Community and Non-governmental Organizations

BMC has regular informal engagement with community groups and provides regular updates through its newsletters and media releases.

While there has not been formal engagement with non-governmental organization groups in recent months, BMC has regularly met with Yukon Conservation Society (YCS) over the past 7 years to provide updates on the Project and to receive informal feedback. BMC understands that YCS was the recipient of federal funding to participate in the YESAB process. Primary concerns raised during meetings with YCS since 2017 have included: the preservation of water quality, stability of the Class A and B Storage Facilities and financial securities for the Project.

These concerns have been addressed through updated designs of the liner and cover systems of the Class A and Class B Storage Facilities resulting in associated improvements in the water quality predictions at Closure. The stability of the facilities was addressed through appropriate engineering and design of the facilities, which includes removal of unsuitable overburden material from the foundation of the facilities, and completion of a formal Risk Assessment in 2024 including participation from YG and YCS. The financial security costs have been updated (Section 9) and will be progressively updated every two years as Mine development advances.

2.3.5 Future Engagement

Future engagement will follow BMC's Consultation and Engagement Plan as referenced above.

As well, in addition to the EMAC described in Section 2.3.1, under the proposed SEPA BMC has also committed to formation of a Management Oversight Committee and a Heritage Management Committee comprised of Kaska and BMC membership. In addition, under the RRDC Elders Conditions of Consent, BMC has committed to funding and using Kaska Land Guardians as part of the overall environmental management program for the Project.

The Decision Document for the Project also requires the formation of the joint Yukon Government/Kaska Finlayson Caribou Herd Oversight Committee (FCHOC). While BMC is not a member of the FCHOC it will be required to provide information and updated management plans to the Committee for review and opportunity for input.

All of these provide formal avenues for engagement with Kaska in addition to ongoing community engagement efforts.

2.4 CLOSURE ALTERNATIVES

Mine development and closure planning teams have worked together to evaluate a range of options for the measures which are most consequential to the successful design and closure of the Project. Mine waste storage alternatives (Sections 2.4.1, 2.4.2, and 2.4.3) were evaluated by the planning team, with a particular focus on designing for Closure. Waste cover alternatives (Section 2.4.4) were also evaluated by the planning teams.

2.4.1 Tailings Disposal Methods and Locations

Cominco, the previous owner of the Project, conducted exploration, engineering design studies, baseline environmental studies, and consultation activities in 1994 to 1995 to support planned Project development. The Cominco Mine plan included ABM open pit mining for a nine-year Mine life, storage of approximately 72 million tonnes of waste rock, with tailings deposited in a subaqueous valley-fill tailings storage facility, which included a permanent earth fill tailings storage facility in Geona Creek.

Knight Piésold Ltd. was retained by BMC to undertake a Tailings Management Alternatives Assessment (KP, 2016a) to support Mine design decisions for input to the Prefeasibility Design Report (KP, 2016b). BMC subsequently expanded the alternatives assessment to support the Project Proposal (BMC, 2017a), in which considerations for closure featured prominently in the evaluation. The alternatives assessment is summarized below.

The Knight Piésold Ltd. study identified 13 potential tailings storage sites within approximately 10 km of the ABM Deposit. Two methods of tailings technology for each site were considered: slurry and filtered tailings. The tailings technology for each candidate site was selected based on site-specific constraints.

Pre-screening criteria were developed to evaluate and eliminate candidates with evident shortcomings (KP, 2016a). The four candidates remaining after the pre-screening were:

- A. Slurry tailings storage facility located in Geona Creek;
- B. Slurry tailings storage facility located in the East Hanging Valley;
- C. Filtered “dry stack” tailings storage facility located near the current exploration camp, at the confluence of Geona and Finlayson Creeks; and
- D. Filtered “dry stack” tailings storage facility located on the western hillside of Geona Creek.

BMC then evaluated these four final candidate sites and types of deposition alternatives against common performance criteria. A filtered tailings storage facility located on the western slope in the upper valley of Geona Creek ranks as the preferred alternative for this component. A summary of the assessment is presented in Table 2-2.

Table 2-2: Summary of Alternatives for Tailings Disposal Methods and Storage Locations

Mine Component Alternatives	Performance Criteria				Overall Rating Against Performance Criteria
Tailings Disposal Methods and Locations	Cost Effectiveness	Minimizes Effects on the Natural Environment	Maximizes Socio-economic Benefits	Amenability to Reclamation	-
A. Slurry tailings in Geona Creek	Preferred	Least Preferred	Acceptable	Least Preferred	-
B. Slurry tailings in East Hanging Valley	Acceptable	Acceptable	Acceptable	Least Preferred	-
C. Filtered tailings at confluence of Geona and Finlayson Creeks	Acceptable	Acceptable	Acceptable	Acceptable	-
D. Filtered tailings "dry stack", western hillside, Geona Creek	Acceptable	Preferred	Acceptable	Preferred	Preferred Option

2.4.2 Waste Rock Storage Facility Locations Alternatives

Waste rock generated from mining the ABM open pit and the underground workings will be geochemically characterized into three distinct categories, based on their comparative acid rock drainage and/or metal leaching (ARD/ML) potential. While the locations for the Class A and B Storage Facilities were selected according to their geochemistry-driven operations and closure requirements, the alternatives for location of the benign Class C Storage Facility were assessed as follows:

- A. Southern Lakes Class C Waste Rock Storage Facility; and
- B. Geona Creek Valley Class C Waste Rock Storage Facility.

The deposition of Class C waste rock in the Geona Creek valley was ranked as the preferred alternative for this component. A summary of the assessment is presented in Table 2-3.

Table 2-3: Summary of Alternatives for Waste Rock Storage Facility Locations

Mine Component Alternatives	Performance Criteria				Overall Rating Against Performance Criteria
Waste Rock Storage Facility Locations	Cost Effectiveness	Minimizes Effects on the Natural Environment	Maximizes Socio-economic Benefits	Amenability to Reclamation	-
A. Southern Lakes Class C Waste Rock Storage Facility	Acceptable	Least Preferred	Acceptable	Acceptable	-
B. Geona Creek Valley Class C Waste Rock Storage Facility	Preferred	Preferred	Acceptable	Acceptable	Preferred Option

2.4.3 Waste Rock Management Alternatives

Waste rock storage facilities, described above, will be developed according to their comparative geochemical characteristics. There are essentially two management alternatives that could be employed for a portion of one or more of the facilities:

- Construct and operate permanent facilities utilizing progressive reclamation during mining operations; or
- Deposit rock temporarily and re-handle back into the ABM open pit at closure, noting that bulking will make it impossible to fit all waste rock back into the pit.

The two alternatives were assessed as follows:

- Permanent surface deposition of all waste rock; and
- Temporary surface storage of some waste rock (re-handling waste rock at Closure).

Permanent surface deposition of all waste rock with the integration of progressive reclamation was ranked as the preferred alternative for this component. While the second option presents an effective closure approach for the waste rock that can be submerged in the pit, it has a number of issues that need to be recognized:

1. It would not allow for progressive reclamation, effectively deferring implementation of closure of waste rock storage facilities until the end of mine life and increasing the closure liability for the Project;
2. The deferral of progressive reclamation will also negatively impact the quality of water from the Class A Storage Facility during Operations. Water and oxygen access to stored material would be significantly increased, increasing oxidation of sulphide minerals and subsequent release of COPIs, which would increase the closure liability for the Project; and
3. The open pit would not provide enough space to submerge all waste rock. This means that some waste rock would have to remain in the waste storage facilities, or would be placed above the water level in the pit area that forms the headwaters of Geona Creek.

Future improvement and optimization evaluations will likely include consideration of submerged in-pit storage of a portion of the waste rock.

Table 2-4: Summary of Alternatives for Waste Rock Management

Mine Component Alternatives	Performance Criteria				Overall Rating Against Performance Criteria
Waste Rock Management	Cost Effectiveness	Minimizes Effects on the Natural Environment	Maximizes Socio-economic Benefits	Amenability to Reclamation	-
A. Permanent surface deposition of all Waste Rock Storage Facilities	Preferred	Preferred	Acceptable	Acceptable	Preferred Option
B. Temporary surface storage (re-handling waste rock at closure)	Least Preferred	Acceptable	Acceptable	Preferred	-

2.4.4 Waste Cover Alternatives

The overall objective for the waste rock and tailings facilities for the Project at Closure is to have safe and stable facilities that have limited environmental effects (particularly for water quality) and to respect TLU (see Section 7.4 for more information on closure objectives for these facilities). The Project planning team has undertaken an extensive geochemical characterization program that has informed the design and operational management plans for these storage facilities to achieve this overall objective. The geochemical testing is discussed in the Acid Rock Drainage and Metal Leaching Characteristics of Materials for Kudz Ze Kayah Project (Ensero, 2023a) and the operational design considerations are discussed in the Feasibility Design Report (KP, 2019a), which is summarized herein. These designs, in turn, inform the measures that are required at closure to ensure environmental protection and appropriate end land use for the Project area.

The key water quality risk to address in base metal sulphide deposits is the generation of net acidity and the leaching of metals under near neutral or acidic conditions. The approach to the control of water quality in this context is a hierarchical one. That is, the preferred control will always be to prevent generation of the problem at the source, i.e. to prevent or minimize the generation of ARD/ML potential at the source (i.e., in the waste rock or tailings). The second level of control is to manage the migration of contact water into the receiving environment. This may not always be possible to control completely, and therefore a third level of control (collection and treatment of contact water) may be required. The selection of the control measures considers both the risks and the benefits of each.

Specific to meeting the closure objectives related to preventing or minimizing ARD/ML, the alternatives considered for waste rock and tailings covers included control of contact water by:

- Use of a locally sourced compacted glacial till liner and cover system (base case);
- Use of a composite glacial till and bituminous geomembrane liner and cover system;
- Use of a composite glacial till and a high-density polyethylene (HDPE) geomembrane liner and cover system

- Use of a composite glacial till and linear low-density polyethylene geomembrane liner and cover system; and
- Use of a composite glacial till and geosynthetic clay liner and cover system.

An assessment of each alternative was completed against criteria of constructability, effectiveness in reducing infiltration (low permeability), geotechnical stability and cost, as presented in Table 2-5, with a composite glacial till and a high-density polyethylene (HDPE) geomembrane liner and cover system selected as the preferred alternative for this component.

Table 2-5: Summary of Alternatives for Waste Cover Systems

Mine Component Alternatives	Performance Criteria				Overall Rating Against Performance Criteria
Waste Cover System	Constructability	Permeability	Stability	Cost	-
A. Glacial Till Liner	Acceptable	Least Preferred	Preferred	Preferred	-
B. Bituminous Geomembrane Liner	Acceptable	Preferred	Preferred	Least Preferred	
C. HDPE Liner	Preferred	Preferred	Preferred	Acceptable	Preferred Option
D. LLDPE Liner	Preferred	Preferred	Preferred	Acceptable	
E. Geosynthetic Clay Liner	Acceptable	Preferred	Least Preferred	Acceptable	

Details of the cover design for the Class A, Class B and Class C Storage Facilities are summarized as follows:

- Both the Class A waste rock and tailings material are anticipated to have strong ARD/ML potential and will be co-disposed in the Class A Storage Facility (Ensero, 2023a). Class A waste rock and tailings will be placed on a composite liner constructed from compacted glacial till and high-density polyethylene (HDPE) geomembrane. As far as is practicable, the majority of the facility (excluding an appropriately sized working face/area) will be progressively covered and reclaimed during Operations with a composite cover system, also constructed from compacted glacial till and an HDPE geomembrane. Once the Closure phase commences the composite cover system will be completed over the surface that remains to be covered and reclaimed. The cover will be overlain by a layer of Class C waste rock as a frost protection layer. Growth media will then be placed over this to allow surface revegetation. Additional detail is provided in the Tailings Management Plan (BMC, 2024a);
- Class B waste rock is anticipated to have ARD/ML potential over the longer term (after cessation of mining activities) and will be managed in the Class B Storage Facility (Ensero, 2023a). The design of this facility includes the same composite liner and cover systems as the Class A Storage Facility. The cover will be overlain by a layer of Class C waste rock as a frost protection layer. Growth media will then be placed over this to allow surface revegetation. Additional detail is provided in the Waste Rock and Overburden Management Plan (BMC, 2024b). Similar to the Class A Storage Facility, the Class B Storage Facility will be the subject of progressive reclamation during the Operations phase of the Mine;

- Class C waste rock is non-PAG and has low ML potential (Ensero, 2023a). Class C rock will be a source of rock for construction during Operations and for reclamation during Closure. This rock will be used, for example, for the frost protection layers on the Class A and Class B closure covers. Areas of the Class C Storage Facility that were not progressively reclaimed during Operations will receive a cover of growth media to promote revegetation at Closure. Additional detail is provided in the Waste Rock and Overburden Management Plan (BMC, 2024b); and
- Progressive reclamation will be carried out on three Waste Storage Facilities (Class A, B and C) over the life of the Project. This reclamation will commence with the construction of the base of the facilities with appropriate liners, internal roads, tipping points and bund walls being installed prior to and during mining commencement to facilitate easy management and reclamation. The bulk earthworks portion of the progressive reclamation will be carried out by the mining fleet as part of the normal cycle of work which will ensure that dumps are appropriately formed, covered and revegetated as they are built. This modern approach to Mine reclamation has been proven to be the most cost efficient, and also improves site aesthetics and helps to control dust around the Mine site. In addition to that, it means that cover and revegetation techniques can be effectively trialed and monitored in the field well before commencement of the Closure phases. At the point of closure of the Mine, minimal shaping of the three facilities will be required and the areas requiring final cover and revegetation will be minimized. This approach will significantly reduce the reclamation risk and cost of Mine closure after the Operations phase of the Project.

2.5 RECLAMATION RESEARCH

An important component of the reclamation planning process is ongoing research to support implementation of a successful reclamation program. Reclamation research is, and will continue to be, focused in areas related to both the key and contingency closure methods planned for the site, as well as the planned adaptive management measures, which include:

- Detailed engineering and field-testing during Operations of the cover for the waste rock and tailings storage facilities;
- Progressive reclamation of the waste rock and tailings storage facilities during the Operations phase of the Mine life in a manner complementary with the field testing regime;
- Revegetation and erosion control; and
- Semi-passive water treatment technologies.

These closure measures have been selected based on mining industry experience, experience of BMC's management on other Mine projects, and site-specific conditions. A reclamation research program has been designed to provide proof of concept, information to inform detailed design, and/or to optimize reclamation techniques for the Project. The elements of this program are presented in this section. Some aspects of site reclamation such as progressive recontouring and erosion stabilization techniques are well established and are less reliant upon site-specific research for success.

Information developed on site will be supplemented with information obtained from other Mine reclamation programs in Yukon and other jurisdictions. Considerable research has been carried out into the reclamation and revegetation of disturbed lands in Yukon and similar northern environments, including operating and abandoned mines, and mineral exploration sites. Much of this information is in the public domain and is well presented in the guidance documents Mine Reclamation Guidelines in the Northwest Territories (INAC, 2007), and Yukon Revegetation Manual, Practical Approaches and Methods (Matheus and Omtzigt, 2013). BMC personnel have communicated with members of the Faro Mine Remediation Project, where similar methods of reclamation are currently being researched and implemented, and intend to continue learning from this large and complex reclamation project.

Research results and any related revisions to planned closure measures will be provided in regular RCP updates.

2.5.1 Waste Cover Systems

Composite cover systems are planned for the Class A and Class B Storage Facilities for long-term chemical stability. As discussed in more detail in Chapter 7 of the RCP, the Class A Storage Facility will employ a cover comprising the following:

- Approximately 0.50 m layer of compacted glacial till;
- Overlain by an 80 mil textured HDPE geomembrane;
- Overlain by approximately 0.50 m protection layer;
- Overlain by a minimum of 3.0 m of Class C waste rock for frost protection; and
- A final layer of approximately 0.30 m of growth media for revegetation.

The cover will be constructed progressively during Operations as the facility is expanded.

The Class B Storage Facility will receive the same cover system as the Class A Storage Facility. That is approximately 0.50 m layer of compacted glacial till overlain by an 80 mil textured HDPE geomembrane overlain by approximately 0.50 m protective layer that will be covered by a minimum of 3.0 m of Class C waste rock for frost protection, and approximately 0.30 m of growth media for revegetation. This cover system will be progressively constructed during Operations and completed during Active Closure.

The Class C Storage Facility does not require control for long-term chemical stability; the facility will be progressively reclaimed with approximately 0.30 m of growth media for revegetation during Operations and Active Closure.

The following tasks are underway or are planned during the life of Mine to finalize the cover designs and predict performance. Progressive reclamation will allow for waste cover system performance to be evaluated and revised as necessary during Operations.

- Cover material characterization including field confirmation of material quantities and properties to achieve the design cover performance of the compacted till layer;
- Updating geochemical modelling during operations to inform detailed design of the cover systems;
- Geotechnical material characterization of glacial till material to be used in the cover systems;
- A program to determine frost penetration depth line at the waste storage facilities. This will include collection of data from installed temperature (thermistor) and moisture (conductivity) sensor(s) to create a profile in the top 6.0 m below ground surface to determine depth and seasonal freeze/thaw pattern;
- Predictive modelling of cover performance during detailed design including climate, storage facility slopes and aspect, and testing of borrow materials to determine realistic short-term and long-term performance of Class A and Class B Storage Facility covers;
- Evaluation of options for performance monitoring, such as equipment to measure water ingress through the cover material and the temperature profile of the frost protection cover during progressive reclamation, to monitor and assess the covers during Operations, and Closure; and
- The Class A, Class B and Class C facilities require a growth media to provide appropriate substrate for revegetation and are designed to be covered with approximately 0.30 m of growth media based on typical rooting depths. The rooting depth will be checked during re-vegetation plot trials to determine if the planned 0.30 m can be reduced or needs to be augmented.

2.5.2 Revegetation

Successful and appropriate revegetation is a vital component of Mine closure and, as such, revegetation research is being undertaken by BMC in collaboration with Kaska to establish the best approach to regenerate vegetation covers on disturbed areas (Appendix B).

The ongoing revegetation research program includes (or is planned to include):

- Optimization of the revegetation species mixes, integrating TK for the area with Yukon revegetation guidance and commercially available native species;
- Collection of seeds and cuttings sourced from the Project site to carry out research to optimize species mixes, and germination and propagation techniques in a nursery, likely either in Ross River or at site;
- Preparation, seeding, planting, fertilizing, management, and monitoring research test plots on site; and
- Implementation and evaluation of progressive reclamation during Operations and Active Closure.

Plants require, as a minimum, a medium that will allow roots to penetrate, that will retain adequate moisture and that contains suitable levels of nutrients for successful growth. The natural vegetation found on undisturbed areas around the Project site generally provides information about the underlying soil properties required for successful revegetation, including texture, drainage, and pH, and the level of available nutrients. A soil sampling program was initially conducted in the Project site in 2015 and 2016. The results of this program provide the basic information required for reclamation planning.

Two research plots were established at the Project site (Appendix B) in 2018 and will be monitored for the duration of the Project. Additional reclamation research trial plots will be constructed during Operations to collect site-specific data to aid with the final reclamation treatments. Trial plots will be constructed after the first few years of operation, when there is sufficient material to evaluate the physical properties of the different storage facilities. The main disturbance areas that will be the focus for the research trials are the Class A, Class B, and Class C Storage Facilities as well as an area of unaffected surface disturbance as a control.

Probable initial trial sites during Operations will include the initial lifts on the Class A, B and C Storage Facilities. Trials will be constructed on flat and sloped surfaces for each disturbance area, as the closure goal will be to reclaim areas with varying surface slopes. Each trial site will examine a combination of different revegetation treatments to help outline the most effective and efficient closure treatment for the areas requiring reclamation.

Treatment options at sites will depend on the reclamation objectives for each reclamation unit, and may include:

- Plant species and seed ratios;
- Native seed and naturalized seed mix variations;
- Reseeding requirements;
- Willow staking;
- Scrub birch seedling planting and protection requirements;
- Soil and fertilizer amendment types and application rates; and
- Surface treatment and seeding and amendment application techniques.

Treatments at each trial site are divided into four subplots and assigned and replicated in each trial to ensure data is accurately representing the treatment variation. Analysis of the effect of each treatment option will be used to inform the final reclamation prescriptions.

A Terrestrial Ecosystem Map was developed to define and quantify specific habitat types in the bioclimatic zones of the vegetation in the Project area (AEG, 2016a). Plant species selection will be based on the Terrestrial Ecosystem Map vegetation associations and the appropriate edatopic grid (based on soil moisture and nutrient regime). More detail on the reclamation revegetation program at the Project site is presented in Section 7.1.2.

Trial plots will be monitored to compare relative percent cover, species composition, and height with respect to the seeding treatment and previous monitoring results. It is expected that for the first two to three years, individual species might not be distinguishable in the field and therefore only measurements such as percentage cover and height will be recorded. Additionally, composite soil samples and tissue samples will be periodically collected from trial sites and examined for metal concentrations to monitor the relative amount of metal uptake occurring at each site in comparison to the control site. Growth and succession will be recorded and reported annually, and modifications made to the progressive revegetation program as required. Design of the research program will take into consideration the results of Yukon University research initiatives where there are related programs. One specific area of research Yukon University has undertaken relates to soil amendments and their potential to assist with germination, nitrogen-fixing and the development of biological soil crusts, which may in turn improve seed germination and establishment of diverse vegetation communities. Research at the Project site will include homogenizing native soil crusts (i.e., the lichens, bryophytes, and topsoil layer) and applying the soil mix to reclamation trial plots. Soil amendment methods will be developed with the consideration of methods demonstrated to be successful in the Yukon College (now Yukon University) research by Stewart (2013), when reasonable and applicable.

In addition to the site specific reclamation research, BMC has contributed funds to RRDC's Local Plant Nursery Feasibility Study. BMC is supportive of a Kaska owned and operated local plant nursery/greenhouse. Using local species can have many advantages over non-native species as previously disturbed sites have a better chance of being restored to their pre-disturbance condition. In addition to environmental benefits, a nursery envisions many socio-economic advantages including:

- Employment and economic opportunities;
- Building human resources, relationships and expertise with local community; and
- Connect communities through engagement and new opportunities.

BMC would not only purchase seeds and seedlings from the Kaska owned nursery but would also source Kaska staff to come to the Project to collect the seeds and participate in the reclamation activities. Seed collection training programs were developed in 2020 in collaboration with Yukon University and Dena Cho. For a nursery project to be economically viable there needs to be a major anchor client such as the KZK Project. BMC will work with RRDC to advance the nursery project once all licences are in place for the Project.

BMC supported the Yukon University Mine Research Committee's revegetation research programs and is actively looking to support additional mine revegetation research through both the Yukon University and the University of Saskatoon.

As the Project progresses BMC is committed to ongoing engagement and collaboration with Kaska to further refine and implement the revegetation programs, including seeking advice on species of cultural importance that should be included in studies and research. Through this collaboration, the risk of traditional land users of avoiding the Project area in Post-Closure will be reduced.

2.5.3 ABM Lake In Situ Water Treatment

Following the cessation of Operations, the Fault Creek diversion (Section 7.2) will be removed, which will allow Fault Creek to return to its pre-mining channel and begin filling the ABM open pit, ultimately creating the ABM lake. Approximately 15 years after the cessation of mining, the ABM lake is predicted to overtop and discharge to Geona Creek (KP, 2024a). Water quality modelling of the ABM lake chemistry suggests that without treatment concentrations of cadmium, copper, lead, selenium, uranium, and zinc will be present at levels that exceed water quality objectives (WQOs) and will require treatment prior to discharge (Ensero, 2024; Ensero and Minnow, 2024). Therefore, source control for the ABM lake is planned in the form of in situ treatment.

The planned in situ treatment involves injection of a calculated amount of soluble organic carbon (e.g., glycerol) into ABM lake, which stimulates indigenous bacteria to produce sulphate-reducing conditions in the water column. The dissolved sulphide produced under such conditions will react with chalcophile metals (elements with an affinity for forming metal sulphides) such as cadmium, copper, lead and zinc to form insoluble metal sulphide precipitates. The reducing conditions will also promote the reductive precipitation of selenium and uranium (e.g., as uraninite and elemental selenium).

In situ water treatment has been successfully employed at other cold climate sites in North America to significantly lower metal concentrations [e.g., Sweetwater, Wyoming (Harrington, 2002); Barite Hill, South Carolina (Harrington et al., 2009); and Anchor Hill, South Dakota (Harrington et al., 2004)]. The planned treatment requires refinement and proof-of-concept testing using local materials (e.g. ABM waste rock, local soil) and representative water chemistry to refine the treatment application methods, materials, and dosage quantities. Ensero (formerly Alexco Environmental Group) was retained to conduct pilot-scale tests to validate the site-specific application of in situ treatment, and to further refine the treatment materials and dosages (Appendix C). Pilot-scale testing consisted of eight 200 L plastic barrels each containing 10 kg of composite waste rock and 200 L of synthetic ABM lake water. Trials differed in the amount of soil amendment added (10 g vs. 10 kg), constituents of potential interest (COPI) concentrations (water quality model inputs vs. 10 times the water quality model inputs), carbon dosing (regular or high) and temperature (room temperature or 5°C).

The objectives of the pilot-scale tests were to:

- Demonstrate that in situ treatment is capable of lowering the COPI concentrations in ABM lake;
- Confirm that the degree of constituent removal observed in the testing is consistent with that assumed in the water quality modelling for ABM lake in situ treatment;
- Obtain information on the appropriate carbon dosage for ABM lake in situ treatment; and
- Assess the longevity of in situ treatment events to provide information on the likely required frequency of carbon amendment to ABM lake in the early years of closure.

Pilot-scale test work was performed to evaluate the organic carbon dosage and the effects of soil amendment and temperature on the efficacy of the planned in situ water treatment. This included

eight trials which were performed using 200 L barrels containing synthetic water designed to replicate the modelled chemistry of ABM lake, amended with crushed waste rock reflecting the final exposed open pit surfaces. Stage 1 of the test work operated for 34 weeks; during which glycerol was added to the trials to assess COPI removal under reducing conditions. The results from Stage 1 test work indicated that:

- Organic carbon amendment (as glycerol) of synthetic ABM lake water resulted in the development of sulphate-reducing conditions which in turn resulted in reduction of antimony, cadmium, copper, lead, selenium, uranium, and zinc concentrations
- The addition of 10 kg of local soil to selected trials resulted in COPI treatment results comparable to those trials that received only a small soil inoculum dose of local soil (10 g), however, following re-oxidation, sustained COPI concentration reduction via sorption on the larger soil mass was observed for these experiments;
- At lower temperatures (5°C), reducing conditions were slower to be established, due to slower microbial metabolism at the colder temperatures, which was reflected in the slower decrease of COPIs compared to those trials operating at room temperature;
- The level of COPI removal assumed in the ABM lake water quality model (Ensero, 2024) was confirmed by the in situ treatment trial; and
- The in situ trials demonstrated establishment of a diverse population of sulphide-producing, selenium-reducing, and uranium-reducing bacteria with the addition of carbon, thereby supporting the observation of microbially catalyzed COPI removal in the trials. Establishment of the bacteria was not inhibited by colder temperature or by higher COPI concentrations that were also tested.

As expected, arsenic removal was not observed under the reducing conditions during Stage 1. Therefore, ferric iron dosing was investigated in Stage 2 of the in situ treatment trials over a 12 week period. Ferric sulphate was added using 10:1 and 20:1 iron to arsenic ratios (by mass) to the pilot-scale barrel trials, both before or after carbon addition, to evaluate arsenic removal in the presence of elevated iron under both oxidizing and reducing conditions. These experiments indicated:

- Addition of ferric iron resulted in a maximum removal of approximately 40% to 65% of dissolved arsenic from the water;
- The higher iron to arsenic ratio (20:1) improved removal of dissolved arsenic, suggesting that overall removal of total arsenic may be further improved with an extended settling time;
- Lower temperature did not affect the overall arsenic removal observed;
- Although the order of ferric and carbon dosing did not appear to influence the maximum total arsenic removal observed, greater removal of dissolved arsenic was observed when ferric iron was first added under oxidizing conditions prior to the transition to reducing conditions after carbon amendment;
- Additional arsenic sequestration in reducing systems likely occurs via incorporation into iron sulphides in the presence of iron, which can also polish arsenic concentrations as the system

begins to re-oxidize, perhaps through sorption on iron (oxyhydr)oxides that start to re-precipitate; and

- Ferric iron addition under oxidizing conditions resulted in no to minor reduction of other COPIs; however, subsequent transition to reducing conditions resulted in improved reduction of cadmium and copper at the highest iron dose.

Given the lower than expected arsenic removal observed, smaller bench-scale (Stage 3) trials were conducted using 1.5 L of synthetic ABM lake water amended with ferric iron at 10:1 and 20:1 iron to arsenic ratios (by mass). These trials were sampled over seven days and showed 50% and 90% total arsenic removal for the 10:1 and 20:1 iron to arsenic ratio experiments, respectively. Improved mixing in these bench-scale trials likely explains the higher arsenic removal observed than in the larger pilot-scale barrel trials.

Based on the pilot-scale test work, ferric iron addition is considered a contingency should arsenic levels measured during filling of ABM pit require treatment. Similarly, addition of soil material to aid COPI removal via sorption or placement of Class C waste rock in ABM pit to provide acid neutralization may also be considered as contingency options if required.

Additional research to take place during Operations will include studies to collect supporting information for in situ water treatment including hydrodynamic pit lake modelling which incorporates water balance updates informed by site data (precipitation, climate change, ABM pit shell, groundwater, local runoff etc.).

ABM lake is expected to take approximately 15 years to fill before it begins to discharge to Geona Creek. Water quality monitoring of the ABM lake will occur as it fills so as to monitor its chemistry, to help direct the optimal location and timing of in situ treatment, and to determine whether additional treatment events are required to maintain low COPI concentrations that are expected to peak in the first year of flooding as the more reactive, metal-leaching rock facies are located in the lower portion of the ABM pit which release their accumulated soluble load to the small volume of water in the pit. COPI concentrations are then anticipated to decline over the following year due to dilution before stabilizing or rising slowly as the pit fills.

2.5.4 Constructed Wetland Treatment Systems

Contingency measures, if the objectives for ABM lake treatment are not met, include a constructed wetland treatment system (CWTS). Water quality modelling indicates that water quality in the receiving environment will typically meet the water quality objectives without further treatment (Ensero, 2024; AEG & Minnow, 2024); however, the CWTS continues to be tested and optimized as it may function to further improve water quality, although is not needed or intended as a primary treatment mechanism.

Following an initial evaluation of the feasibility of implementing a CWTS at the Project site, a phased approach to design the CWTS was implemented in 2015 and Contango Strategies Ltd. (Contango), was retained to undertake the phased design. The planned approach includes five phases of design and implementation of a CWTS including:

- Phase 1a: Information gathering and site assessment;
- Phase 1b: Conceptual design and sizing;
- Phase 2: Off site bench-scale testing and optimization;
- Phase 3: Off site pilot-scale testing and optimization;
- Phase 4: On site demonstration-scale design and monitoring; and
- Phase 5: Full-scale implementation.

Information gathering and site assessment (Phase 1a) was completed in 2016 (Contango, 2016). Conceptual design and sizing was completed in 2017 (Contango, 2017). Off site bench and pilot scale test work was initiated in 2018. Details of the Phase 2 and 3 test work completed to date are provided in Appendix D. The objectives of the off site bench and pilot scale CWTS test work are to refine the sizing of the full scale CWTS and the expected CWTS outflow water quality in the event that the CWTS is needed. Phase 4 will be conducted during Operations.

2.5.4.1 Contingency

Condition #4 of the Decision Document issued on June 15th, 2022, requires that: *“The Proponent shall implement additional treatment options if the proposed CWTS cannot be demonstrated to reduce COPI concentrations to levels that are consistently below the defined regulatory thresholds.”* As described above the CWTS has become a contingency measure to the Project at closure. However, if water quality monitoring shows that this contingency measure is not achieving the intended outcome, then additional treatment options would be implemented.

3 CLOSURE OBJECTIVES AND DESIGN CRITERIA

Section 2.1 identified the framework and process used to develop “on the ground” closure measures that can be demonstrably linked back to the closure goals for the site. The broader closure goals are broken down into a number of objectives, the attainment of which through specific measures will indicate achievement of closure goals. Closure objectives are statements that clearly describe what the selected closure measures aim to achieve. They must be achievable and must allow for the development of measurable closure criteria. Objectives are short-term, concrete, stepping-stones toward achieving a goal and should be specific, appropriate and realistic. The purpose of implementing performance-based objectives is to encourage research and innovation resulting in cost-effective applications while ensuring public health and safety and environmental protection are met (YG, 2013).

3.1 RECLAMATION AND CLOSURE OBJECTIVES

The development of the reclamation and closure objectives for the Project start with the fundamental objectives established in YG, 2013 (Table 3-1).

These fundamental objectives form the basis for the development of Project-specific and component/facility specific objectives for the Project in Post-closure. These are presented in Chapter 7.

Table 3-1: Fundamental Mine Reclamation and Closure Objectives (YG, 2013)

Value	Reclamation and Closure Objectives
Physical Stability	All Mine-related structures and facilities are physically stable and performing in accordance with designs. All Mine-related structures, facilities and processes can withstand severe climatic and seismic events.
Chemical Stability	Release of contaminants from Mine related waste materials occurs at rates that do not cause unacceptable exposure in the receiving environment.
Health and Safety	Reclamation eliminates or minimizes existing hazards to the health and safety of the public, workers and area wildlife by achieving conditions similar to local area features. Reclamation and closure implementation avoids or minimizes adverse health and safety effects on the public, workers and wildlife.
Ecological Conditions and Sustainability	Reclamation and closure activities protect the aquatic, terrestrial and atmospheric environments from Mine-related degradation and restore environments that have been degraded by Mine-related activities. The Mine supports a self-sustaining biological community that achieves land use objectives.
Land Use	Lands affected by Mine-related activities (e.g., building sites, chemical and fuel storage sites, roads, sediment ponds, tailings storage facilities, and waste rock storage areas) are restored to conditions that enable and optimize productive long-term use of land. Conditions are typical of surrounding areas or provide for other land uses that meet community expectations. Site access is consistent with community land use expectations.
Aesthetics	Restoration outcomes are visually acceptable.
Socio-economic Expectations	Reclamation and closure implementation avoids or minimizes adverse socio-economic effects on local and Yukon communities, while maximizing socio-economic benefits. Reclamation and closure activities achieve outcomes that meet community and regulatory expectations.
Long-term Certainty	Minimize the need for long-term operations, maintenance and monitoring after reclamation activities are complete.
Financial Considerations	Minimize outstanding liability and risks after reclamation activities are complete.

3.2 DESIGN CRITERIA

A key principle in the reclamation planning for the Project is design for closure. Success in applying this principle to the closure planning in turn supports other principles and fundamental closure objectives related to minimizing activities required at closure and reducing associated risks and liabilities.

Specific design criteria related to Project closure and Mine components (i.e. ABM open pit, waste rock storage facilities, etc.) are presented in Section 7. These criteria have largely been developed by the Project engineering team and presented in the Feasibility Design of Tailings Waste and Water Management Facilities report (KP, 2019a).

4 ENVIRONMENTAL DESCRIPTION

4.1 REGIONAL SETTING

The Project is located in the Boreal Cordillera Ecozone, situated in a transitional climatic zone bordering on three different ecoregions: Yukon Plateau to the north, Liard Basin to the east, and Pelly Mountains ecoregion to the south (Smith et al., 2004). The Project footprint is in the northern portion of the Pelly Mountains ecoregion (Figure 4-1). The major part of the Pelly River ecoregion is underlain by metamorphic rock; however, large bodies of volcanic and intrusive rocks and small bodies of sedimentary rocks occur throughout.

The planned Project infrastructure is primarily situated from an elevation of 1,300 masl to approximately 1,550 masl (Figure 4-2).

The Project is situated in the upper Geona Creek valley, which is surrounded by larger steeper sided mountain slopes. A series of shallow wetlands occur along Geona Creek due to historical beaver dams in the valley bottom. Side valleys east of the Geona Creek valley are relatively broad and 'U-shaped'. Tributaries, such as Fault Creek, are high velocity streams that have incised the mountain slopes before depositing sediment into Geona Creek.

At higher elevations, dwarf shrubs, graminoids, and herbs dominate; boreal forests are more prevalent at lower elevations. White spruce (*Picea glauca*) and black spruce (*Picea mariana*) are the most common tree types. Black spruce is usually dominant in wetter areas, while white spruce dominates in drier areas. Paper birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), and lodgepole pine (*Pinus contorta*) also occur; sub-alpine fir (*Abies lasiocarpa*) occurs at the treeline (1,350 masl to 1,500 masl). In dense coniferous stands, feathermoss dominates the understorey; however, in more open areas willow (*Salix* spp.) and heath-like shrubs become prevalent. Sedge or sphagnum tussocks are common in wetlands and under black spruce. Scrub birch (*Betula glandulosa*) and willow occur in the subalpine and extend well above the treeline.

The Project area is in the "Extensive Discontinuous Permafrost Zone". Permafrost has been encountered under the organic layers that cover the Geona and Finlayson valleys. Permafrost is typically located under poorly drained areas, cool aspects, and upper elevations. Permafrost related ground movement or solifluction is apparent on upper to middle elevation slopes.



LEGEND:

RIVERS / STREAMS

WATERBODIES

0 10 20 30 40 Kilometers

NOTES:

1. DIGITAL ELEVATION MODEL CREATED BY THE YUKON DEPARTMENT AND OBTAINED FROM GEOMATICS YUKON. CANVEC COMPILED BY NATURAL RESOURCES CANADA.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:500,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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KUDZ ZE KAYAH PROJECT

PROJECT LOCATION

Knight Piésold CONSULTING

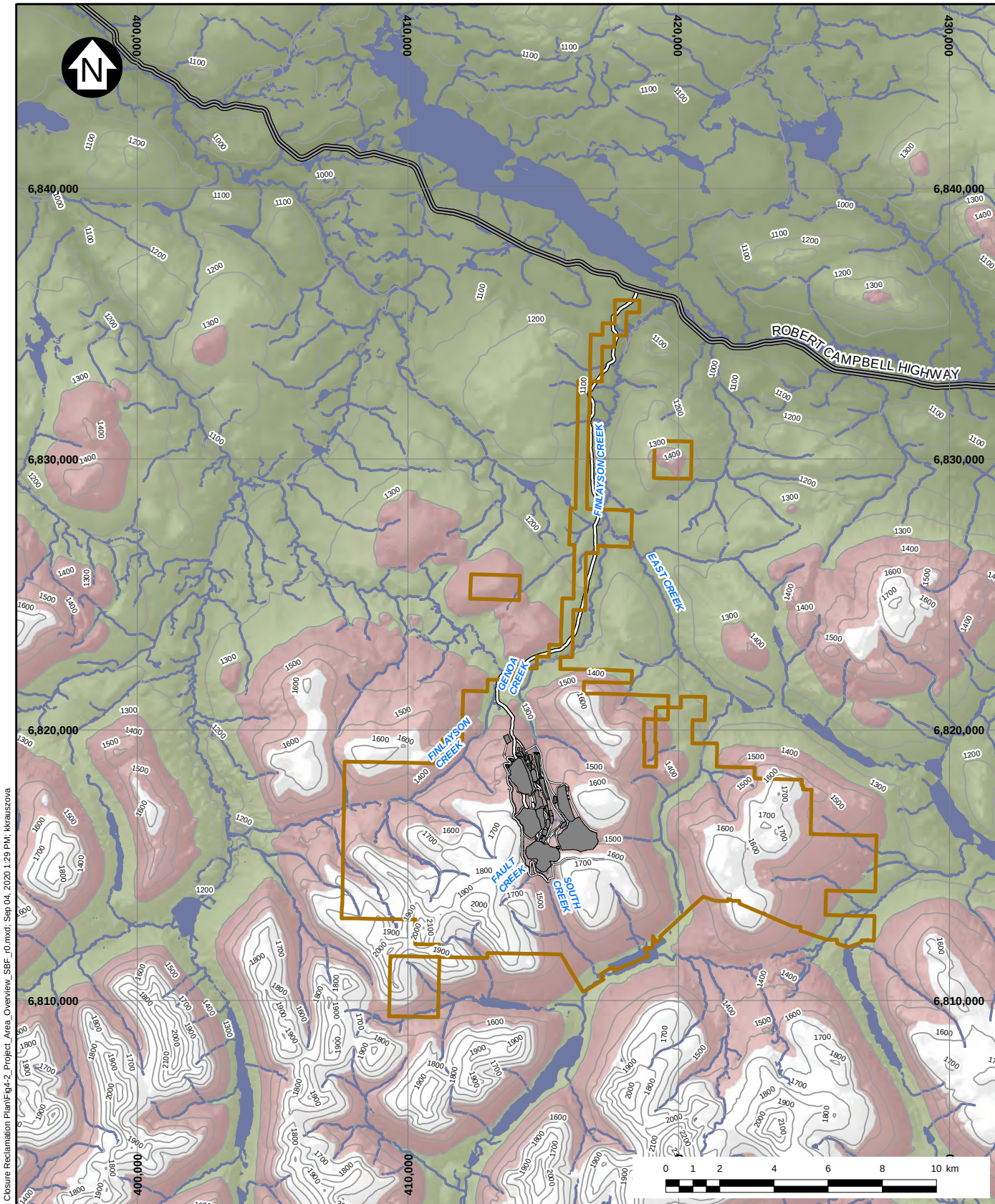
PIA NO.
VA101-640/11

REF NO.
6

REV
0

FIGURE 4-1

0	04SEP'20	ISSUED WITH REPORT	WOG	SBF	GLS
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED



LEGEND:

- CONTOUR (100 m INTERVAL)
- WATERBODIES
- RIVERS / STREAMS
- PROPOSED MINE INFRASTRUCTURE
- BMC MINERALS (NO. 1) LTD MINERAL CLAIM AREAS
- BIOCLIMATE ZONE:
 - BOREAL HIGH (850-1300M)
 - SUBALPINE (1300-1550M)
 - ALPINE <1550M

NOTES:

1. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 9N.
2. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:200,000 FOR 8.5x11 (LETTER) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.



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KUDZ ZE KAYAH PROJECT

PROJECT AREA OVERVIEW



PIA NO.
VA101-640/11

REF NO.
6

FIGURE 4-2

REV
0

REV	DATE	ISSUED WITH REPORT	DESCRIPTION	WOG DESIGNED	CJV DRAWN	GLS REVIEWED
0	04SEP20	ISSUED WITH REPORT				

Regionally significant wildlife resources occur in the Project area. The area surrounding the Project forms part of the extensive regional habitat used by the Finlayson caribou herd from spring to fall, while the Pelly River lowlands are part of the area used by the herd in the winter. Caribou (*Rangifer tarandus*) provide a valuable food source for the Kaska and are also of economic significance to sport hunters and the guiding industry. Moose (*Alces alces*) are also a significant wildlife resource and are found in all habitats (except alpine habitat) throughout the Project area. Furbearer populations are also prevalent. Waterfowl use the wetlands in the upper Geona Creek valley for nesting and foraging. Cliff-nesting raptors nest on rock outcrops and many species of songbirds utilize the various habitats throughout the area. Fish in the Liard River watershed include Arctic grayling (*Thymallus arcticus*), whitefish (*Coregonus clupeaformis*), lake trout (*Salvelinus namaycush*), and Dolly Varden (*Salvelinus malma*).

4.2 CLIMATE

The climate of the Project is described using regional data available through Environment and Climate Change Canada and Environment Yukon, as well as data collected at site in 1995 and from 2015 to March 2023 (Ensero, 2023b). Two meteorological stations were established in the Project area during 1995; one high and one low elevation station. A Campbell Scientific meteorological station was installed and commissioned at the Project site on August 25, 2015, for the measurement of air temperature, relative humidity, wind speed and direction, barometric pressure, solar radiation and total precipitation. An evaporation pan was also installed, and daily manual measurements were taken during the open water seasons of 2016 and 2017. The evaporation pan had an automated system installed in June 2018. Manual snow surveys were conducted in 1995, and monthly (January, February, March and April) from 2016 to 2019 and in March from 2020 to 2023.

The Project area has a typical northern interior climate, with cool and short summers and long and very cold winters. The mean annual temperatures at regional stations ranged from -4.7°C at Ross River to -2.2°C at Swift River Station, and extreme annual temperatures ranged from -59.4°C at Ross River in December to 35.4°C at Watson Lake in July.

Monthly average minimum, maximum, mean and extreme temperatures are compiled from the hourly data collected at the Project's Campbell Scientific station since time of commissioning (September 2015). The mean annual temperature recorded at Kudz Ze Kayah has ranged from -0.8°C to -3.6°C.

Mean annual precipitation at regional stations ranged from 210 mm at Ross River to 710 mm at Ketza River Mine; the proportion of total annual precipitation falling as rain ranged from 39% at Ketza River Mine up to 70% at Ross River and Faro. The greatest amount of precipitation generally falls between June and September for all regional stations.

Long-term records do not show clear trends in terms of total precipitation over time; however, the proportion of total precipitation falling as rain has displayed an increasing trend at all stations, consistent with the rising trends observed in air temperature. Total annual measured precipitation at Kudz Ze Kayah between 2016 and 2022 ranged from 217.7 mm to 333.4 mm, noting that 2017 and 2018 had missing data and their annual totals were not considered.

4.3 SURFACE WATER

4.3.1 Water Quantity

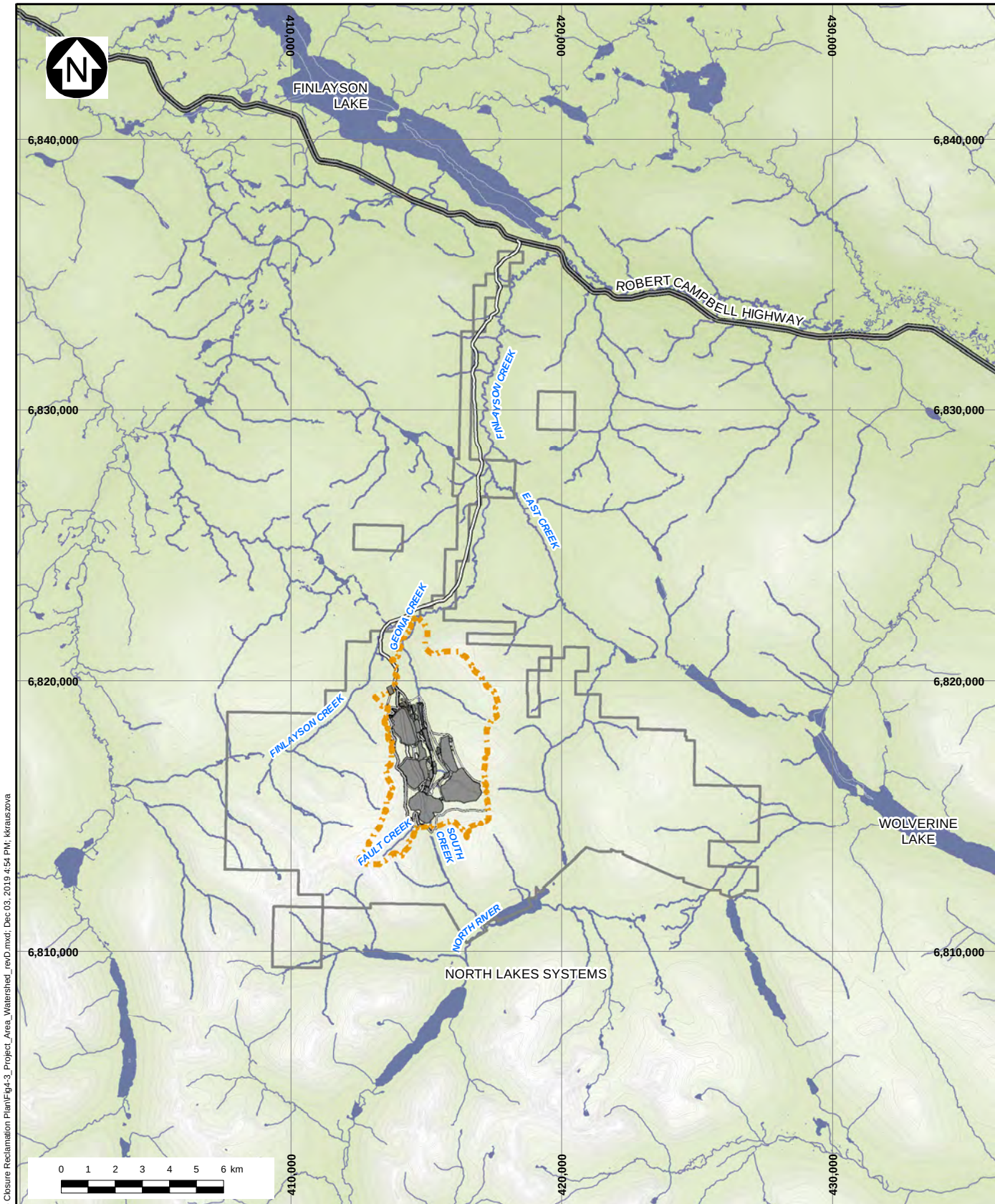
The Project lies in a small watershed called Geona Creek, which is a north flowing and north facing tributary to Finlayson Creek (Figure 4-3). Finlayson Creek meets the outflow of Finlayson Lake below the Robert Campbell Highway and flows east to eventually join the Frances River, and ultimately, the Mackenzie River. One of the highest elevation tributaries in Geona Creek is Fault Creek, which has a median elevation of 1,708 masl, and a catchment area of approximately 2 km². Fault Creek is characterized by steep slopes, and small trees and shrubs in the creek valley, but otherwise is an alpine environment. Geona Creek has a median elevation of 1,479 masl and spans from the alpine to sparsely forested areas at lower elevations. The Finlayson Creek catchment area is approximately 35 km² above the confluence with Geona Creek and grows to 211 km² where it flows under the Robert Campbell Highway shortly before it joins the outflow of Finlayson Lake. The watershed divide of Geona Creek is characterized by several small ponds.

Hydrometric data were first collected on site in 1995. Seven continuous monitoring stations were installed in May 2015 and discrete monthly discharge data were gathered to facilitate the development of a continuous record. The current monitoring network consists of 12 active stations (one station was discontinued in March 2017).

The hydrometric data collected between 2015 and 2023 indicate that peak flows typically occur in May in the smaller catchments, though they can occur in summer months in years when snow melt generated peak flows are less significant. Low flows occur late winter in March, April or even early May depending on the melt cycles and snowpack in any given year. None of the creeks have been observed to freeze completely and some flow has been observed in all months of the 2015 through 2023 monitoring program. Smaller catchments tend to peak earlier than large regional rivers. It was also observed that higher flows in September are likely driven by precipitation, which has a greater relative impact in small creeks than larger rivers as the large regional sites tend to dampen the effect of more localized rain events (Ensero, 2023b).

4.3.2 Water Quality

The surface water monitoring program currently consists of monthly water quality sampling at twelve surface water stations located on South Creek, Fault Creek, Geona Creek, Finlayson Creek, and East Creek. The most recent baseline report (Ensero, 2023c) presents the data collected between April 2015 and March 2023. These data were combined with the historic Cominco water quality surveys conducted in 1994 to 1995 and subsequent biennial sampling, as required by the water licence, conducted between 2002 and 2016 to evaluate the natural background chemistry of the major watercourses located at the Project. All creek waters were circumneutral to mildly alkaline (pH 6.4 to 8.7; median 7.7), with hardness ranging from moderately hard (South Creek and Fault Creek) to hard (Geona Creek) to very hard (Finlayson Creek and East Creek).



LEGEND:

- CONTOUR (100 m INTERVAL)
- WATERBODIES
- RIVERS / STREAMS
- PROPOSED MINE INFRASTRUCTURE
- BMC MINERALS (NO. 1) LTD MINERAL CLAIM AREAS
- TOTE ROAD/PROPOSED ACCESS ROAD
- PROPOSED MINE ROAD
- GEOVA CREEK CATCHMENT

NOTES:

1. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 9N.
2. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:200,000 FOR 8.5x11 (LETTER) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.



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KUDZ ZE KAYAH PROJECT

PROJECT AREA WATERSHED



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FIGURE 4-3

REV
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D	03DEC19	ISSUED WITH REPORT	WOG	SBF	GLS
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED

Water quality was compared against the most recently revised water quality guidelines for protection of aquatic life established by the Canadian Council of Ministers of the Environment (CCME) or British Columbia Ministry of Environment and Climate Change Strategy (BC ENV). Comparison to the guidelines indicated sporadic natural exceedances for dissolved oxygen, fluoride, phosphorus, aluminum, arsenic, cadmium, chromium, copper, iron, selenium, and zinc. In general, more water quality guideline exceedances were noted for total metal concentrations than their dissolved counterparts, suggesting that a significant portion of the metals were particulate-bound, especially during freshet and/or other periods characterized by elevated total suspended solids levels. The much less frequent water quality guideline exceedances observed for dissolved metals is important since it is the dissolved fraction that is the most bioavailable.

Higher total metal concentrations were measured during spring freshet due to the high run-off and associated stream flow which increased the particulate content of the streams. The exceptions to this trend were concentrations of fluoride, total selenium, uranium, and hardness, which were lowest during spring freshet and summer. Selenium, uranium, and hardness concentrations rose throughout the late fall and winter months, suggesting that groundwater is an important contributor to the surface water concentrations of these constituents. Elevated concentrations of these constituents were observed in shallow groundwaters of the Project area.

A comparison of the 1994-1995 water quality dataset with the more recent baseline water quality monitoring dataset indicated that the majority of constituents shared a similar concentration range. This suggests that for the most part there were no material differences between the two datasets, the exceptions being total selenium and total chromium, which may be attributable to differences in sampling frequency, flow conditions at the time of sampling, and laboratory pre-concentration techniques used to improve the detection limits of these two elements in the historical dataset (Ensero, 2023c).

4.4 GROUNDWATER

4.4.1 Groundwater Quantity

The hydrogeologic units in the Project area are bedrock and overburden (Ensero, 2023d). The overburden consists of two subunits:

- Fine-grained lower permeability sediments composed of silts and fine sands; and
- Coarse-grained higher permeability sands and gravels.

In the depth range of 10 m to 70 m below ground surface, the bedrock hydraulic conductivity generally ranges from 1×10^{-7} m/s to 1×10^{-5} m/s and does not appear to exhibit a trend of increasing or decreasing hydraulic conductivity with depth. The geometric mean of short-term tests conducted in bedrock is 1.2×10^{-6} m/s, which is similar to the results of a longer-term bedrock pumping test (1.7×10^{-6} m/s).

For tests conducted in the fine-grained overburden, the measured hydraulic conductivities have a geometric mean of 5.2×10^{-6} m/s. The geometric mean hydraulic conductivity of the coarse-grained overburden is 1.3×10^{-4} m/s.

Continuous groundwater level monitoring was conducted in eight monitoring wells across the site from mid-November 2015 through March 2023. The water levels in both bedrock and overburden wells exhibited the following seasonal trends:

- Rising water levels through the summer months (late April/early May to September);
- Peak water levels reached between June to August to October, depending on the year;
- Falling water levels through the winter months (approximately October to April); and
- Lowest levels reached between April or May, depending on the year.

In most monitoring wells, the maximum-minimum water level difference ranged between 2 m and 8 m; the maximum observed difference was 16.5 m.

4.4.2 Groundwater Quality

Project wide, the groundwater field pH ranged from circumneutral to slightly acidic to alkaline (5.7 to 9.4, for both bedrock and overburden wells (Ensero, 2023d)). Monitoring wells MW15-10S and MW15-10D had the lowest pH values compared to the average field pH (5.8 to 6.5, and 5.8 to 7.4 pH range, respectively) and are likely recharged by the same source as the KZ-9 east seep.

Water quality results were compared against the Yukon *Contaminated Sites Regulation* (YG, 2002) standards, which indicated exceedances for dissolved cadmium, arsenic, cobalt, and zinc. Dissolved iron concentrations were also higher than federal interim groundwater quality guidelines in several wells (often bedrock wells) across the site partly due to the reducing conditions prevailing at those wells. Concentrations of other anions, nutrients, and metals did not typically show marked differences between overburden and bedrock aquifers. In general, dissolved selenium concentrations were higher in shallower overburden wells but no clear pattern was evident for other constituents.

Groundwater sampled in the planned ABM open pit area had generally higher anion, nutrient, and metal concentrations than groundwater sampled elsewhere in the study area. Groundwater concentrations of arsenic, cadmium, copper, lead, and zinc were elevated in the planned ABM open pit area relative to the rest of the study area, which is likely due to the subsurface mineralization present in this area. Additionally, sulphate concentrations were typically more elevated within the planned ABM open pit area, likely due to the oxidation of the sulphidic minerals in the ABM Deposit.

4.5 VEGETATION

4.5.1 Terrestrial Ecosystems

A Terrestrial Ecosystem Map was developed to define and quantify specific habitat types in the bioclimatic zones of the vegetation in the Project area (AEG, 2016a). From this mapping three bioclimatic zones were identified (Boreal High (40%), Boreal Subalpine (40%), and Alpine (20%)).

Boreal forest ecosystems are gradually replaced by the subalpine plant communities as elevation increases. This is commonly a matrix of scrub birch and willows with an occasional stunted subalpine fir. Meadows also occur in the subalpine zone, populated by grasses, sedges, mosses, and a variety of forb species. On the top of mossy hummocks, the dwarf ericaceous shrubs persist, and Labrador tea exists. The lower and mid slopes of the subalpine valleys contain sparse subalpine fir and white spruce forests.

The Alpine bioclimatic zone is characterized by limited soil and harsh climatic conditions. Therefore, small, low-growing plants such as sedges, grasses, forbs, and dwarf shrubs persist at alpine elevations. Dwarf shrubs are an assemblage of ericaceous plants consisting of four-angled mountain heather (*Cassiope tetragona*), bog blueberry (*Vaccinium uliginosum*), lingonberry (*Vaccinium vitis-idaea*), crowberry (*Empetrum nigrum*), and bearberry (*Arctostaphylos rubra*). Other low growing shrubs that were often observed at these high elevations included: mountain aven (*Dryas integrifolia*), willow species (*Salix arctica*, *reticulata*, and *polaris*), and diminutive scrub birch.

A total of 27 vegetation communities were defined and are described in Appendix A of the Baseline Vegetation Report (AEG, 2016a). The Project area and associated infrastructure is primarily situated in the subalpine bioclimatic zone, from an elevation of 1,300 masl to approximately 1,550 masl, with the open pit anticipated to extend to the lower range of the alpine zone. Table 4-1 is a summary of the vegetation communities that are found within the proposed Project infrastructure. The Project infrastructure will affect most of the vegetation communities with the following communities being the most impacted in area by the proposed facilities: Subalpine – Scrub birch-Willow-Feathermoss (01) including the fir association (01SZ), Subalpine – Scrub birch-Willow-Crowberry (23) and Subalpine – Scrub birch-Lichen (11) (Table 4-1).

The riparian systems in the Project area are composed of two types: slow flowing creek/fen complexes with associated wetlands, or faster flowing creeks confined to deep valleys with definitive floodplains, such as Finlayson Creek. The riparian systems associated with slow flowing creeks contain organic substrates derived from sphagnum mosses and graminoids. Acid tolerant plants such as Labrador tea, bog blueberry, and cloudberry (*Rubus chamaemorus*) grow amongst the moss hummocks. The second type of riparian system has a rocky substrate; comprising sediment composed mostly of gravel, cobbles and boulders. The vegetation associated with this system is tall willows, balsam poplar, and white spruce on upper terraces.

Table 4-1: Summary of Ecosystems located within Project Facilities

Facility	Site Unit Code	Plant Association	Plant Association Code	Soil Moisture Regime	Soil Nutrient Regime	Area (ha)
	01	Subalpine – Scrub birch-Willow-Feathermoss	EsWiFM	4	C	3.7

Facility	Site Unit Code	Plant Association	Plant Association Code	Soil Moisture Regime	Soil Nutrient Regime	Area (ha)
Class A Storage Facility	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FEsWiFM	4	C	14.0
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	6.3
	23	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	37.9
	31	Subalpine – Fir-White spruce-Labrador tea-Scrub birch-Feathermoss-Lichen	FSwRhEsFmLi	5	B	4.7
	35	Subalpine – Willow-Horsetail-Forbs-Grass	WiEqFbGr	5	C	0.8
	TA	Talus	n/a	n/a	n/a	1.0
Class B Storage Facility	01	Subalpine – Scrub birch-Willow-Feathermoss	EsWiFM	4	C	22.2
	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FEsWiFM	4	C	13.0
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	2.9
	23SZ	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	14.2
	35	Subalpine – Willow-Horsetail-Forbs-Grass	WiEqFbGr	5	C	3.4
	420	Subalpine – Water sedge-Sphagnum	CaaqSp	6	B	0.02
	480	Subalpine – WyliCarex-Grass-Forb-Moss	CxGrFbMo	6-7	D	0.4
	13G	Alpine – Scrub birch-Grass-Lichen	EsGrLi	2	B	4.2
	31SZ	Alpine – Net-veined Willow/Scrub birch-Carex-Moss	SireCxMo	5	B	1.8
Class C Storage Facility	01	Subalpine – Scrub birch-Willow-Feathermoss	EsWiFM	4	C	7.4
	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FEsWiFM	4	C	21.8
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	20.3
	22S	Subalpine -Scrub birch-Feathermoss-Lichen	EsFmLi	3	B	2.8
	23SZ	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	52.6
	480	Subalpine – WyliCarex-Grass-Forb-Moss	CxGrFbMo	6-7	D	0.9
	01	Alpine – Scrub birch-Willow-Dwarf shrubs-Lupine	EsWiDsLu	4	C	5.8
	31SZ	Alpine – Net-veined Willow/Scrub birch-Carex-Moss	SireCxMo	5	B	3.1
	TA	Talus	n/a	n/a	n/a	0.9
	Wetland	Wetland	n/a	n/a	n/a	0.9
Overburden Stockpile	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FEsWiFM	4	C	18.6
	23SZ	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	27.5
Open Pit	01	Subalpine – Scrub birch-Willow-Feathermoss	EsWiFM	4	C	25.4
	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FEsWiFM	4	C	11.7
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	3.4
	23	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	8.0
	35	Subalpine – Willow-Horsetail-Forbs-Grass	WiEqFbGr	5	C	4.2
	36	Subalpine – Grass-Forb-Moss	GrFbMo	5-6	D	8.5

Facility	Site Unit Code	Plant Association	Plant Association Code	Soil Moisture Regime	Soil Nutrient Regime	Area (ha)
	420	Subalpine – Water sedge-Sphagnum	CaaqSp	6	B	1.8
	480	Subalpine – WyliCarex-Grass-Forb-Moss	CxGrFbMo	6-7	D	3.1
	01	Alpine – Scrub birch-Willow-Dwarf shrubs-Lupine	EsWilDsLu	4	C	9.8
	31SZ	Alpine – Net-veined Willow/Scrub birch-Carex-Moss	SireCxMo	5	B	6.6
	TA	Talus	n/a	n/a	n/a	0.1
	Wetland	Wetland	n/a	n/a	n/a	3.7
Water Management Ponds	01	Subalpine – Scrub birch-Willow-Feathermoss	EsWiFM	4	C	0.8
	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FESWiFM	4	C	0.3
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	0.1
	23	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	3.6
	31	Fir-White spruce Labrador tea-Scrub birch-Feathermoss-Lichen	FSwRhEsFmLi	5	B	0.5
	31	Labrador tea-Scrub birch-Feathermoss-Lichen (non-treed)	RhEsFmLi	5	B	0.54
	35	Subalpine – Willow-Horsetail-Forbs-Grass	WiEqFbGr	5	C	4.9
	420	Subalpine – Water sedge-Sphagnum	CaaqSp	6	B	1.6
	480	Subalpine – WyliCarex-Grass-Forb-Moss	CxGrFbMo	6-7	D	0.8
	Wetland	Wetland	n/a	n/a	n/a	1.0
Collection Ponds	01	Subalpine – Scrub birch-Willow-Feathermoss	EsWiFM	4	C	1.6
	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FESWiFM	4	C	6.0
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	1.6
	23	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	2.4
	31	Subalpine – Fir-White spruce Labrador tea-Scrub birch-Feathermoss-Lichen	FSwRhEsFmLi	5	B	1.5
	31	Subalpine – Labrador tea-Scrub birch-Feathermoss-Lichen (non-treed)	RhEsFmLi	5	B	0.03
	35	Subalpine – Willow-Horsetail-Forbs-Grass	WiEqFbGr	5	C	1.1
	420	Subalpine – Water sedge-Sphagnum	CaaqSp	6	B	0.4
	480	Subalpine – WyliCarex-Grass-Forb-Moss	CxGrFbMo	6-7	D	0.05
Process Plant	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FESWiFM	4	C	1.6
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	0.2
	35	Subalpine – Willow-Horsetail-Forbs-Grass	WiEqFbGr	5	C	0.2
Tote Road	01	Subalpine – Scrub birch-Willow-Feathermoss	EsWiFM	4	C	0.8
	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FESWiFM	4	C	1.0
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	0.3
	23	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	3.0
	31	Subalpine – Fir-White spruce Labrador tea-Scrub birch-Feathermoss-Lichen	FSwRhEsFmLi	5	B	0.4

Facility	Site Unit Code	Plant Association	Plant Association Code	Soil Moisture Regime	Soil Nutrient Regime	Area (ha)
	31	Subalpine – Labrador tea-Scrub birch-Feathermoss-Lichen (non-treed)	RhEsFmLi	5	B	0.3
	35	Subalpine – Willow-Horsetail-Forbs-Grass	WiEqFbGr	5	C	0.2
	36	Subalpine – Grass-Forb-Moss	GrFbMo	5-6	D	0.5
	480	Subalpine – WyliCarex-Grass-Forb-Moss	CxGrFbMo	6-7	D	0.1
	01	Boreal High – White spruce	SwWiFbFm	4	C	1.4
	11Z	Boreal High – Trembling aspen-Kinnickinnick-Grasses	AKnGr	2	B	0.1
Other Disturbed Areas	01	Subalpine – Scrub birch-Willow-Feathermoss	EsWiFM	4	C	13.7
	01SZ	Subalpine – Fir-Scrub birch-Willow-Feathermoss	FEsWiFM	4	C	9.9
	11S	Subalpine – Scrub birch-Lichen	EsLi	2	B	2.6
	23	Subalpine – Scrub birch-Willow-Crowberry	EsWiEmni	4	B	25.8
	31	Subalpine – Fir-White spruce Labrador tea-Scrub birch-Feathermoss-Lichen	FSwRhEsFmLi	5	B	0.9
	31	Subalpine – Labrador tea-Scrub birch-Feathermoss-Lichen (non-treed)	RhEsFmLi	5	B	20.1
	35	Subalpine – Willow-Horsetail-Forbs-Grass	WiEqFbGr	5	C	1.4
	36	Subalpine – Grass-Forb-Moss	GrFbMo	5-6	D	0.06
	420	Subalpine – Water sedge-Sphagnum	CaaqSp	6	B	5.0
	480	Subalpine – WyliCarex-Grass-Forb-Moss	CxGrFbMo	6-7	D	1.7
	01	Boreal High – White spruce	SwWiFbFm	4	C	9.7
	11Z	Boreal High – Trembling aspen-kinnickinnick-Grass (Successional Stage)	AKnGr	2	B	0.6
	15S	Boreal High – Scrub birch-Cladina	EsCl-x	2	B	7.3
	25	Boreal High – White spruce-Scrub birch-Cladina	SwEsCl	3	B-C	3.3
	25SZ	Boreal High – White spruce-Scrub birch-Dwarf shrub-Feathermoss-Cladina	SwEsDsFmCl	3	B-C	6.8
	35SZ	Boreal High – Black spruce-White spruce Labrador Tea-Feathermoss	SbSwRhFm	5	B	3.6
	40	Boreal High – Black spruce-Labrador tea-Feathermoss-Cladina	SbRhFmCl	6	B	3.7
	41	Boreal High – Willow-Carex aquatilis-Moss	WiCaaqMo	6	C	0.7
	520	Boreal High – Scrub birch-Water Sedge-Sphagnum	EsCaaqSp	7	B	0.9
	56SZ	Boreal High – Sedge-Forb-Glow moss	CxFbAuco	7	C-D	2.3

4.5.2 Rare Plants

The Yukon Conservation Data Centre (YCDC) compiles lists of plants that are of global concern, federally listed under the *Species at Risk Act*, or of specific conservation concern in the Yukon. The YCDC publishes a Track list, which is publicly available and regularly updated for all species of conservation concern and a Watch list for species where there is not enough information to determine a conservation status.

Although it is possible rare plants may exist, no rare plants have been observed in the Project Area during various vegetation surveys from 2015 to 2024. It has been assumed that the probability of observing a currently listed rare plant species is low since the Project area does not have landscape features such as hot springs, limestone or alkaline wetlands that are known to be associated with rare plants in the southeast region of the Yukon. But it cannot be concluded that no rare plant exists within the Project area, only that they have not been observed in areas that have been surveyed.

4.5.3 Invasive Species

The Yukon Invasive Species Council has 21 invasive plants on their priority watch list and 50 invasive vascular plant species on their invasive species list by invasiveness. A baseline inventory of invasive plant species was conducted within disturbed areas of the Project Area to determine the existence and extent of any invasive plant species, locations of infestations, and vectors of transportation and spread. Invasive species were observed within the Project Area. During the baseline surveys, invasive species observations were made along the Tote Road with only one invasive species observation within the proposed Project Footprint.

BMC Minerals Ltd has developed an invasive species monitoring program as part of their Invasive Species Management Plan to identify, monitor and manage invasive species populations. The Plan aims to establish a systematic and annual survey schedule with a uniform methodology with the goal to not only facilitate ongoing monitoring of invasive species but will also evaluate the effectiveness of implemented control methods. Currently the invasive species monitoring occurs annually within disturbed areas such as along the Tote Road and infrastructures such as the existing exploration camp. Invasive species have been observed in various disturbed areas within the Project area during theses annual monitoring surveys.

4.6 WILDLIFE

The following sections summarize the Wildlife Baseline Report for the Project area (AEG, 2019) and the Ungulate Baseline Report (BMC, 2023). The Wildlife Protection Plan (BMC, 2024c) and Site Characterization Plan (BMC, 2024d) include additional detail.

4.6.1 Caribou

A focus of the baseline monitoring studies has been, and continues to be, the Finlayson caribou herd. The Finlayson caribou herd is of ecological, economic, and cultural importance in the region to the Kaska, the public, and resident or guided hunters. The herd is part of the Northern Mountain caribou population (*Rangifer tarandus caribou*), assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as a species of Special Concern, and listed as such under the Canadian *Species at Risk Act* in 2005. The Finlayson caribou herd uses the uplands around the Project area in the spring, summer, and fall for calving and rutting, and the lowlands of the Pelly River for overwintering. As part of the baseline study, caribou-focused surveys were conducted annually during three key seasons (post calving, rut, and late winter), between March 2015 and March 2023, to assess the spatial and temporal distribution of Finlayson caribou herd throughout the year in the Project area. Table 4-2 shows the resulting counts from each survey.

Table 4-2: Summary of Caribou Observations (2015–2023)

Season and Year	Total Caribou	Cows	Calves	Bulls	Unclassified Adults
Post calving (June)					
2015	93	61	12	20	0
2016	142	103	18	21	0
2017	233	147	43	41	2
2018	197	30	35	20	112
2019	158	97	95	26	0
2020	329	192	34	94	10
2021	378	81	81	78	138
2022	303	64	59	35	145
Rut (October)					
2015	712	449	123	140	0
2016	660	398	107	155	0
2017	463	260	95	108	0
2018	650	see note	96	see note	554
2019	989	541	128	320	0
2020	662	346	69	234	13
2021	704	422	86	196	0
2022	413	240	57	116	0
Late Winter (March)					
2015	19	0	0	0	0
2016	143	109	11	16	7
2017	198	0	23	0	175
2018	61	0	5	0	56
2019	22	3	3	3	13
2020	0	0	0	0	0
2021	43	-	2	-	41
2022	8	-	-	-	8
2023	263	9	9	1	244

Note: During the 2018 rut survey, immature bulls and cows were not classified as conditions did not allow for reliable classification.

4.6.2 Moose

Moose (*Alces alces*) are also a significant wildlife resource to the Kaska, resident, and guided hunters alike. Two different periods (late winter and early winter) were surveyed each year between 2015 and 2023 to assess moose distribution patterns and abundance in the Project area.

During the 2015 late winter survey, a total of 31 moose were observed, as compared to 115 in 2016, 57 in 2017 and 36 in 2018. Results of the 2019, 2020, 2021, and 2022 late winter surveys found a total of 91, 62, 35, 94, and 56 moose, respectively. Variance in relative abundance of moose is

attributed to annual differences in snow age and depth, visibility during the survey, and uniformity of the study area. The distribution of moose observations was nearly uniform through the northern half of the regional study area, with regional distribution likely affected by snow depth. Late winter moose habitats consisted of lowland habitats found in associated with abundant shrubs.

Results of the 2015, 2016, 2017, and 2018 early winter ungulate surveys found a total of 114, 154, 166, and 198 moose, respectively. Results of the 2019, 2020, 2021, and 2022 early winter ungulate surveys found a total of 136, 185, 260, and 228 moose, respectively. During the early winter period, as expected, moose were found in subalpine draws/valleys. Moose were often using the upland areas in the east, south, and west of the Project area.

4.6.3 Grizzly Bears

Grizzly bear (*Ursus arctos*) den surveys were conducted in 2015 (three surveys) and 2016 (two surveys). In 2015, an active den was found approximately 4.5 km southwest of the Project area. It was located on a south facing slope at an elevation of approximately 1,500 masl, a few metres above the treeline. A sow and two cubs were observed about 500 m from the den site, and mud and tracks were observed around the den entrance. In 2016, a grizzly bear sow and sub-adult cub (2+ years old) were observed approximately 3.5 km from the Project area. During the second survey flight, an active grizzly bear den was discovered within 0.5 km of the previous observation of the grizzly bear; the tracks by the den entrance indicated a sow grizzly bear with a young cub. In addition, two freshly dug dens were observed during the 2016 caribou rut count. Exploration wildlife logs from 2015 to 2018 indicate that grizzly bear use the Project area from spring to fall.

4.6.4 Furbearers

Other predators in the Project area include black bear (*Ursus americanus*) and grey wolf (*Canis lupus*). Multiple incidental observations have been recorded, although no targeted surveys were conducted for these species other than the snow track surveys completed in March 2016 and 2017. Black bear observations have only been recorded at lower elevation sites along the Tote Road. Wolf sightings and tracks have been reported during various surveys, as well as by BMC employees and contractors. Wolf observations have been made throughout the Project area from alpine ridges to the boreal forest. Following the wolf control program in the 1980s, wolf populations in the Finlayson Lake area have recovered to regional pre-control numbers of approximately 240.

Other furbearer species, such as wolverine (*Gulo gulo*), American marten (*Martes americana*), red fox (*Vulpes vulpes*), and Canada lynx (*Lynx canadensis*) are present in the Project area. Incidental observations of these species have been reported in addition to track observations made during the snow track surveys conducted in March 2016 and 2017.

Evidence of historic use of Geona Creek and Finlayson Creek by beaver (*Castor canadensis*) is confirmed by the presence of old dams and lodges. In 2015, a beaver survey was conducted along Geona Creek; however, no sign of recent beaver activity was observed. In 2016, a follow-up beaver survey was conducted in the upper reaches of Geona Creek, and again there was no sign of active beaver use. However, there was evidence of recent beaver activity approximately 2.5 km upstream

from the confluence with Finlayson Creek in the form of freshly gnawed willow stems and beaver trails. In 2017, two beaver observations were reported at the headwaters of South Creek.

4.6.5 Collared Pika and Hoary Marmot

Through targeted surveys, collared pika (*Ochotona collaris*) and hoary marmot (*Marmota caligata*) were observed on the mountains on the southern and western sides of the Geona Creek valley, and most observations were outside of the Project area. Pika were observed at high elevation sites that exhibited large, talus rock with crevices below that may provide cover. Although the COSEWIC conservation rank for collared pika is “special concern”, Yukon conservation rank is listed as “secure”. Given the frequency of observations made in 2015, 2016, and 2017, it is suspected that collared pika and hoary marmot are present throughout the Project area at all high elevation sites with suitable habitat.

4.6.6 Bats

There are three species of bat known to exist in Yukon, only one of which is expected to be found in the Project area; the little brown bat (*Myotis lucifugus*). A bat detector was installed at a wetland in the Geona Creek valley for one week in August 2015; no recordings were identified, which confirmed expectations for the subalpine elevation. Two detectors were installed in 2016 at two different wetlands in boreal forest habitat along the Tote Road. Both detectors had some recordings of *Myotis* sp. assumed to be *M. lucifugus*.

4.6.7 Birds

A total of 42 bird species were observed during surveys conducted in 2015, and 61 species were observed in 2016. Among these species, five are reported as at risk by COSEWIC. Olive-sided flycatcher (*Contopus cooperi*), bank swallow (*Riparia riparia*), and barn swallow (*Hirundo rustica*) are considered threatened, while red-necked phalarope (*Phalaropus lobatus*), and rusty blackbird (*Euphagus carolinus*) are considered Special Concern. The most frequently observed species were white-crowned sparrow (*Zonotrichia leucophrys*), American tree sparrow (*Spizella arborea*) and Wilson’s warbler (*Cardellina pusilla*). A total of five habitat types were surveyed including riparian, wetland, alpine, mixed subalpine, and boreal forest. The greatest diversity of birds was observed in the wetland habitat. A golden eagle (*Aquila chrysaetos*) nest was active in 2015 and 2016, presumably by the same pair. The nest is located in the Project area. A northern harrier (*Circus cyaneus*) nest was also located in the Project area in the headwater wetlands of Geona Creek. Other raptor species observed in the Project area include bald eagle (*Haliaeetus leucocephalus*) and gyrfalcon (*Falco rusticolus*). Ptarmigan (*Lagopus* sp.) were frequently observed throughout the Project area at all elevation levels. Spruce grouse (*Falcapennis canadensis*) were often seen along the Tote Road. Large sandhill crane (*Grus canadensis*) flocks fly over the Project area going north in April and south in August and September, with very few landing. In addition, twilight surveys were completed in June 2017 resulting in no common nighthawk (*Chordeiles minor*) and one short-eared owl (*Asio flammeus*) observation.

4.7 SOILS AND GEOLOGY

4.7.1 Soils and Surficial Geology

Glacial, periglacial (ice related), and fluvial processes are the main processes which have been involved in the creation of landforms and the surficial deposits in the Project area (Cominco, 1996). This was confirmed by work conducted by KP in 2015, 2016, and 2017 (BMC, 2024d). The main surficial deposits in the Project area are:

- Alluvial deposits – geologically recent and result from water processes reworking the sediments deposited during the last ice age;
- Glaciofluvial deposits – the result of water processes from the melting of glaciers and ice sheets. The valley bottoms are infilled generally with sand and gravel deposits from alluvial and glaciofluvial processes to depths of up to 20 m. There are some glaciofluvial deposits on the west side of Geona Creek near the confluence with Finlayson Creek where a deposit in excess of 40 m thick is present;
- Glacial till deposits – the result of the direct glacial action. These silty sand and gravel deposits overlie much of the area, ranging in thickness from less than 1 m to up to 10 m. The thickness of these deposits generally decreases with increasing elevation;
- Colluvium deposits – the result of frost loosening of bedrock which is then transported by debris and avalanche flows to the base of steep slopes. Colluvium is generally found above approximately 1,500 masl in the Project area; and
- Organic material – generally less than 0.5 m thick overlies colluvium and glacial till deposits.

In general, the soils in the Project area are acidic sandy loams and are low in macronutrients. Organics occur on gentle slopes and valley bottoms in association with fens and bogs found along drainages. The most common soil order (soil classification based on dominant physical, chemical, or biological properties) encountered during the ecosystem survey were Cryosols. Cryosols are soils that overlay shallow permafrost (less than 2 m below the surface) especially on the north aspects in Spruce/Feathermoss forests and in the valley bottoms where thick organic layers insulate mineral soils from solar radiation. The other orders of mineral soils encountered in the Project area were Dystric Brunisols (displaying some horizontal development) found on south facing mountain slopes and old alluvial plains. Regosols are young soils with a poorly developed “B” horizon. Regosols are mainly located in the alpine, where soils evolve slowly or in floodplain corridors where there is repeated disturbance by high water events.

Soil surveys have been completed across the Project site as part of the baseline environmental monitoring program, including analysis of nutrients and metal concentrations to characterize soil qualities in the Project area (AEG, 2016a).

4.7.2 Permafrost

Site investigations, comprising test pitting and boreholes, were carried out at the site in 1995 and 1996. Additional site investigations, including test pitting, boreholes and installation of thermistors, were carried out in 2015, 2016 and 2017 (BMC, 2024d).

The 1995/1996 field program included 35 test pits that encountered permafrost; a further 40 test pits observed ice lenses and ice segregation, which was interpreted as an active layer rather than permafrost. Permafrost was not identified in any of the 2016 thermistors, however frozen soil and ice were encountered in samples at approximately 1.5 m and 5.0 m from a drill hole in the Class C Storage Facility footprint. Additionally, a monitoring well installed in the Class A Storage Facility area was discovered to be frozen in the bedrock at approximately 6 m below ground surface (KP, 2016b).

Permafrost distribution mapping was completed within the footprint of all planned Mine infrastructure and the Tote Road, including a surrounding 100m wide “buffer zone” so as to fully encompass all potential disturbance (Coregeo and Associates, 2017a). This mapping was based on a synthesis of data from multiple years of geotechnical field investigations and detailed terrain stability and hazard mapping and related field reconnaissance (Coregeo and Associates, 2017b). The results of this mapping are presented in Coregeo and Associates (2017a) and are also shown in the Site Characterization Plan (BMC, 2024d).

4.7.3 Bedrock Geology

The Project is located in the Finlayson Lake District, a crescent-shaped area approximately 300 km long and 50 km wide that extends from Ross River in the north to Watson Lake in the south. The Finlayson Lake District comprises Devonian to Lower Carboniferous (Mississippian) volcanic, intrusive, and sedimentary rocks separated from the Proterozoic and Paleozoic strata of the ancient North American continental margin to the southwest by the Tintina Fault. The combined Yukon-Tanana and Slide Mountain terranes are separated from the ancient continental strata to the northeast by the Inconnu Thrust (Mortensen and Jilson, 1985; Plint and Gordon, 1996; Tempelman-Kluit, 1979).

The Project area is underlain by rocks of Devonian-Mississippian age with the Big Campbell thrust sheet that host the ABM Deposit. The Jules Creek Fault separates the Yukon-Tanana Terrane from the Slide Mountain Terrane in the Finlayson Lake District. The Yukon-Tanana Terrane of the Finlayson Lake District is contiguous with the main part of the Yukon-Tanana Terrane, which underlies most of west central Yukon, after restoration of approximately 425 km of Late Cretaceous right-lateral, strike-slip movement along the Tintina Fault (e.g., Mortensen, 1992; Peter et al., 2007).

The Yukon-Tanana terrane in the vicinity of the Finlayson Lake belt is composed of foliated and lineated greenschist to lower amphibolite-grade metasedimentary, metavolcanic and metaplutonic rocks. The Yukon-Tanana Terrane was imbricated by Permian thrust faulting into the Cleaver Lake, Money, and Big Campbell thrust sheets. The Project is located on the Big Campbell thrust sheet, which is the structurally deepest of the Yukon-Tanana Terrane. The Grass Lake and Wolverine middle Palaeozoic unconformity-bound groups are exposed in the Big Campbell thrust.

Within the Project area, the Grass Lake Group is divided into three main stratigraphy components:

- The “KZK formation”, comprising a felsic volcanic package hosting all significant volcanogenic massive sulphide mineralization;
- The overlying “Upper Sedimentary and Mafic Volcanic Sequence” metasedimentary package (or “Wind Lake formation”); and
- The underlying “Lower Sedimentary Sequence” metasedimentary package.

The KZK formation is a thick felsic, epiclastic and intrusive/flow (dome) complex with minor mafic sills and flows and rare interbedded sediments. Sediments consist of tuffaceous and carbonaceous mudstone, wacke and orthoquartzite.

The Upper Sedimentary and Mafic Volcanic Sequence base is approximately 200 m above the ABM Deposit. It is composed of variably carbonaceous and calcareous mudstone with minor quartzite, siltstone and limestone, intercalated with mafic volcanic and minor felsic volcanic units. It is finer grained than the Lower Sedimentary Sequence formation.

4.8 SEISMICITY

The Project area is located in the Yukon-Tanana Terrane in southeastern Yukon Territory. The Yukon-Tanana Terrane is located on either side of the Tintina Fault, located approximately 30 km to the west of the Project area. The Tintina Fault is a dextral strike slip fault that trends to the northwest and extends from British Columbia to Alaska. The Tintina Fault separates the stable North American continent from accreted terranes to the west. The Tintina Fault is not considered to be currently active by the Geological Survey of Canada (Cominco, 1996).

The Project area is in an area of low seismic activity (Cominco, 1996). This was verified by a study titled Earthquakes and Seismic Hazard in the Yukon–Beaufort–Mackenzie (Hyndman et al., 2005), a preliminary desktop study by Knight Piésold Ltd. (KP, 2016b), and a site-specific seismic hazard assessment (KP, 2024b).

4.9 AQUATIC RESOURCES

The most recent aquatics and ecosystems resources baseline reports for the Project area were published in 2016 (AEG, 2016b) and 2017 (Laberge and Can-Nic-A-Nick, 2017), and includes a summary of the baseline studies conducted in the 1990s, 2000s and 2015 to 2017. The reports present data and observations of baseline fish and fish habitat, stream sediments, benthic invertebrates, periphyton, and chlorophyll *a* surveys. Additional supporting information describing water quality and other aquatic ecosystem physical parameters is also provided for an overall ecosystem context.

4.9.1 Fish

Geona Creek and the small ponds overlying the ABM Deposit generally have low abundances of fish, containing just a few slimy sculpin (*Cottus cognatus*) and Arctic grayling (*Thymallus arcticus*). Further

downstream, adult Arctic grayling occur in Finlayson Creek. Fish sampling in South Creek, North River, and East Creek indicated the presence of Arctic grayling, slimy sculpin, and burbot. No fish were captured in Fault Creek, despite significant effort. Larger rivers and lakes in the region host grayling, lake whitefish, lake trout, burbot and Dolly Varden char.

4.9.2 Aquatics

4.9.2.1 Sediments

Aquatic sediments over the monitoring period (i.e. from the 1990s through to 2017) have shown year to year variability and site to site variability (BMC, 2024d). In general, arsenic, cadmium, copper and zinc are elevated to varying degrees in sediments throughout the study area, indicating that these drainages intersect naturally mineralized zones.

4.9.2.2 Benthic Invertebrates

Benthic invertebrates were collected for community composition and tissue metal analysis from Geona Creek, Finlayson Creek, North River, and East Creek during all aquatic sampling events.

Benthic invertebrate abundance and density was highest in Geona Creek and lowest in Fault Creek, and diversity was greatest in lower Finlayson Creek. Diptera (true flies) were the dominate taxon at most sample locations in the Project area. Diptera, Plecoptera, or Ephemeroptera share dominance in Geona Creek downstream of the Project area, and in the upper portions of Finlayson Creek. The downstream reach of Finlayson Creek is the only site where Oligochaeta (aquatic worms) were the dominant taxon or shared dominance with Diptera. Results from 1995 to 2016 have shown fluctuations in both the density and community composition of benthic invertebrates at all sample locations, but these fluctuations are considered natural as no development has occurred in any of the drainages studied.

The mean metal concentrations in benthic invertebrate tissue documented during the 1995 to 2016 studies were well below the mean concentrations in the Yukon database (Laberge and Can-Nic-A-Nick, 2015, 2017), except in 2014 when metal concentrations were an order of magnitude higher than all other years. Elevated concentrations were not observed again in 2016. High metal concentrations observed in 2014 are believed to be from the laboratory testing the samples as plant tissue rather than as benthic invertebrate tissue.

4.9.2.3 Periphyton

Periphyton sampling occurred in Finlayson Creek, Geona Creek, and Fault Creek in 2015. Abundance and diversity of Periphyton was highest in Geona Creek and lowest in Fault Creek, which was generally consistent with the benthic invertebrate results. Bacillariophyta was the dominant phylum observed at all sites. Bacillariophyceae and Fragilariophyceae were the dominate orders in the phylum, representing an average of 41% to 56% of cells across all sites. All other phyla generally represented less than 1%, except for Cyanobacteria in Fault Creek (4.35%) and Chlorophyta in lower Finlayson Creek (1.6%). *Didymosphenia geminata*, an invasive species, was observed at four

locations throughout the Project area. In all cases Didymosphenia represented <1% of the total number of cells.

4.9.2.4 *Chlorophyll a*

Chlorophyll a concentration provides a measure of algae biomass and therefore the primary productivity of a given location. *Chlorophyll a* concentrations in the Project area are generally low, which is interpreted as an indication of low productivity systems. The highest concentrations were observed at the mouth of Geona Creek and the lowest at the confluence of Geona and Finlayson Creeks.

4.10 HERITAGE RESOURCES

The Project area has been the subject of six Heritage Resources Impact Assessments from 1995 to 2018. To date, four subsurface lithic archaeological sites have been identified by Ecofor Natural and Cultural Resources Consultants (Ecofor). Ecofor have provided BMC with recommendations to manage each site. Recommendations for each site included avoidance and where avoidance was not possible (due to Project design) then systematic data recovery excavations were conducted. Any activity that requires ground disturbance, outside of the areas already assessed, will require a heritage impact assessment before works can begin. All Heritage Resources Impact Assessment reports have been provided to the Yukon Heritage Resources Unit, RRDC and LFN.

A Heritage Resources Protection Plan has been developed to provide strategies to protect and manage heritage resources during all phases of the Project (BMC, 2024e). This will include:

- Ensure heritage assessments have been completed before ground disturbance activities occur in new areas;
- Ensure all known sites are clearly flagged in the field prior to construction activities occurring;
- Review and implement site-by-site management recommendations; and
- Train all site management, Construction, and Operations crews on the communication protocols to manage future ground disturbances and chance finds of heritage resources.

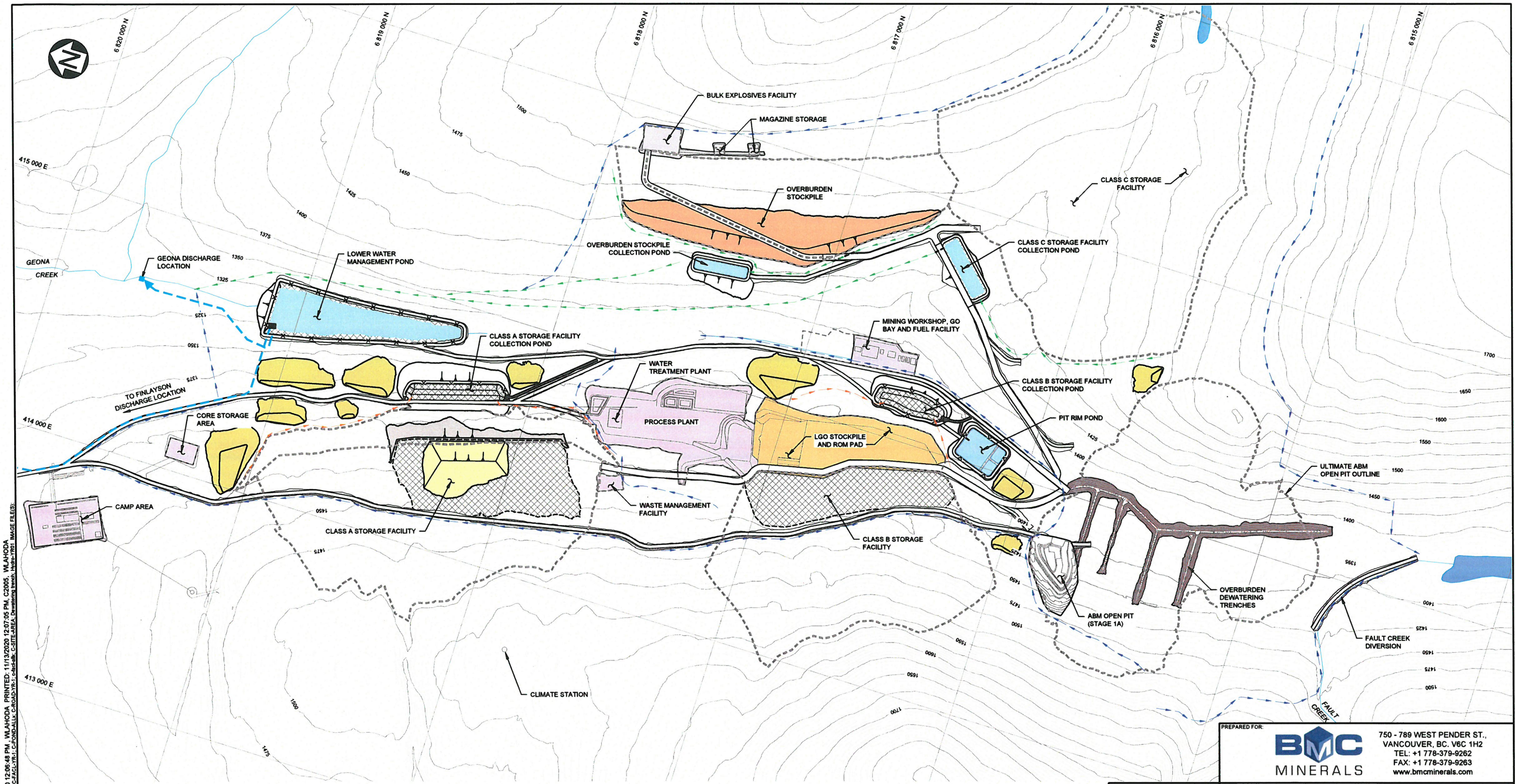
5 PROJECT DESCRIPTION

5.1 PROJECT OVERVIEW

Development of the mineral resource will be by open pit and underground mining methods at a current life of mine annual average rate of approximately 5,500 tonnes of ore per day. The proposed phases of the Mine life are summarized as follows:

- Pre-construction: approximately 2 years;
- Construction: approximately 2 years;
- Operations: approximately 10 years;
- Active Closure: approximately 3 years;
- Transition Closure: approximately 12 years, when water discharges via the ABM lake spillway; and
- Post-closure: approximately 10 years.

Pre-construction and Construction may happen concurrently, pending the timing of receipt of licences. These stages of Mine development are shown in Figures 5-1 through 5-5. Figure 5-1 shows the Project at the end of the Construction phase immediately before Process Plant start-up. Figure 5-2 shows the Project at the end of Operations. Figure 5-3 shows the end of Active Closure, Figure 5-4 shows the end of Transition Closure, and Figure 5-5 shows Post-closure conditions.



- NOTES:**
1. COORDINATE GRID IS UTM NAD 83 9N.
 2. TOPOGRAPHIC DETAIL PROVIDED OCTOBER, 2017.
 3. OPEN PIT OUTLINE PROVIDED BY BMC, APRIL 26, 2019.
 4. CONTOUR INTERVAL IS 5 METRES.
 5. ALL ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
 6. PROGRESSIVE RECLAMATION NOT SHOWN.

LEGEND:

	WATER		LINER
	CLASS A MATERIAL		STREAM/DRAINAGE/WATERBODY
	CLASS B MATERIAL		ROAD
	CLASS C MATERIAL		DIVERSION DITCH (NON CONTACT)
	OVERBURDEN		DIVERSION DITCH (CONTACT CLASS A & B)
	TOPSOIL STOCKPILE AREA		DIVERSION DITCH (CONTACT CLASS C & OVERBURDEN)
	MINE AND PROCESS SITE INFRASTRUCTURE		OUTLINE OF PROPOSED INFRASTRUCTURE
			DISCHARGE FROM POND

DISCLAIMER:

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SCALE 1:500

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PREPARED BY:

Knight Piésold CONSULTING

BMC MINERALS (NO. 1) LTD.

KUDZE KAYAH PROJECT

**GENERAL ARRANGEMENT
PROCESS PLANT START-UP**

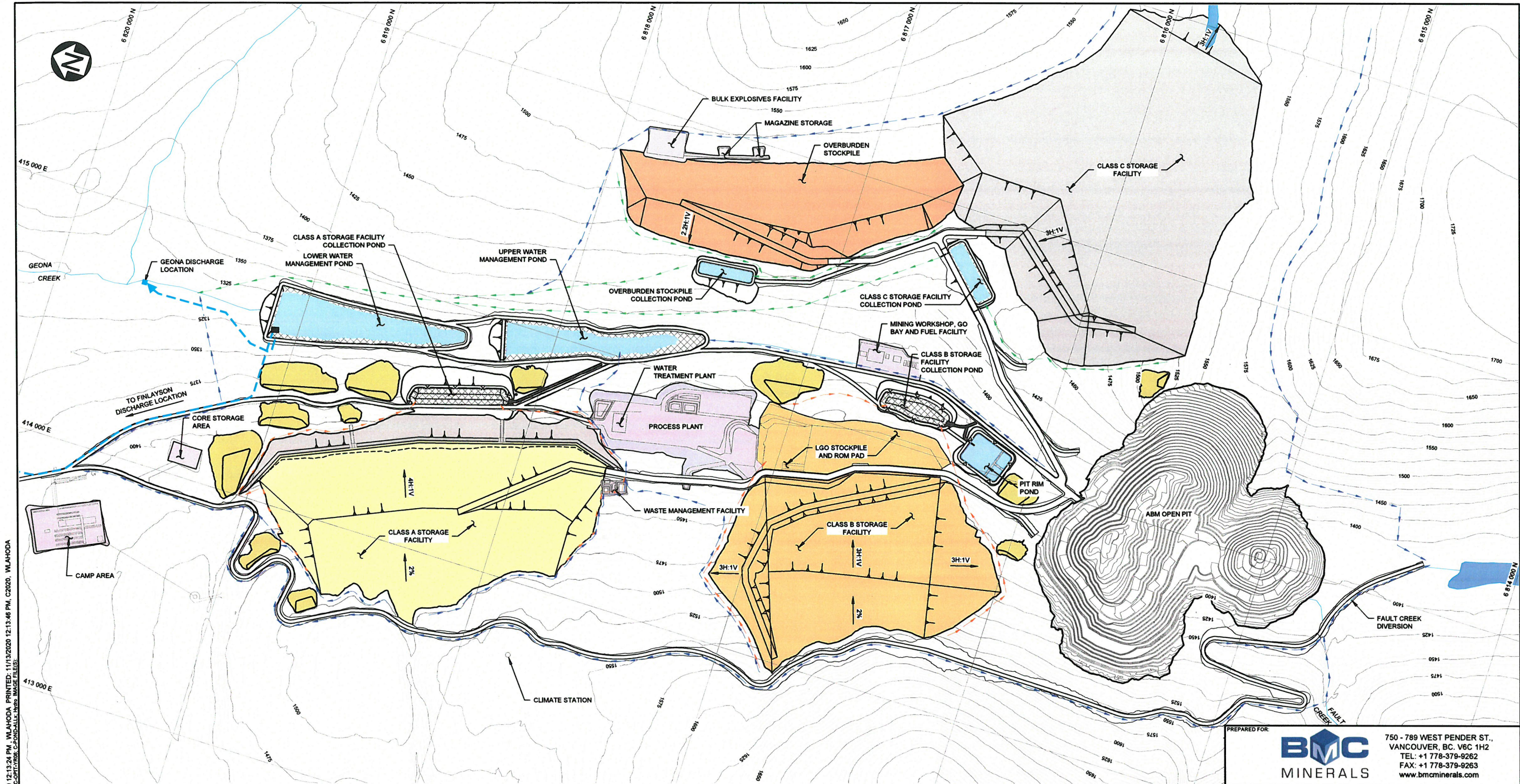
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TERRITORY
ENGINEER

VA101-640/11

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NOTES:

1. COORDINATE GRID IS UTM NAD 83 9N.
2. TOPOGRAPHIC DETAIL PROVIDED OCTOBER, 2017.
3. PIT SHELLS PROVIDED BY BMC, APRIL 26, 2019.
4. CONTOUR INTERVAL IS 5 METRES.
5. ALL ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
6. PROGRESSIVE RECLAMATION NOT SHOWN.
7. THIS DRAWING REPRESENTS THE FEATURE/STRUCTURE TO DESIGN-LEVEL ACCURACY, AND IS SUBJECT TO MODIFICATIONS DURING CONSTRUCTION IN ACCORDANCE WITH EITHER A) INFORMATION GAINED FROM GEOTECHNICAL INVESTIGATIONS, OR B) AS A RESULT OF MODIFICATIONS MADE TO OTHER STRUCTURES/FEATURES THAT ARE CONNECTED.

LEGEND:

- | | | | |
|--|--------------------------------------|--|--|
| | WATER | | LINER |
| | CLASS A MATERIAL | | STREAM/DRAINAGE/WATERBODY |
| | CLASS B MATERIAL | | ROAD |
| | CLASS C MATERIAL | | DIVERSION DITCH (NON CONTACT) |
| | OVERBURDEN | | DIVERSION DITCH (CONTACT CLASS A & B) |
| | TOPSOIL STOCKPILE AREA | | DIVERSION DITCH (CONTACT CLASS C & OVERBURDEN) |
| | OPEN PIT | | OUTLINE OF PROPOSED INFRASTRUCTURE |
| | MINE AND PROCESS SITE INFRASTRUCTURE | | DISCHARGE FROM POND |

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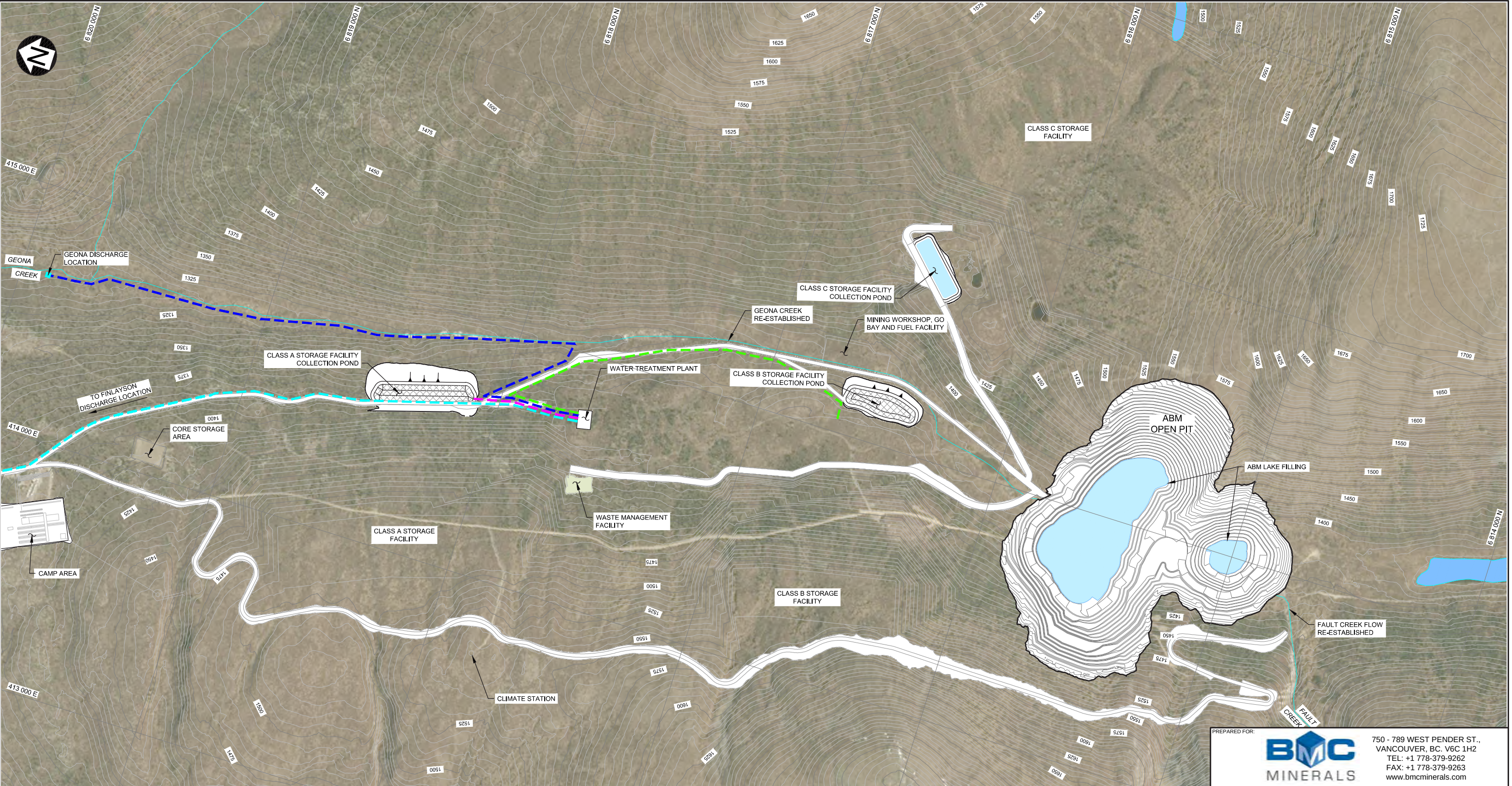
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SCALE 1:5000
150 75 0 250 500 750 m

YUKON
MADELINE PEASE
TERRITORY
Nov 16/20
ENGINEER

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BMC MINERALS (NO. 1) LTD.		
KUDZ ZE KAYAH PROJECT		
GENERAL ARRANGEMENT END OF MINE OPERATIONS		
DRG. NO.	DESCRIPTION	REV. DATE
VA101-640/11	C2020	0

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- NOTES:**
- COORDINATE GRID IS UTM NAD 83 9N.
 - TOPOGRAPHIC DETAIL PROVIDED OCTOBER, 2017.
 - PIT SHELLS PROVIDED APRIL 26, 2019.
 - CONTOUR INTERVAL IS 5 METRES.
 - ALL ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

- LEGEND:**
- | | | | |
|--|---------------------------|--|--------------------------------|
| | WATER | | CLASS A COLLECTION POND TO WTP |
| | STREAM/DRAINAGE/WATERBODY | | CLASS B SEEPAGE TO WTP |
| | ROAD | | WTP TO FINLAYSON |
| | | | WTP TO GEONA |

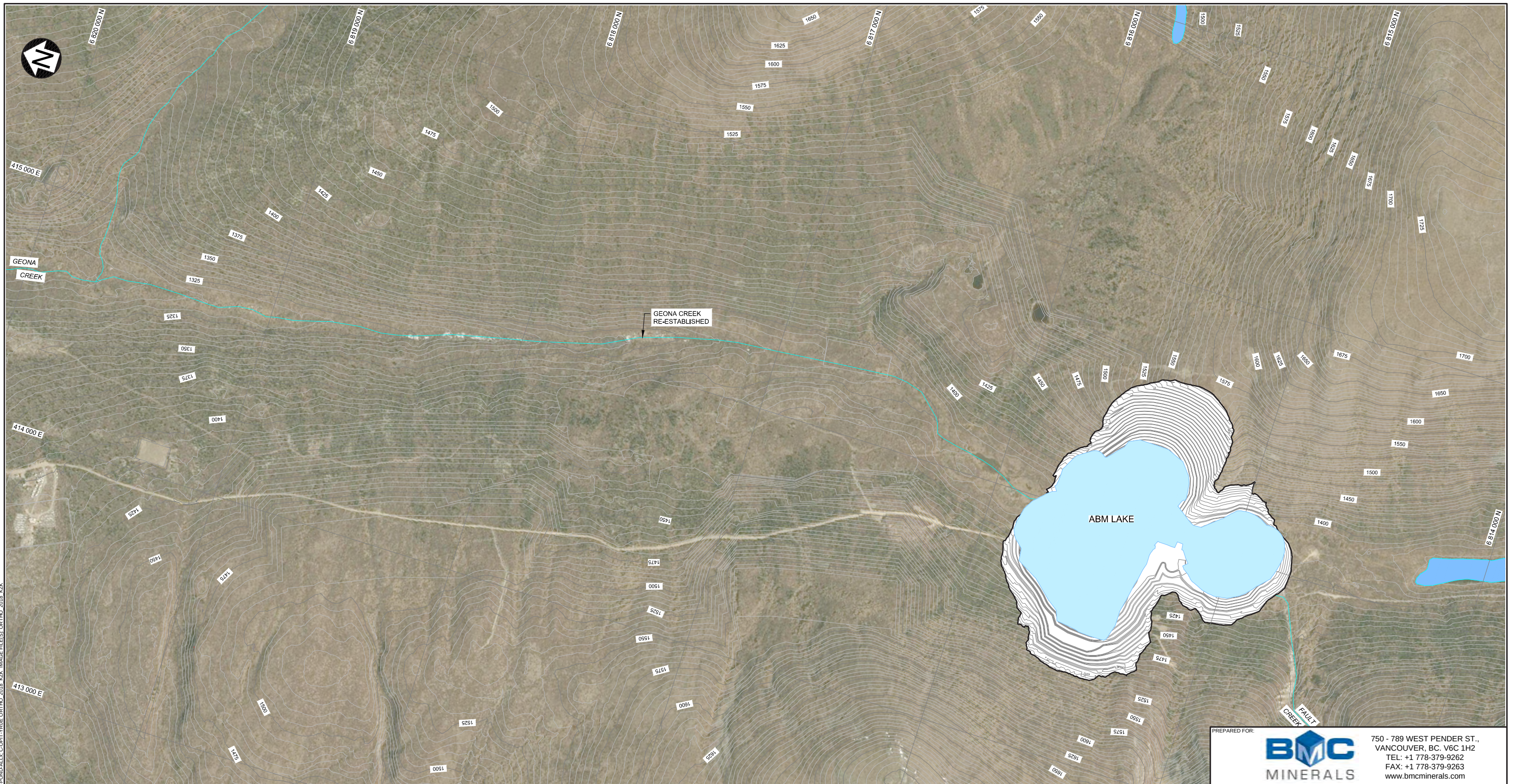
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Figure Previously Issued as KP Drawing

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		KUDZ ZE KAYAH PROJECT			
		FIGURE 5-3 GENERAL ARRANGEMENT END OF ACTIVE CLOSURE			
PIA NO.	DRAWING NO.		REVISION		
VA101-640/11	C2025		A		



NOTES:

1. COORDINATE GRID IS UTM NAD 83 9N.
2. TOPOGRAPHIC DETAIL PROVIDED OCTOBER, 2017.
3. PIT SHELLS PROVIDED APRIL 26, 2019.
4. CONTOUR INTERVAL IS 5 METRES.
5. ALL ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

LEGEND:

-  WATER
 STREAM/DRAINAGE/WATERBODY
 ROAD

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150 75 0 250 500 750 m
SCALE A

Figure Previously Issued as KP Drawing

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KUDZ ZE KAYAH PROJECT

**FIGURE 5-5
GENERAL ARRANGEMENT
POST-CLOSURE**

P/A NO.

VA101-640/11

DRAWING NO.

C2027

REVISION

A

5.2 PROJECT INFRASTRUCTURE

5.2.1 Waste Storage Facilities

Waste rock will be classified as Class A, B or C, based on its ARD/ML characteristics and stored accordingly in permanent facilities on surface. In addition, overburden and topsoil material will be strategically stockpiled on surface for reuse during reclamation of the site. All soil disturbed by mining activities will be salvaged for use in future reclamation activities.

Design of the following waste management facilities is described in KP (2019b):

- Class A Storage Facility;
- Class B Storage Facility;
- Class C Storage Facility; and
- Overburden Stockpile.

The details of these facilities are summarized in the following sections.

5.2.1.1 Class A Storage Facility

The Class A Storage Facility is located on the western hillside of Geona Creek, north of the Process Plant area. The principal objectives for the Class A Storage Facility are to provide safe and secure storage of tailings and waste rock, to protect regional groundwater and surface water during Operations and in Closure, and to achieve effective reclamation. Class A waste rock and tailings material are defined as potentially acid generating and metal leaching in the near term (i.e. in the life of the Mine) (Ensero, 2023a). Details of the Class A Storage Facility are presented in the Tailings Management Plan (BMC, 2024a).

The Class A Storage Facility will store Class A waste rock from the ABM open pit, co-disposed with filtered tailings produced at the Process Plant. The facility is designed to manage approximately eight million cubic metres (Mm³) of potentially acid generating filtered tailings and approximately six Mm³ of potentially acid generating waste rock.

Design of the Class A Storage Facility includes the following key design functions:

- Permanent, secure and total confinement of filtered tailings and waste rock in an engineered facility;
- Diversion of clean water around the facility to the extent practicable with use of berms and diversion channels;
- Collection of runoff from the facility with use of lined collection ditches;
- Progressive advancement of the composite HDPE geomembrane liner system;
- Conveyance of groundwater flows beneath the facility;

- Internal facility seepage collection and management during Operations and Active Closure;
- Inclusion of monitoring features to confirm performance goals are achieved and design criteria and assumptions are met; and
- Progressive emplacement of the closure cover on to the facility over the operating life of the Project.

A buttress will be constructed for confinement at the down gradient slope of the Class A Facility, which will improve the overall geotechnical stability of the facility. The buttress will be constructed with selectively sourced Class C (non-potentially acid generating) waste rock material. The buttress has been designed with a 2.5H:1V upstream slope and 3H:1V down gradient slope. Foundation preparation beneath the buttress includes removal of all overburden material, which is estimated to be approximately 10 m in depth.

A layer of low permeability glacial till will be placed and compacted in thin lifts across the facility basin, above the foundation drainage system, to provide a low permeability seepage barrier beneath the facility. An 80 mil, textured HDPE geomembrane will be installed above the compacted glacial till material to form a composite liner system. Crushed sand and gravel will be placed above the HDPE geomembrane for protection from construction vehicle traffic and to collect and convey seepage from within the facility.

The facility will be graded to collect and convey seepage flows to two internal sumps at the base of the facility, at the upstream toe of the buttress. Seepage from the sumps will report to the Class A Collection Pond.

The facility has been designed with an overall slope of 4H:1V. Tailings and waste rock will be co-disposed in the facility in lifts and compacted by vibrating drum compactor.

The facility will be progressively reclaimed with a composite cover as it is constructed. The design of the closure cover includes a layer of glacial till material, covered by an 80 mil, textured HDPE geomembrane to form a composite cover system. The facility will be capped with a sand and gravel protective layer followed by a layer of Class C material for frost protection and to improve long-term geotechnical stability. Growth media will be spread above the Class C rock and the facility will be revegetated as part of progressive reclamation activities during Operations. Note that the recontouring will include benches with berms/ditches to control runoff.

5.2.1.2 Class B Storage Facility

The Class B Storage Facility is located on the western hillside of Geona Creek, south of the Process Plant area. The Run of Mine (ROM) pad and Low Grade Ore (LGO) stockpile are incorporated into the design of the Class B Storage Facility. Class B waste rock is defined as potentially acid generating with metal leaching potential over the longer term (after cessation of mining activities) (Ensero, 2023a).

Class B material requires encapsulation to limit contact with oxygen and water, and therefore the facility will incorporate the same composite liner and cover system as the Class A Storage Facility. The principal objectives for the Class B Storage Facility are to provide safe and secure storage of Class

B waste rock, to protect regional groundwater and surface water during Operations and in Closure, and to achieve effective reclamation. Details of the Class B Storage Facility are presented in the Waste Rock and Overburden Management Plan (BMC, 2024b).

The Class B Storage Facility has been designed with an overall slope of 3H:1V for long-term physical stability and to allow for re-contouring as required for reclamation. Note that the recontouring will include benches with berms/ditches to control runoff.

The Class B Storage Facility includes the following key design functions:

- Permanent, secure and total confinement of Class B waste rock in an engineered facility;
- Diversion of clean water around the facility to the extent practicable with use of berms and diversion channels;
- Construction of a progressively advanced low permeability composite liner system;
- Control and collection of runoff from the facility during Operations to the maximum practical extent;
- Conveyance of groundwater flows beneath the facility;
- Internal facility seepage collection and management during Operations and Active Closure; and
- Progressive reclamation and construction of the closure cover during the Operations phase, with encapsulation and construction of the closure cover of the facility completed at the end of mining (during Active Closure).

A layer of low permeability glacial till will be placed and compacted in thin lifts, above the foundation drainage system, to provide a low permeability seepage barrier beneath the facility. An 80 mil, textured HDPE geomembrane will be placed above the compacted glacial till material to form a composite liner system followed by a sand and gravel protective layer.

The facility closure cover will be progressively constructed during Operations with a composite cover system, the same as that of the Class A Storage Facility. The design of the closure cover includes a layer of glacial till material covered by an 80 mil textured HDPE geomembrane. The geomembrane will be capped with a sand and gravel protective layer followed by a layer of Class C material for frost and erosion protection. Growth media will be spread above this capping layer, and the facility will be revegetated.

5.2.1.3 Class C Storage Facility

The Class C Storage Facility is designed to manage waste rock that is classified as non-reactive or potentially acid consuming and therefore specific ARD management strategies are not required (Ensero, 2023a). The facility is located on the eastern hillside of Geona Creek, in a hanging valley northeast of the ABM open pit. The principal objectives for the Class C Storage Facility are to provide safe and secure storage of Class C waste rock, and to achieve effective reclamation. Details of the Class C Storage Facility are presented in the Waste Rock and Overburden Management Plan (BMC, 2024b).

The Class C Storage Facility includes the following key design functions:

- Permanent, secure confinement of Class C waste rock in an engineered facility;
- Diversion of water around the facility to the maximum extent possible with use of diversion channels; and
- Control and collection of runoff from the facility during Operations to the maximum practical extent.

The Class C Storage Facility will have no infiltration-restricting liner or cover. The facility has been designed with overall face slopes of 3H:1V, while the top of the facility will have a very gently sloping 1% gradient to shed runoff. The final facility bench crests will be rounded and the faces sloped to control runoff, which is a similar configuration to the existing natural slopes in the area. Where possible, Class C material will be used for construction purposes around the site as well as capping material for reclamation of the Class A and B Storage Facilities. The facility will be reclaimed by placing a layer of growth media over the final formation surface before being revegetated. Note that the recontouring will include benches with berms/ditches to control runoff.

5.2.1.4 Overburden Stockpile

The Overburden Stockpile is designed to manage overburden material excavated from the ABM open pit area or from other site infrastructure locations. The stockpile is located on the eastern hillside of Geona Creek, north of the Class C Storage Facility. Suitable glacial till material will be selectively managed and sourced from the stockpile and used during Operations as a construction material, and in Closure for reclamation and select cover material for the other facilities. Details of the Overburden Stockpile design are presented in the Waste Rock and Overburden Management Plan (BMC, 2024b).

The Overburden Stockpile includes the following key design functions:

- Secure confinement of overburden in an engineered facility;
- Diversion of runoff around the facility to the maximum extent possible with use of berms and diversion channels; and
- Control and collection of sediment-laden runoff from the facility during Operations to the maximum practical extent.

The Overburden Stockpile is designed to manage overburden material excavated during Construction and ABM open pit stripping. The stockpile will be used in Active Closure as reclamation cover material for the other Mine waste storage facilities; the remaining stockpile will be recontoured and revegetated.

5.2.2 Water Management Facilities

Water management is a critical component of site operations, and a series of water management ponds will be used to collect, treat as required, and discharge water from site. The water management

objectives and strategies are described in the Water Management Plan (BMC, 2024f). The main site water management facilities include the following:

- Upper Water Management Pond (UWMP);
- Lower Water Management Pond (LWMP);
- Class A Storage Facility Collection Pond;
- Class B Storage Facility Collection Pond;
- Class C Storage Facility Collection Pond;
- Overburden Stockpile Collection Pond; and
- Pit Rim Pond.

Collection ditches and diversion channels have been designed to divert water to the maximum practical extent, and to collect and control runoff into the Project area.

The Water Management Plan utilizes water in the Project area to the practicable extent by collecting and managing site runoff from disturbed areas. Surplus water will be stored on site, with excess water being released in a controlled manner to Geona Creek and to Finlayson Creek. Water will be discharged from site at controlled dilution ratios, as described in the Water Management Plan (BMC, 2024f).

A water balance model was developed to assess potential effects of variability on surface and groundwater flows as the Project develops (KP, 2024a). The Water Management Plan (BMC, 2024f) involves collecting and controlling site runoff from disturbed areas to ensure maximum recycling of mining and process water and control of water quality discharged to the surrounding environment.

5.2.3 Water Treatment Plant

A Water Treatment Plant (WTP) will be constructed adjacent to the Process Plant to treat influent water streams from the Class A Storage Facility, a portion of the process water stream, ROM pad and LGO Stockpile runoff, Pit Rim Pond and Process Plant sumps (Integrated Sustainability Consultants, 2019). Water quality from each of these sources will be monitored to determine if treatment through the WTP is required. The planned treatment system consists of two circuits: a metals removal circuit and a Selen-IX™ circuit for selenium removal. Treated water will be discharged into the LWMP.

5.2.4 Power Generation and Fuel Supply

Power is planned to be generated on site by a dual fuel (natural gas and diesel) power plant located adjacent to the Process Plant. Fuel supply and storage on site includes liquified natural gas for the power plant, and diesel fuel for standalone generators, mining equipment and the power plant. Waste heat from the power plant will be used by the heating, ventilation and cooling system to heat the Process Plant building through a glycol loop.

5.2.5 Mining Infrastructure

Mine workshop facilities will be constructed for both the ABM open pit and underground mining operations. A vehicle wash bay will be constructed adjacent to the Mine workshop facilities. The main diesel storage facility will be constructed adjacent to the Mine workshop. Explosives will be stored in secure, fenced facilities, which will be well separated from the main activity areas. Bulk explosives will be stored within a bulk explosives compound. The bulk explosive compound will also contain a garage for the explosives loading trucks and a small office for the explosives contractor. Magazines will also be established for the storage of packaged explosive products and detonators.

5.2.6 Communications

Site communications are planned to be established via microwave link to connect the Project directly to the Northwestel terrestrial network through the McEvoy Tower, located approximately 36 km northeast of the Project area. One intermediate repeater site will be required, adjacent to the Access Road, to relay the signal to the Mine site.

Satellite communication technology is rapidly evolving and BMC may consider the adoption of this as a means of communication in the future.

5.2.7 Roads

The existing Tote Road will be upgraded to an all-weather, single lane Access Road with sufficient passing bay pull-outs to safely facilitate two-way traffic. The Access Road will be the main access to the site for all traffic including personnel transport, supply trucks and concentrate transport trucks.

In addition to the Tote Road upgrades, approximately 22 km of roads within the Project area will be either upgraded or newly constructed to service the needs of the Project. This will include construction of both light vehicle access roads and Mine haul roads.

5.2.8 Accommodation Camp

An approximately 350 person accommodation camp will be constructed adjacent to the existing exploration camp.

5.2.9 Finlayson Lake Airstrip

The existing Finlayson Lake airstrip is located approximately 40 km from the site and will be the main facility used to fly all Project personnel to and from Whitehorse. Should Finlayson Lake airstrip be unable to be used for any reason, contingency options include airstrips at Ross River, Faro and Watson Lake.

5.2.10 Concentrate Haulage

In general, concentrate will be hauled to Stewart World Port in Stewart, British Columbia via Watson Lake, Yukon for shipping to market.

Should concentrates be sold within the North American market, concentrate may be hauled to a rail siding at Fort Nelson for subsequent rail haulage to the customer, if that transportation route is considered to be more efficient than that of sea freight.

5.2.11 Support Infrastructure

Minor infrastructure that will support the main mining activities on site is summarized in Table 5-1.

Table 5-1: Support Infrastructure Summary

Infrastructure Item	Description
Paste Fill Plant	Produce paste backfill using binder and tailings for the underground Mine.
Warehouse and Administration Complex	Contains various areas to support Mine operations; assay lab, first aid room, maintenance area, cold storage area, Mine dry, warehouse, administration area and office space.
Fire Protection	Fire water distribution system will be installed around the Process Plant and camp area with wall hydrants at strategic locations.
Sewage Collection and Treatment	Sewage will be collected from the accommodation complex and the Process Plant/office. Treatment will occur at a Sewage Treatment Plant. The treated water will then be diverted to a septic field. Bio-sludge from the treatment plant will be buried on site at an approved location.
Production Core Storage Area	Store all drill core produced by the operation. Includes facilities for logging of core.
Accommodation Facilities	Modular accommodation facilities; kitchen and mess facilities; administration office; recreation facilities; laundry facilities; lockers and storage facilities.

5.3 MINING OPERATIONS

The Kudz Ze Kayah Mine, comprising both the ABM and Krakatoa Zones, is planned to operate for approximately 10 years. Details of the planned Mine development are presented in the Open Pit Mine Development and Operations Plan (BMC, 2024g).

5.3.1 ABM Open Pit

The ABM deposit comprises both the ABM Zone and the Krakatoa Zone. The majority of the ABM Zone will be mined by open pit mining methods. A single open pit will be mined that will access the ABM and Krakatoa Zones. The mining of the ABM Zone is currently planned to be staged into four separate phases to manage overall waste stripping requirements and the Krakatoa Zone is planned in a single stage.

5.3.2 Underground Mine

Underground mining is currently anticipated for the lower part of the ABM Deposit. Underground stope voids are designed to be filled with paste backfill.

5.3.3 Ore Processing

The Process Plant and associated service facilities is designed to process ROM ore at rate of up to 2.2 million tonnes per year, to produce separate copper, High Precious Metals (HPM) and zinc

concentrates and tailings, as described in the Process Plant Development and Operations Plan (BMC, 2024h). The processing will consist of the crushing and grinding of ore, separate sequential pre-float, rougher and cleaner flotation of copper, lead and zinc and regrind of copper, lead and zinc rougher concentrates. Concentrates will then be thickened, filtered and stockpiled on site prior to being loaded onto trucks for transport to third party smelters. The flotation tailings will be dewatered by thickening and filtration before being transported either for disposal at the Class A Storage Facility, or combined with binder to produce paste backfill to be emplaced underground as part of the mining cycle (in later years of Operations).

6 TEMPORARY CLOSURE

Temporary Closure for the Project is defined as closure of the undertaking as evidenced by the cessation of development and production authorized by the QML and Type A Water Licence for a period longer than six (6) consecutive months and is not expected to last longer than five years and can include both planned and unplanned closure. This condition assumes that the owner is still in active control of the site (i.e., not abandonment). This section presents how BMC will manage the Project in the event of Temporary Closure.

The approach to Temporary Closure is based on maintaining the site in a state of physical and chemical stability, while also ensuring the site is secure, safe, and in compliance with all regulatory requirements and authorization obligations. While ensuring these conditions, the Project and infrastructure will be maintained in a manner that will facilitate the resumption of mining operations in a timely manner.

The Temporary Closure preparations are described in Section 6.1. The subsequent specific measures employed to meet the Temporary Closure objectives are outlined in Sections 6.2 to 6.5. Monitoring and maintenance programs for Temporary Closure are presented in Section 6.6.

Socio-economic implications of potential Temporary Closure are described in Section 17.4 (Accidents and Malfunctions) of the Project Proposal (BMC, 2017a).

6.1 TEMPORARY CLOSURE PREPARATIONS

If a Temporary Closure condition is triggered through the definition stated in the Project's QML and Water Licence, a notice will be provided to the appropriate authorities stating:

- The nature and reason for the Temporary Closure;
- The anticipated duration of the Temporary Closure; and
- Actions planned to maintain compliance with Project permits and plan approvals.

The focus of the activities to prepare the site for Temporary Closure will be on securing the site in a manner which will allow for continued maintenance of site access, security, water management infrastructure, and any facilities which will be required for adhering to applicable licences, permits, and regulations.

To prepare the site for Temporary Closure, assets not required during the Temporary Closure period will be secured and major contractors will most likely be demobilized depending upon the expected length of the Temporary Closure period. Steps will be taken to reduce the environmental liability during this period. Any parts of the camp and process facilities which will not be used during Temporary Closure will be considered for decommissioning to the extent practical, without undermining the ability of the Project to be successfully and efficiently returned to operation at the end of the Temporary Closure period.

Full-time on site staff will ensure a consistent site presence during Temporary Closure, and the camp will be prepared for reduced staffing levels. The staffing numbers on site at a given time would likely range from four to ten people depending on the circumstances of the Temporary Closure. Environmental personnel will undertake all the environmental monitoring and inspection requirements. Appropriate trades personnel will conduct routine maintenance activities and WTP operators will be employed as required to achieve water management and effluent discharge criteria.

The power plant will be maintained and operated as needed. However, equipment and facilities not required during Temporary Closure will be de-energized, winterized (if required), and secured to allow access only to authorized personnel. Any components of the processing facilities, which are either not required to be in use during the Temporary Closure or which are not likely to suffer negative maintenance outcomes, will be drained, cleaned, and secured. The explosives facilities will be secured to ensure access is limited to authorized personnel only.

6.2 SITE SECURITY AND SAFETY

Site security will be maintained in a manner comparable to the operational period with access to the site controlled by maintaining a consistent presence at the gatehouse. Personnel accessing the site will be required to be on an approved site manifest.

All visitors will be required to check in with the camp administrator upon arrival. All operational safety protocols, plans, policies, and site orientation measures will be maintained and strictly enforced during Temporary Closure. This includes (but is not limited to) all aspects of the Emergency Response and Health and Safety Plan (BMC, 2024i) and Wildlife Protection Plan (BMC, 2024c).

6.3 MINING OPERATIONS AND MINE WASTE FACILITIES

After mining operations have shifted into Temporary Closure, the ABM open pit ramp will be protected against casual and/or unauthorized entry and signage warning of potential hazards will be posted (if not already in place) and otherwise maintained. Access may still be required for water management and/or other monitoring activities depending on when the Temporary Closure commences in relation to the remaining mining schedule.

Underground Mine portals, if developed at the time of Temporary Closure, will have signage posted, if not already in place, warning of hazards. BMC will work with Kaska to develop signage in Kaska Language (not only for Temporary Closure but also in permanent Closure). Access may still be required for water management activities, including maintenance of dewatering equipment, depending upon when the Temporary Closure commences in relation to the remaining mining schedule.

The Class A Storage Facility will undergo progressive reclamation during Operations, which will help to minimize the area of exposed tailings and waste rock if a Temporary Closure is initiated. There are three main potential risks under conditions of Temporary Closure:

- Surface desiccation and wind erosion (dusting);

- Oxidation of the exposed tailings and waste rock; and
- Metal leaching, particularly as the surface dries.

The most appropriate practice for minimizing the potential risks is to place a temporary 'isolation' cover on any exposed tailings and Class A or Class B waste rock surfaces. In the short term (within six months of cessation of development and production activities), a heavy duty plastic cover will be installed over the surface of the Class A Storage Facility. In the longer term (within twelve months of cessation of development and production activities), an overburden cover will be placed over the exposed Class A surface. The cover will be 0.25 m to 0.50 m thick and compacted to be trafficable by construction equipment.

Given the much slower onset of oxidation and metal leaching from the Class B Storage Facility, the expected duration of the Temporary Closure period will be considered when planning for placement of a temporary 'isolation' cover on the Class B Facility. For expected durations of 24 months or less, no action will be taken, unless monitoring identifies conditions that warrant placement of the cover, as per the Project AMP. If Temporary Closure extends beyond 24 months, or is expected to last longer than 24 months, the temporary 'isolation' cover will be placed within 6 months.

The facilities are designed to be physically stable and substantial regrading should not be required during Closure (temporary or otherwise) (although grading will be conducted if needed to support efficient drainage). Environmental and geotechnical monitoring activities will continue per the operational schedule at all Waste Storage Facilities (Section 7.11).

6.4 EQUIPMENT AND PROCESSING FACILITIES

The storage, removal, or otherwise of any equipment, machinery or consumables on site during a period of Temporary Closure is dependent on the expected nature, period and extent of the Temporary Closure and will be judged on a case by case basis. Any equipment remaining on site that is not required for Temporary Closure activities or for any other projected activities will be secured on site. Consumables will be stored and secured on lined areas, inside shops, or underground.

Prior to commencement of Temporary Closure, the crushed ore stockpile and bulk solid reagents (lime and binder) stock levels will be drawn down to minimum levels where practicable. Depending on the expected period of Temporary Closure, binder stocks may need to be removed from site to prevent the risk of binder hardening inside storage vessels. Lime will still be required for ongoing water treatment activities.

Management of explosive products on site will depend on the expected period of Temporary Closure. At a minimum, secure storage on site will be maintained; however, bulk explosives may be removed from site in the event of extended Temporary Closure duration. The explosives supplier will be consulted to determine the most appropriate approach after taking the expected Temporary Closure period into account.

Slurries will be drained from all process equipment and tanks, which will then be flushed with water. Residual reagent solutions remaining in mixing and storage tanks will also be drained and flushed

with water and treated in the Water Treatment Plant. Reagents in stock will initially be secured in the reagent storage area, with removal from site considered for an extended Temporary Closure period. Grinding media in the semi-autogenous grinding mill, ball mill and stirred regrind mills will be removed and stored for reuse when operations recommence.

The WTP and associated infrastructure will remain operational for ongoing water treatment requirements as discussed in Section 5.2. Lime will continue to be used on site for water treatment; however, at lower quantities than when the Process Plant is operational.

A care and maintenance crew will be responsible for maintaining the (shutdown) Process Plant and equipment, including periodically servicing all electrical motors to maintain bearing condition and ensuring essential services, such as the fire water pumps and the potable WTP, are on standby and can be run if required.

Any hazardous materials remaining on site during Temporary Closure will be stored in secured areas or buildings as appropriate and as authorized. Reagents required for water treatment during Temporary Closure will be stored in a secured manner, limiting access to authorized personnel only. The Waste Management Facility (WMF) will be managed per approved management plans and YG permit conditions as outlined in the Waste Management Plan (BMC, 2024j).

Fuel storage will be utilized in a reduced manner during Temporary Closure and will be secured and maintained by site staff.

The ROM pad and LGO stockpiles will be left in place at the time of initiating Temporary Closure, as they are incorporated into the Class B Storage Facility. They will be inspected periodically (i.e. annually) with other site facilities for physical integrity, and signs of erosion. All runoff from the stockpiles will continue to be collected and treated as during Operations.

6.5 WATER MANAGEMENT

The strategy from the Water Management Plan will be maintained in the event of Temporary Closure (BMC, 2024f). Existing diversions, seepage collection systems, water storage structures, and treatment systems will be maintained and utilized/operated as planned for the period of Temporary Closure. The water management strategy includes the following key principles:

- Water collected will continue to be treated as per the Water Management Plan such that it is acceptable for discharge and in compliance with all applicable regulations, licences, and permits;
- Water will continue to be diverted around the site in existing diversion channels/ditches. These channels and ditches will be maintained through Temporary Closure to ensure that non-impacted water is being appropriately diverted;
- The Water Treatment Plant will continue to be operated; and
- The ABM open pit and underground mine will continue to be de-watered during Temporary Closure as required. If the underground workings are developed to the point of needing

substantial dewatering, the dewatering activities will continue during Temporary Closure. The dewatering may be discontinued if deemed necessary (for example: to reduce the quantity of water requiring management, treatment and discharge).

6.6 MONITORING AND MAINTENANCE

During Temporary Closure, the site will be monitored in compliance with the approved Environmental Monitoring, Surveillance and Reporting Plan (EMSRP) (BMC, 2024m) and Adaptive Management Plan (AMP) (BMC, 2024n), the site Operations Maintenance and Surveillance Manual, and all lease and permit requirements.

Monitoring and inspection activities will include, but not be limited to:

- Environmental protection monitoring and reporting as per the approved EMSRP and AMP;
- Physical stability inspections as per the Sediment and Erosion Control Plan (BMC, 2024k), looking for signs of instability and problematic erosion/sedimentation;
- Inspections of the water conveyance systems to ensure the facilities function as designed;
- Inspections of equipment, buildings, and processing facilities to ensure that they remain in good repair; and
- Follow-up investigation by the appropriate personnel, as warranted, based on reports of changes to the physical status of any part of the site.

Facilities and equipment required during Temporary Closure will be maintained on a preventative maintenance program similar to that used during Operations. Maintenance activities are likely to include, but not be limited to:

- Maintaining the physical stability and functionality of diversion channels;
- Maintenance of water conveyance equipment and systems;
- Maintenance of the Access Road and site service and haul roads including surface drainage, ditches, culverts, and road grading as required;
- Maintaining progressively reclaimed and temporary cover areas of Waste Storage Facilities to prevent/minimize erosion and sedimentation;
- Maintenance of seepage collection and sediment control ponds;
- Preventative maintenance of equipment;
- Maintenance of the WMF;
- Maintenance and securing of fuel storage areas; and
- Maintenance and operation of the WTP.

7 FINAL RECLAMATION AND CLOSURE MEASURES

This chapter outlines the final RCP for the Project. The information presented in this Chapter ensures that closure measures:

- Support the defined closure goals and objectives;
- Are technically feasible;
- Support the evaluation of potential environmental and socio-economic effects from the Project (in the Closure phases); and
- Are sufficient to support a detailed closure liability cost estimate.

The following sections present specific closure objectives and corresponding criteria and measures for both broadly applied (general reclamation) measures, and specific Project facilities (e.g., ABM open pit, Class A Storage Facility). Dialogue and involvement of Kaska representatives will be ongoing throughout all Project phases and therefore, the closure measures presented in this Chapter are expected to be refined from time to time as a result of ongoing engagement.

7.1 GENERAL RECLAMATION MEASURES

Reclamation of the Project will rely on a combination of standard, commonly applied strategies as well as some Project and component-specific measures aimed at meeting all reclamation and closure objectives. Section 3.1 outlined the fundamental reclamation and closure objectives that YG's Mine Closure Guidelines dictate must be achieved through closure and reclamation measures (YG, 2013). The general or broadly applied measures planned to meet these fundamental objectives are summarized and described in this section.

Table 7-1 summarizes the general reclamation and closure objectives and measures for the Project.

Table 7-1: General Reclamation and Closure Objectives and Measures

Value	Reclamation and Closure Objectives	Measures
Physical Stability	All Mine-related structures and facilities are physically stable and performing in accordance with design. All Mine-related structures, facilities and processes can withstand severe climatic and seismic events.	The objectives are all achieved through design that considers the long-term performance of the facility. Facilities are constructed on stable foundations, with appropriate factors of safety, and appropriate design criteria for extreme climatic events.
Chemical Stability	Release of COPIs from Mine related waste materials occurs at rates that do not cause unacceptable exposure in the receiving environment.	The Class A and B Storage Facilities are lined and covered with a composite liner system to minimize contact with oxygen and water, and to minimize impacted runoff/seepage. The Class A and B Storage Facilities contain seepage collection systems and collection ditches to manage impacted water. Active water treatment infrastructure and capacity will be retained on site until passive water treatment system(s) are achieving performance criteria. ABM lake water will be treated with lime, ferric iron and carbon sources as required as it fills to reduce COPI concentrations prior to release. Progressive reclamation and revegetation strategies will minimize the potential for windblown tailings/dust mobilization.
Health and Safety	Reclamation eliminates or minimizes existing hazards to the health and safety of the public, workers and area wildlife by achieving conditions similar to local area features. Reclamation and closure implementation avoids or minimizes adverse health and safety effects on the public, workers and wildlife.	All worker health and safety systems, protocols and preventative measures employed during Operations will continue during the Closure phases. Infrastructure and facilities deemed by BMC to not be required for closure activities will be decommissioned and removed from the site. The ABM open pit will be signed and barricaded (ramp access and two berms will be constructed around pit rim) to minimize the potential for deliberate or inadvertent access by humans or wildlife.
Ecological Conditions and Sustainability	Reclamation and closure activities protect the aquatic, terrestrial and atmospheric environments from Mine-related degradation and restore environments that have been degraded by Mine-related activities. The Mine site supports a self-sustaining biological community that achieves land use objectives.	Revegetation strategies are informed by a comprehensive terrestrial ecosystem mapping inventory of pre-existing conditions. Revegetation prescriptions for disturbed areas will balance the objectives of restoring like ecosystems with erosion stabilization and stability monitoring objectives. Revegetation prescriptions will also consider traditional foods and medicines and input from Kaska.
Land Use	Lands affected by Mine-related activities (e.g., building sites, chemical and fuel storage sites, roads, sediment ponds, tailings storage facilities, and waste rock storage areas) are restored to conditions that enable and optimize productive long-term use of land by wildlife and Traditional Use by Kaska (focused primarily on hunting). Conditions are typical of surrounding areas or provide for other land uses that meet community needs, interests, and expectations through discussions and involvement from Kaska representatives from RRDC and LFN.	Wildlife use has been well documented, and TLU is understood at a general level. Habitat and land capability requirements of species that are key to the primary TLU of hunting (caribou and moose) are the basis of the development of revegetation prescriptions for all reclamation activities.

Value	Reclamation and Closure Objectives	Measures
Aesthetics	Reclamation outcomes are visually acceptable.	Class A, B, and C and Overburden Storage Facilities have been designed with slopes and features that mimic the surrounding topography. No constructed facilities will be higher than surrounding features (i.e., not visible from afar). Revegetation strategies will employ native species and will be informed by vegetation communities on similar slopes, aspects and elevations in the surrounding area.
Socio-economic Expectations	Reclamation and closure implementation avoids or minimizes adverse socio-economic effects on local and Yukon communities, while maximizing socio-economic benefits. Reclamation and closure activities achieve outcomes that meet community and regulatory expectations.	The Project has been planned and designed to minimize long-term maintenance and management requirements (e.g., filtered tailings, passive water treatment, lined/covered waste facilities, no embankments remaining in Geona Creek). There is a Socio-economic Participation Agreement in place with Kaska, and this agreement contains a framework for contract preference, which will persist and apply in Closure/Post-closure. Commitments have been made as part of the Information Request Response Reports that meet community and regulatory expectations (e.g.: use of the composite HDPE liner/cover systems, removal of overburden from beneath the Class A Storage Facility buttress). Commitments have been made as part of a Failure Modes Effects Assessment (FMEA) workshop (e.g. double berm constructed around the perimeter of the ABM open pit).
Long-term Certainty	Minimize the need for long-term operations, maintenance and monitoring after reclamation activities are complete.	The Project and the closure measures are designed to minimize long-term maintenance and management requirements (e.g., dry-stacked tailings, passive water treatment, lined/covered waste facilities, no classified water retention structures remaining).
Financial Considerations	Minimize outstanding liability and risks after reclamation activities are complete.	Facilities designed for closure; alternatives assessment considered closure conditions for waste placement to minimize environmental liability and therefore costs to conduct reclamation and closure activities. A FMEA was completed to further identify potential failure modes and effects, and to refine closure measures to reduce risk and costs at Closure and in Post-closure (Appendix A).

7.1.1 Re-grading and Re-sloping

The Class A, Class B and Class C Storage Facilities were designed for ease of closure (i.e., forms and slopes are appropriate to meet closure objectives), therefore there are limited requirements for substantial earthworks to re-grade the facilities for long-term physical stability. Progressive reclamation of the Waste Storage Facilities will be adopted during Operations and will use standard earthworks methods with appropriate machinery (e.g., dozers, graders and backhoes).

Reclamation methods that reduce equipment traffic during soil redistribution and placement will be utilized to lessen compaction of soil in stockpiles and reclaimed areas. For example, where practicable, instead of a dozer, a backhoe will be used to distribute topsoil cover in the reclaimed areas. Ripping will be used in areas where surficial soils are excessively compacted.

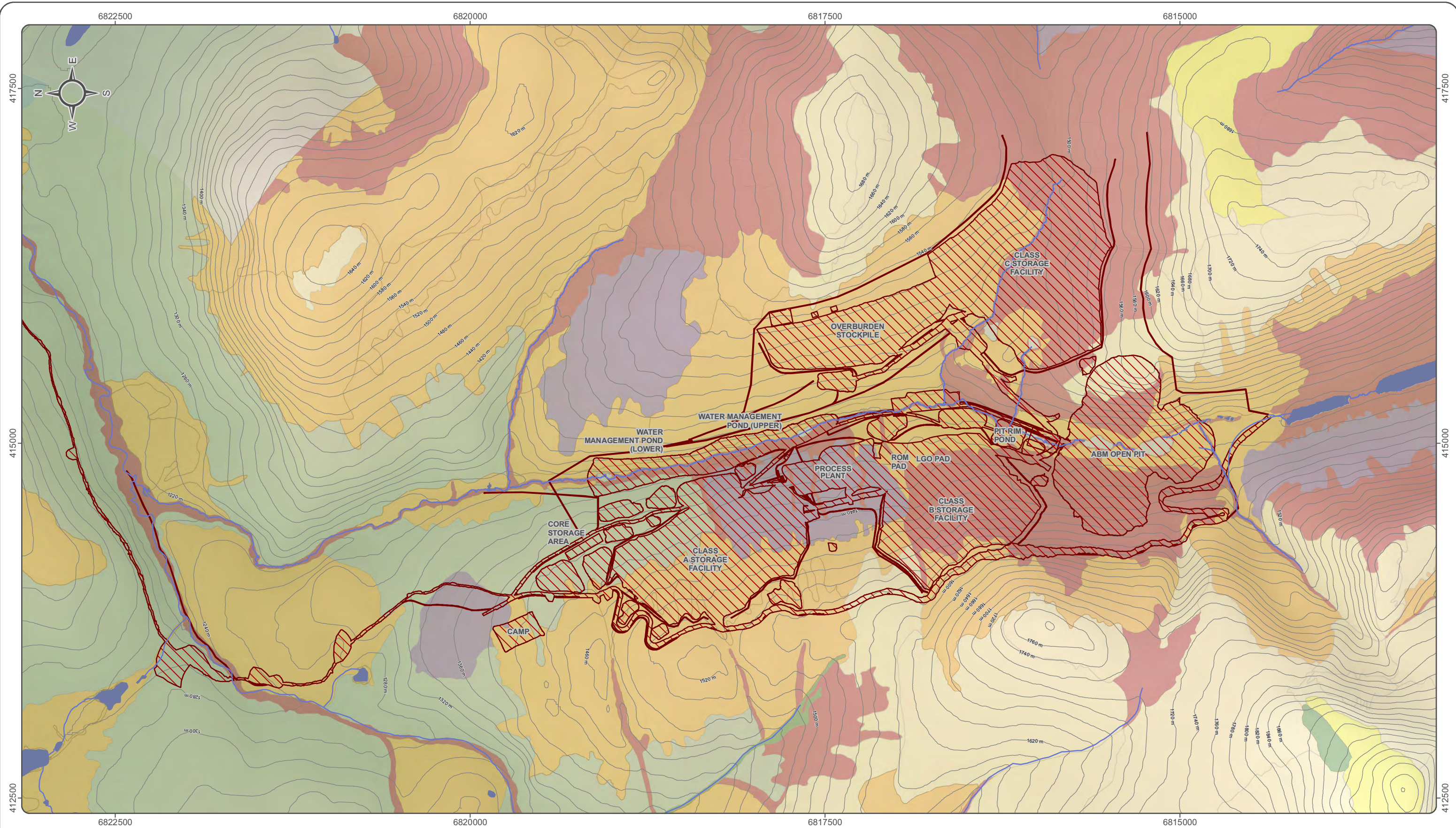
7.1.2 Revegetation

Revegetation is a key component of Mine reclamation and is a critical measure employed to meet a variety of Mine Closure objectives, including erosion control and reclamation of land use and habitat

capability. Land use for activities of traditional hunting, trapping, and gathering that were unable to be maintained during Operations will also be restored through revegetation and reclamation of wildlife habitat.

The revegetation plan is based on information from the baseline terrestrial ecosystem mapping for the Project area (AEG, 2016a). The Terrestrial Ecosystem Map shows what groups of plant species (vegetation associations) grow on different types of soils in the Project area. The types of soils are categorized into ecosites, which are defined by the nutrient and moisture regimes at various elevations, aspects, and slope gradients.

Figure 7-1 shows a portion of the Terrestrial Ecosystem Map for the Project area where baseline conditions exhibit a variety of vegetation associations, dominated mostly by scrub birch (dark yellow) and willow (red) with some subalpine fir (purple), white spruce (green), and grasslands (yellow).

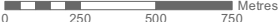


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- ECOSYSTEMS BY LEADING SPECIES**
- | | |
|---|--|
|  Carex species |  Graminoids |
|  Dwarf shrubs |  Black Spruce |
|  Scrub Birch |  White Spruce |
|  Subalpine Fir |  Willow species |

- | |
|---|
|  Development Footprint |
|  Watercourse |
|  Waterbody |



**KUDZ ZE KAYAH PROJECT
RECLAMATION AND CLOSURE PLAN**

**FIGURE 7-1
EXISTING ECOSYSTEMS AND
PROJECT FOOTPRINT**

SEPTEMBER 2019

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(Last edited by: mducharme.9/6/2019/5:03 AM - edited in corel draw - November 2019.)

The final surface of all impacted Project areas will be recontoured, covered with suitable growth media where required to promote vegetation growth and then revegetated. Stockpiled topsoil and overburden materials were assumed to be nutrient poor based on experience at other metal mines in BC and Yukon (Polster, 2013) and as demonstrated in baseline soil sampling at the Project (AEG, 2016a). When soil is stripped during construction and stockpiled it can lose structure, nutrients, and microbial communities, seeds in the soil lose their viability, and anaerobic conditions develop that degrade the soil further (Strohmayer, 1999). Ideally, storage of soil in low berms, less than 1 m deep, re-vegetating stockpiles, and staging progressive reclamation to minimize soil storage times help retain soil nutrients and biota and improves revegetation success (Strohmayer, 1999). However, stockpile depth needs to be balanced with minimizing the footprint of surface disturbance.

To promote the most effective use of topsoil salvaged from Project development, BMC will adopt the following principles for topsoil management:

- Remove topsoil just prior to when excavation is required (to reduce potential for erosion);
- Reuse topsoil immediately in reclamation where possible (to limit rehandle and promote the preferential use of the most viable topsoil);
- Limit rehandling of topsoil where practicable, including when soil is too dry or too wet (to reduce dust and erosion and maintain soil viability);
- Limit the size of topsoil stockpiles (to reduce the impact of heating the pile and therefore maintain seed viability as much as possible);
- Where topsoil stockpiles are required to be maintained for a long period, apply seed to promote natural cover; and
- Reseed topsoil as soon as reasonably possible immediately after placement and contouring when completing reclamation works (to limit potential for erosion).

Continuous progressive construction and reclamation techniques will reduce the potential for deconditioning of stripped soils as far as is practicable. Paquin and Brinker (2011) found retaining large woody debris in stripped soils helped retain nutrients and promote revegetation; this technique may be used for the topsoil stockpiles.

Long-term vegetation associations were estimated based on the predicted ecosites on the Waste Storage Facilities. Short-term revegetation goals were also targeted, incorporating known revegetation seed mixes and recommendations as outlined in the Yukon Revegetation Manual (Matheus and Omtzigt, 2013). Once pioneer species of vegetation develop through seeding and planting, surrounding plants should take over through succession with the expectation that more diverse, long-term vegetation associations will develop (Polster, 2013). Table 7-2 summarizes the expected ecosites to be available on each component of the various post-mining landforms, the target species for seeding and planting in the short-term, the long-term target vegetation associations expected to develop through natural succession, and the primary wildlife species expected to use the resulting habitats. Existing and predicted ecosystems by leading species are shown in Figure 7-2.

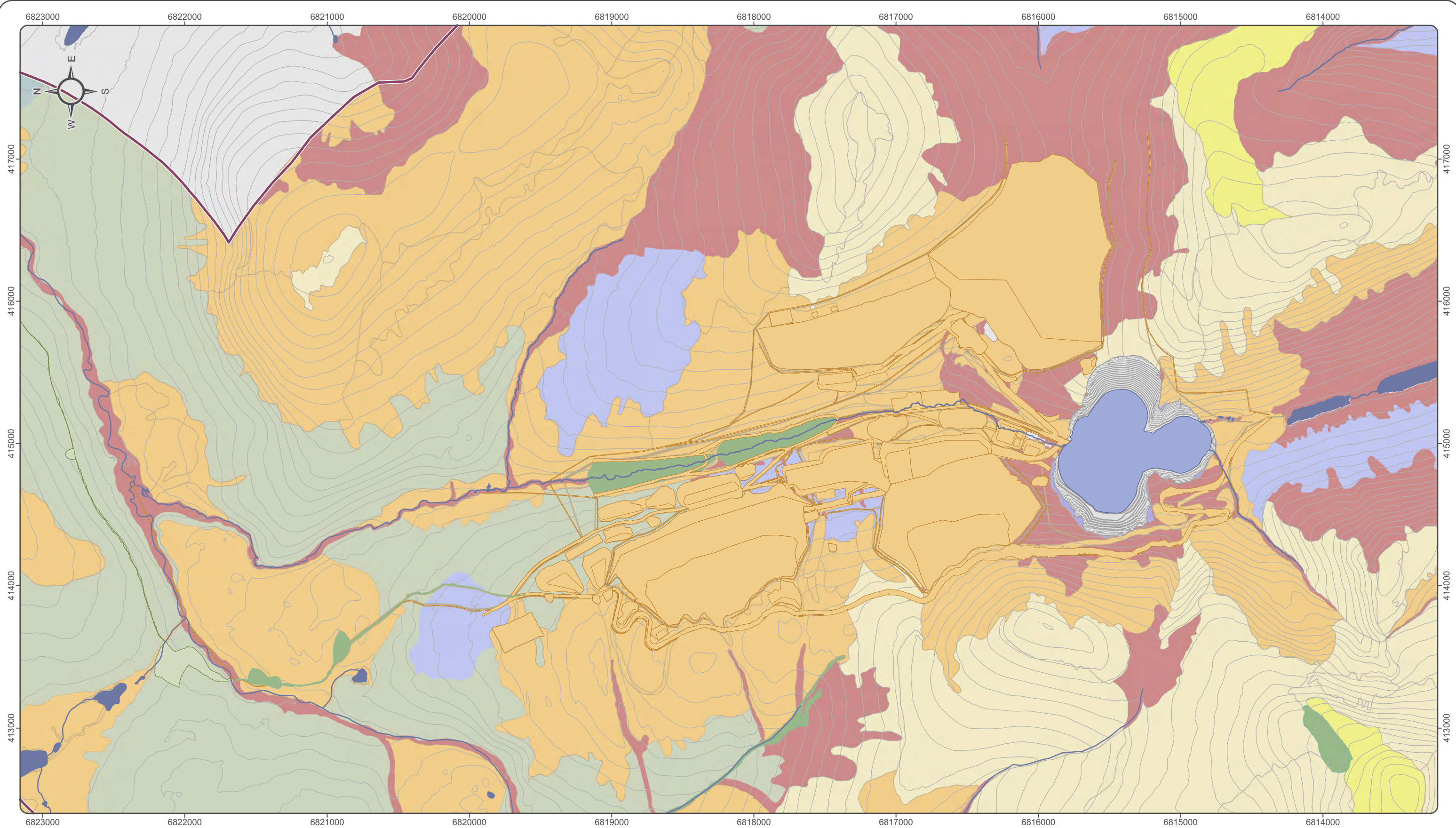
The expected wildlife use of the resulting habitats shown in Table 7-2 is based on baseline wildlife suitability mapping which only describes the suitability of a habitat to meet a specific wildlife species' life requisites such as rutting, breeding, shelter. The suitability mapping does not confirm presence or use of a habitat by a species, but describes how suitable the habitat is for the described life requisite. It could be assumed that once an area has reached the revegetation objectives described then it also has the potential of being suitable habitat for the species and life requisite described. For example, for moose, the post rut period and the late winter period were considered the most important life requisites for moose in the Project area. Wildlife surveys and incidental observations have recorded many different wildlife species throughout the Project area including around proposed infrastructure, so it can be assumed that successful reclamation will provide similar habitat for wildlife species that have been observed. The wildlife program will continue to monitor the presence of wildlife species and the use of reclaimed areas.

In the long-term, vegetation associations are expected to be dominated by scrub birch on the various waste storage facilities and on the slopes surrounding Geona Creek due to the expected low moisture and nutrients (Figure 7-3).

Table 7-2: Post-Mining Land Use - Revegetation Objective and Potential Wildlife Use

Facility	Facility Sub-Area	Area (ha)	Target Ecosite # / Nutrient-Moisture Regime	Short-term Target Revegetation Treatment and Rationale	Long-term Target Post-Mine Vegetation Association	Estimated Post-Mine Habitat Suitability
Class A Storage Facility	Top	33	Subalpine 23/ Poor-Mesic	Grasses and forbs. Seed with commercial and locally collected native seed mix, fertilize. Plant scrub birch seedlings.	Scrub birch, willow, and crowberry.	Caribou rut, moose post-rut, grizzly bear, wolf, small mammals, and upland game birds.
	Slopes	54	Subalpine 11/ Poor-Subxeric	Low growing species to allow for monitoring physical and chemical stability of facility. Grasses and forbs. Seed with commercial and locally collected native seed mix, fertilize. Research with inoculation to restore lichens and mosses in biological soil crusts.	Scrub birch, and lichen.	Moose post-rut, and wolf.
Class B Storage Facility	Top	16	Subalpine 23/ Poor-Mesic	Grasses and forbs. Seed with commercial and locally collected native seed mix, fertilize. Plant scrub birch seedlings.	Scrub birch, willow, crowberry.	Caribou rut, moose post-rut, grizzly bear, wolf, small mammals, and upland game birds.
	Slopes	51	Subalpine 11/ Poor-Subxeric	Low growing species to allow for monitoring physical and chemical stability of facility. Grasses and forbs. Seed with commercial and locally collected native seed mix, fertilize. Research with inoculation to restore lichens and mosses in biological soil crusts.	Scrub birch, and lichen.	Moose post-rut, and wolf.
Class C Storage Facility	Top	65	Subalpine 23/ Poor-Mesic (70%)	Grasses and forbs. Seed with commercial and locally collected	Scrub birch, willow, and crowberry.	Caribou rut, moose post-rut, wolf,

Facility	Facility Sub-Area	Area (ha)	Target Ecosite # / Nutrient-Moisture Regime	Short-term Target Revegetation Treatment and Rationale	Long-term Target Post-Mine Vegetation Association	Estimated Post-Mine Habitat Suitability
		28	Subalpine 31/ Poor-Subhygric (30%)	native seed mix, fertilize. Plant scrub birch seedlings.	Fir-scrub birch, feathermoss, and lichen.	ptarmigan, voles, and mice.
	Slopes	32	Subalpine 22/ Poor-Submesic	Grasses and forbs. Seed with commercial and locally collected native seed mix, fertilize. Research with inoculation to restore lichens and mosses in biological soil crusts.	Scrub birch, feathermoss, and lichen.	Caribou rut, moose post-rut, and wolf.
Overburden Stockpile	Slope	46	Subalpine 23/ Poor-Mesic	Grasses and forbs. Seed with commercial and locally collected native seed mix, fertilize. Plant scrub birch seedlings.	Scrub birch, willow, and crowberry.	Moose post-rut, and wolf.
Open Pit		83	Flooding	No revegetation.	ABM lake.	Waterfowl.
Water Management Ponds	Constructed Wetland (Contingency design measure)	2	Subalpine 42/ Poor-Hygric	Engineered design and species selection based on water treatment requirements.	Carex sp.	Waterfowl, passerines, moose, grizzly bear, and small mammals.
	Water management ponds	7	Subalpine 42/ Poor-Hygric (30%)	Locally collected willow staking.	Willow, horsetail, forbs, and grass.	Waterfowl, passerines, moose, grizzly bear, and small mammals.
		15	Subalpine 35/ Rich-Subhygric (70%)	Supplement organics.		
	Seepage collection ponds	19	Subalpine 23/ Poor-Mesic	Grasses and forbs. Seed with commercial and locally collected native seed mix and fertilize.	Scrub birch, willow, and crowberry.	Moose, small mammals, and passerines.
Process Plant and Ancillary Facilities	Process Plant	36	Subalpine 23/ Poor-Mesic	Scarify. Grasses and forbs. Seed with commercial and locally collected native seed mix and fertilize.	Scrub birch, willow, and crowberry.	Moose, small mammals, and passerines.
	Other disturbed areas	39.5	Subalpine 01/ Medium-Mesic	Contour and scarify where needed. Grasses and forbs. Seed with commercial and locally collected native seed mix and fertilize.	Subalpine fir, scrub birch, willow, feathermoss.	Moose, small mammals, and passerines.
Site Roads	Site roads	122	Boreal and Subalpine 01/ Medium-Mesic	Scarify. Grasses and forbs. Seed with commercial and locally collected native seed mix and fertilize.	White spruce, willow, forbs, and feathermoss in Boreal High.	Caribou, moose, small mammals (including bats), and passerines.
					Scrub birch, willow, feathermoss in Subalpine.	



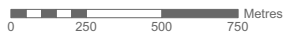
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ECOSYSTEMS BY LEADING SPECIES

- | | |
|---------------|----------------|
| Carex species | Black Spruce |
| Dwarf shrubs | White Spruce |
| Scrub Birch | Willow species |
| Subalpine Fir | Bare Rock |
| Graminoids | |

- | |
|------------------|
| Local Study Area |
| ABM Lake |

- | |
|-------------|
| Watercourse |
| Waterbody |

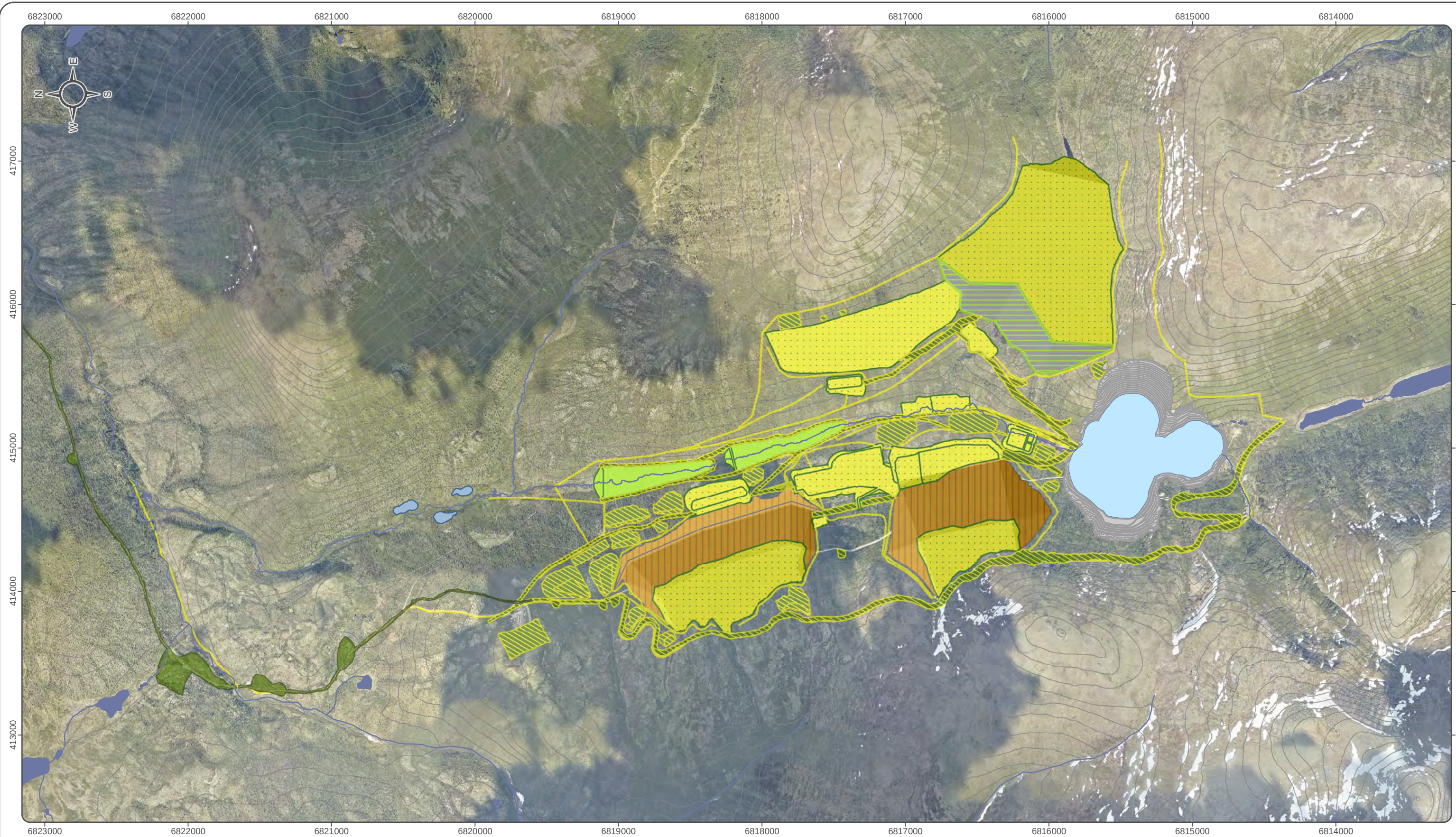


KUDZ ZE KAYAH PROJECT RECLAMATION AND CLOSURE PLAN

FIGURE 7-2 EXISTING AND PREDICTED ECOSYSTEMS BY LEADING SPECIES

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AEG

PREDICTED POST-MINING ECOSYSTEM VEGETATION ASSOCIATIONS
(only dominant vegetation shown)

- | | | |
|---------------------------------------|------------------------------|--------------------------------|
| Fir-Scrub Birch-Willow-Feathermoss | Scrub Birch-Willow-crowberry | ABM Lake |
| White Spruce Willow-Forbs-Feathermoss | Willow-Horsetail-Forbs-Grass | Fish Habitat Compensation Pond |
| Scrub Birch-lichen | Bare Rock | Waterbody |
| Scrub Birch-Feathermoss-Lichen | | |



KUDZ ZE KAYAH PROJECT

FIGURE 7-3
PREDICTED POST-MINING ECOSYSTEMS ON
BACKGROUND IMAGERY

SEPTEMBER 2019

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Permafrost is expected to redevelop on the post-mining landforms, especially the north aspect slopes, which will influence the resulting revegetation. Revegetation is planned to also include planting scrub birch, blueberry, and low bush cranberry seedlings on flatter, moister slopes to restore habitat for some of the larger focal wildlife species. Berry bushes are a target species to help create suitable habitat for grizzly bear and are also traditionally important plants for Kaska (Wein and Freeman, 1995). A revegetation target of grasses and low shrubs on upper portions of facilities is expected to restore suitable caribou habitat. It is expected that subalpine fir will recolonize the edges of facilities over time, in particular on the Class C Storage Facility where north aspect slopes will retain more moisture. Wetlands and riparian vegetation are expected to develop along Geona Creek where there is more moisture present. Willow staking will be employed to help restore riparian vegetation and suitable habitat for moose, as well as wetland habitat for many other wildlife species. Overall, it is expected that furbearers, small mammals, and game birds will also use the restored grass and shrublands.

Revegetation is challenging on northern Mine sites (Adams and Lamoureux, 2005). Revegetation has been found to be most successful on flatter slopes with native species and natural recolonization (EBA, 2011). Re-establishing the bacteria and fungi in the soils has also been found to be a limiting factor to revegetation on sterile soils (Bowker, 2007). Research has shown that amending the overburden with native bacteria, fungi, and bryophytes helps re-establish the biological soil crust which improves the success of seed germination (Bowker, 2007; Stewart, 2013); therefore, research with soil amendments is planned for reclamation to develop a biological soil crust and promote succession.

Maintaining biological diversity is a key management strategy. More diverse vegetation and wildlife communities can be developed by increasing heterogeneity of facilities to create a variety of microenvironments (Polster, 2013). This will be achieved by contouring slopes loosely and less uniformly, which reduces wind and water erosion and allows for better retention of moisture and accumulation of fines (Polster, 2013). Non-uniform seeding and planting can also help develop habitat diversity. The planned seed mixes for the revegetation program are discussed below.

7.1.2.1 Species Selection

To date two types of seed mixtures have been used at the Project (Table 7-3), a dry area mix and a wet area mix. This list will be expanded and/or updated to include additional site-specific native plants in consultation with Kaska and as more information becomes available from the ongoing revegetation research programs at site.

Table 7-3: Seed Mixture used for Reclamation

Dry Area Seed Mix (2015)	Dry Area Mix (2016)	Dry Area Mix (2017 and 2018)	Wet Area Seed Mix (2015 and 2016)
37% Violet Wheatgrass (<i>Elymus violaceus</i>)	37 % Slender Wheatgrass (<i>Elymus trachycaulus</i>)	37% Slender Wheatgrass	40% Violet Wheatgrass
25% Rough Fescue (<i>Festuca altaica</i>)	25% Rough Fescue	15% Ticklegrass (<i>Agrostis scabra</i>)	33% Fowl Bluegrass (<i>Poa palustris</i>)
25% Rocky Mountain Fescue (<i>Festuca saximontana</i>)	25% Rocky Mountain Fescue	35% Rocky Mountain Fescue	27% Tufted Hairgrass
13% Glaucous Bluegrass (<i>Poa glauca</i>)	13% Tufted Hairgrass (<i>Deschampsia cespitosa</i>)	13% Tufted Hairgrass	

BMC plans to add locally collected seeds into its reclamation program and to support this program and the reclamation research BMC commenced collecting seeds from site in 2017 (in collaboration with RRDC and LFN). Seed germination is usually low in colder subalpine areas and locally collected seed germination has been found to be more successful. A combination of naturalized, commercial native seed mixed with locally collected seeds is therefore planned for the Mine reclamation program. Commercially available native species will be trialed on site based on facility-specific soil pH and nutrient content of the final reclamation covers.

The pH of soils at site is generally slightly acidic ranging from 5.94 to 6.24 for Site S-1 and 4.9 to 5.56 for S-2 (Appendix B). The Yukon Revegetation Manual (Matheus and Omtzigt, 2013) recommends Rocky Mountain fescue (*festuca saximontana*) and violet wheatgrass (*elymus*) for alkaline soils, glaucous bluegrass (*Poa glauca*) for a broad range of pH, and, ticklegrass (*Agrostis scabra*), tufted hairgrass (*Deschampsia cespitosa*), alpine bluegrass (*Poa alpina*), and spike trisetum (*Trisetum spicatum*) for acidic soils. Species that are recorded at site and recommended by Matheus and Omtzigt (2013) include alpine sweetgrass (*hierochloe alpine*), mountain timothy (*Phleum pratense*), alpine sagewort (*Artemisia norvegica*), arctic lupine (*Lupinus arcticus*), and mountain avens (*Eightpetal mountain-avens*).

Progressive revegetation on the Class A Storage Facility is planned to start with combined commercially available and locally collected native seed mixes. Table 7-4 summarizes the planned seed mixes for these facilities. The tops of these facilities are expected to be acidic, moister than the slopes, and nutrient poor; therefore, the seed mix is planned to start with glaucous bluegrass, ticklegrass, tufted hairgrass, alpine bluegrass, alpine sweetgrass, and arctic lupine. The slopes of these facilities are expected to be acidic, well drained, and nutrient poor; therefore, the seed mix is likely to start with glaucous bluegrass, alpine bluegrass, mountain timothy, and alpine sagewort. For revegetation success, Matheus and Omtzigt (2013) recommend seeding on subalpine sites should not exceed 1,500 seeds/m² and fertilizer should not exceed 50 kg/ha of nitrogen.

Table 7-4: Proposed Initial Species for Revegetation

Facility Areas	Commercial Native Species (seeds)	Locally Collected Native Species (seeds)	Locally Collected Native Species (staging or seedlings)
Class A, B and C Storage Facilities - Tops	Glaucous bluegrass, ticklegrass, tufted hairgrass, alpine bluegrass	Alpine sweetgrass, mountain timothy, and arctic lupine	Scrub birch seedlings (near edges of facility) <i>Vaccinium</i> sp. seedlings
Class A, B and C Storage Facilities - Slopes; and Overburden Stockpile	Slender wheatgrass, glaucous bluegrass, alpine bluegrass	Northern rough fescue, wheatgrass, alpine sagewort	-
Water Management Ponds	Tufted hairgrass, fowl bluegrass, American sloughgrass	Northern rough fescue, arctic lupine	Willow staging (felt leaf willow, <i>Salix alaxensis</i> preferred; plus, plane- leafed willow, <i>S. planifolia</i> , and small tree willow, <i>S. arbusculoides</i>)
Process Plant and Ancillary Facilities	Slender wheatgrass, rough fescue, Rocky Mountain fescue, tufted hairgrass	Northern rough fescue, wheatgrass, arctic lupine	-
Site Service and Haul Road	Slender wheatgrass, rough fescue, Rocky Mountain fescue, tufted hairgrass	Wheatgrass, sagewort, wormwood, arctic lupine	-

The revegetation treatments proposed in the overall revegetation program will be tested and optimized through the on site research program during progressive reclamation. A reclamation research program has been designed and is described in Section 2.5. This program will include the development and implementation of multiple studies through the Project life to evaluation measures needed to meet Project reclamation objectives. In 2018, an initial research program was implemented to assess various approaches to regenerating vegetation covers on disturbed areas. These initial trial plots examine a combination of different revegetation treatments to determine the most efficient and effective closure option, including assessment of the best way to support growth of vegetation species that are naturally adapted to the area.

Additional trial programs trials may include but are not limited to:

- New seed and fertilizer treatments based on the results of the 2018 trial sites, available seeds, soil analysis and site conditions;
- Research into germination and propagation techniques;
- Install additional sites in riparian areas and the high boreal ecozone; and
- Monitor trial sites and plots throughout the growing seasons to assist in determining germination success and plant growth and to monitor ingress by adjacent natural vegetation.

Mosses and lichens comprise a large proportion of groundcover in the Project area (Figure 7-1; AEG, 2016a). Reclamation research has been conducted by Yukon University and its partners on ways to rebuild this biological soil crust, a layer of soil that contains necessary mosses, fungus, lichen, algae, and bacteria necessary for successional reclamation of low organic overburden such as that found at Mine sites (Stewart, 2013). Additional research has been undertaken using biochar to restore soil nutrients. Project revegetation strategies and treatments will also consider ongoing research on other projects that will work to restore the native moss and lichen groundcover at site.

An integral component of the revegetation program will be input and participation by Kaska and therefore, the closure measures presented above are expected to be refined from time to time with ongoing engagement, especially in integrating Kaska traditional knowledge for the area.

7.2 ABM OPEN PIT

Table 7-5 presents the closure objectives specific to the ABM open pit closure, grouped by value categories (e.g., physical stability and safety, environment and land use). This table also summarizes relevant design criteria and closure measures that have been developed to achieve the objectives, and performance criteria which will be used to define achievement of the objectives in Closure monitoring.

The ABM open pit and surrounding areas will undergo reclamation to ensure that the pit walls are stable and pose no danger to the general public or local wildlife. Double rock safety berms will be constructed around high wall edges to prevent inadvertent access by people or wildlife. The concept of the double berms was introduced as a mitigation measure resulting from the FMEA, presented in Appendix A. The ABM open pit will be allowed to flood once dewatering of the pit ceases. Fault Creek will also be redirected to the ABM open pit. This will help provide a long-term control on oxidation and metal leaching from the pit walls.

Table 7-5: ABM Open Pit Closure Measures Summary

Value	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Physical Stability	Minimize potential for pit wall collapse	No major pit wall failures which compromise engineered outflow or pit crest stability	Overburden designed with 25° slope angle in the valley floor, 30° slope angle on western and eastern valley walls. ABM open pit slope inter-ramp angles designed between 36° and 52° based on geotechnical considerations.
	Provide safe egress from the pit (if someone or something falls into it)	No casualties as a result of not being able to egress pit	Egress location maintained at ABM lake engineered spillway.
Chemical Stability	Minimize COPI loading from the pit in the closure period	ABM lake water quality is in predicted range of COPI concentrations	Batch treatment of ABM lake (add lime, and organics, with initial filling of pit if required) to address flushing of secondary mineralization and related metal concentrations.
	No active water treatment required to maintain chemical stability or environmental compliance	No active water treatment in Post-closure	In situ pit water treatment and contingency passive treatment (CWTS) in Geona Creek.
Health and Safety	Prevent inadvertent access to the pit (falling in over the edge)	No casualties as a result of falling into pit	Limit access to ABM open pit crest with safety double berms, setback from the crest, as per commitments made during the FMEA (Appendix A).
Land Use / Ecological Conditions and Sustainability	Limit impact on wildlife, in particular waterfowl	No wildlife mortalities due to exposure/use of ABM lake	In situ pit water treatment. Wildlife barrier (double berm) around ABM lake walls.
Financial Considerations	Minimize outstanding liability and risks in Post-closure, and	Monitoring surveillance and adaptive management	Removal of Fault Creek diversion removes long-term maintenance requirement.

Value	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
/ Long-term Certainty	minimize the need for long-term operations, maintenance and monitoring in Post-closure	programs are executed as planned without increasing maintenance demands	Engineered spillway to control outflow from ABM lake and double safety berms around high wall.

The accumulation of soluble secondary minerals during weathering of the exposed pit walls and pit floor may result in the presence of elevated trace element concentrations in pit water during its flooding. Water quality data collected from the ABM open pit during its initial filling will be used to determine if lime addition is necessary to control pH. Acidic conditions are not anticipated due to the limited presence of acid generating pit wall lithologies and the alkalinity of water sourced from Fault Creek and from groundwater. Placement of Class C waste rock in ABM pit prior to filling may also be considered should greater than expected proportions of acid generating lithologies be present in the final pit wall. If some limited lime addition is required, it can be added to the ABM lake to raise the pH to circumneutral levels (target pH of 8.0), which will also facilitate metals precipitation from solution in the ABM lake. Lime handling and slaking systems (if required) will be performed using equipment associated with the WTP. The slurried lime will be trucked to the ABM lake and pumped into the flow of Fault Creek as it enters the ABM open pit to achieve adequate mixing of the lime in the ABM open pit water. Additional mitigation measures or adaptive management measures may also be applied to areas of the exposed pit walls at select locations that are not Class C material. An Adaptive Management Initiative (AMI) for ABM lake water is presented in Section 7.2.1.

Water quality modelling suggests that the ABM lake that forms will contain elevated COPI concentrations, which without appropriate treatment will not meet the water quality objectives established for the Project when the ABM lake starts to overflow downstream (BMC, 2024f). Given the expected circumneutral pH of the ABM lake water, there is not expected to be sufficient dissolved iron in the lake to enhance metals removal during lime amendment by co-precipitation with iron oxyhydroxide phases.

Soluble organic carbon (e.g., glycerol, alcohol, or molasses) will be distributed throughout the ABM lake, either via direct addition to the discharging Fault Creek water or via piping or water cannons, to stimulate the development of reducing conditions. Sufficient organic carbon will be added to result in the consumption of dissolved oxygen, nitrate and nitrite, and to cause the partial conversion of some dissolved sulphate to sulphide. Under such reducing conditions, elements such as selenium and uranium are largely transformed to less soluble forms (e.g., elemental selenium and uraninite phases). Chalcophile elements such as cadmium, zinc, copper, antimony, and lead will precipitate as poorly soluble sulphide minerals. The insoluble phases formed in the water column will settle to the lake bottom for long-term storage. Reactive iron sulphide minerals will also form during treatment, which will help scavenge some COPI via co-precipitation and also act as a sacrificial anode to maintain the reduced COPI in their stable precipitated forms in the lake sediment.

Addition of the soluble organic carbon will occur during filling of the ABM lake. Treatment will be initiated in late summer at a time when microbial respiration rates are highest. As reducing conditions develop over the subsequent months, the formation of an ice layer over the lake will help limit the ingress of oxygen and prolong the period of time that the lake will remain reducing, thus maximizing COPI removal.

Pilot-scale test work was completed by Ensero to evaluate the dosage of organic carbon (molasses and glycerol), ferric iron, nitrogen, and phosphorus, and the effects of soil amendment and temperatures on the efficacy of the proposed in situ treatment, as described in Appendix C.

Water quality monitoring of the ABM lake will be used to evaluate the lake chemistry and ensure that the concentrations of COPI, which are expected to respond to in situ treatment (e.g., nitrite, zinc, cadmium, copper, nickel, lead, antimony, selenium, and uranium), are minimized. ABM lake water quality will also be compared with water quality standards for the protection of livestock to ensure that wildlife is also protected. Monitoring will include the collection of samples at strategic depths in the water column to evaluate the development of any stratification, since the presence of an anoxic hypolimnion (the lower layer of water in a stratified lake) at depth will further assist the preservation of the reduced COPI in their stable precipitated forms. If water quality monitoring indicates that ABM lake treatment is to not adequately effective, the AMI presented in Section 7.2.1 would be triggered, including implementation of additional and/or alternative treatment methods. This is in addition to the construction of the CWTS, as a redundant water treatment measure.

An engineered spillway will be constructed to control outflow from the ABM lake. The spillway will be constructed at the north end of the ABM lake, so that flow is directed into Geona Creek (not South Lakes).

7.2.1 Adaptive Management

The Project Adaptive Management Plan (BMC, 2024n) presents Adaptive Management Initiatives (AMIs) for multiple aspects of the Project, focusing on the Construction and Operations phases of the Project, as discussed in Section 7.12.2. Details of adaptive management for Project closure will be developed in detail once Operations have been underway for some time and the AMP has been implemented and validated. An AMI for ABM lake water quality is provided here, in response to Decision Document Term 31. This AMI will be updated and incorporated into a future revision of the Project AMP.

7.2.1.1 Description

As discussed in Section 2.5.3, treatment of ABM lake water using organic carbon dosage and ferric iron addition has been shown to significantly decrease concentrations of certain COPIs. As discussed in the Water Management Plan (BMC, 2024f) and detailed in the Water Quality Model report (Ensero, 2024), it is expected that this treatment approach will lead to all WQOs being met in the receiving environment once ABM lake fills and flows into Geona Creek.

There is a potential risk that initial treatment of ABM lake water using the methods described in Section 2.5.3 will not adequately decrease COPI concentrations, leading to WQOs being exceeded in the receiving environment. Monitoring of water quality in ABM lake, Geona Creek and Finlayson Creek will occur regularly throughout Active, Transition and Post-Closure. Unexpected water quality in Geona Creek and Finlayson Creek would trigger the applicable AMIs in the Project AMP, while unexpected water quality in ABM lake would trigger this AMI.

ABM lake is expected to take approximately 15 years to fill upon the cessation of Operations. It is expected that ABM lake water will have higher COPI concentrations during Active Closure and earlier years of Transition Closure, decreasing over time with submergence of Class A and Class B material, dilution and treatment. This AMI is only applicable in Post-Closure and in the final five years of Transition Closure, leaving enough time for additional or alternative treatment approaches to be implemented before ABM lake starts flowing to Geona Creek.

7.2.1.2 Narrative Response

ABM lake water has concentrations of COPIs that could lead to exceedance of WQOs in the receiving environment.

7.2.1.3 Indicators

The COPIs for which WQOs are developed (Ensero and Minnow, 2024) are used as indicators for this AMI:

- Anions and nutrients including ammonia-N, fluoride, nitrate, nitrite, and sulphate.
- Total aluminum, antimony, arsenic, cobalt, iron, nickel, selenium, thallium, and uranium.
- Dissolved cadmium, copper, lead, manganese, and zinc.

Alkalinity and pH are also included as additional indicators for the potential development of acidic drainage conditions.

7.2.1.4 Triggers and Action Levels

Action level triggers and numerical values are summarized in

Table 7-6 and Table 7-7. Low, moderate, and high action level triggers were calculated relative to Project WQOs for station KZ-37 on Geona Creek presented in Chapter 4 of the Water Management Plan (BMC, 2024f):

- Low trigger: 75% of COPI concentration equal to WQO;
- Moderate trigger: 85% of COPI concentration equal to WQO; and
- High trigger: 95% of COPI concentration equal to WQO.

Table 7-6: ABM Lake Water Quality Triggers and Action Levels

Action Level	Triggers ^a
Low	Two consecutive samples exceed the low triggers indicated in Table 7-7. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; or Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the high trigger within 3 years.
Moderate	Two consecutive samples exceed the moderate trigger indicated in Table 7-7. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; or Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the high trigger within 2 years.
High	Two consecutive samples exceed the high trigger indicated in Table 7-7. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; or Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the high trigger within 1 year.

^a For field pH and alkalinity, the trigger will occur if the sample result is below the trigger value.

Table 7-7: Water Quality Numerical Triggers for ABM Lake Water (KZ-38)

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH	6.5	6	5.5
Alkalinity	tbd ^a	tbd ^a	10
Ammonia-N (unionized)	Concentration in ABM Lake that the WQM calculates would result in the low trigger concentration at KZ-37. ^b	Concentration in ABM Lake that the WQM calculates would result in the moderate trigger concentration at KZ-37. ^b	Concentration in ABM Lake that the WQM calculates would result in the high trigger concentration at KZ-37. ^b
Aluminum, total			
Antimony, total			
Arsenic, total			
Cobalt, total			
Fluoride			
Iron, total			
Nickel, total			
Nitrate-N			
Nitrite-N			
Selenium, total			
Sulphate			
Thallium, total			
Uranium, total			
Cadmium, dissolved			
Copper, dissolved			
Lead, dissolved			
Manganese, dissolved			
Zinc, dissolved			

^a To be determined based on first 5 years of pit lake water quality sampling

^b Numerical trigger value will be calculated when the ABM Lake AMI is brought into the Project AMP, using the WQM that has been updated and re-calibrated based on water quality monitoring results through Project Construction and Operations.

7.2.1.5 Approach to Trend Analysis

Trend analysis, used to identify statistically significant trends, is the basis of some triggers and action levels throughout this AMI. This analysis aims to account for seasonality that is often present in water quality data. For water quality parameters with seasonal variation, the seasonal Mann-Kendall test will be applied to determine statistically significant increasing or decreasing trends (i.e., $p < 0.05$). This test is commonly used to evaluate trends in water sample chemistry because it is designed for time series data and does not require such data to be normally distributed. For water quality data sets that have no clear evidence of seasonality, the (non-seasonal) Mann-Kendall or similar trend analysis test will be used. Where there are not yet enough data available to complete the trend analyses as specified, it may not be possible to identify statistically significant trends. During this period, only the sample-based triggers will be applicable.

7.2.1.6 Monitoring Requirements

The monitoring schedule proposed for ABM lake water is provided in Table 7-28.

7.2.1.7 Evaluation of Monitoring Results

Data review will occur after each sampling event, within two weeks of when the analytical results are received from the laboratory. The typical laboratory turn-around time for standard water quality analysis is two weeks. The evaluation will include a comparison of the water quality data to the AMI trigger values using EQWin environmental data management software, or similar, and the trend analysis will be carried out using Microsoft Excel spreadsheet software, or similar.

If an action level trigger has been reached, verification of the monitoring data will begin within two weeks of when the analytical results are received from the laboratory. This will include review of the laboratory QA/QC data, field QA/QC data, field notes, and historical data associated with the result. Laboratory re-analysis may be warranted pending findings from the data review.

If the data are confirmed as reaching a trigger, the station will be re-sampled within one month of receiving the analytical results from the laboratory, pending current site conditions (e.g., monitoring station may be frozen, dry, or inaccessible). Upon verification of the data following confirmatory sampling the next steps will be taken as outlined in the MRP described in Section 7.2.1.8.

7.2.1.8 Development and Implementation of Management Response Plan

The staged development and implementation of a Management Response Plan (MRP) is detailed in Table 7-8. Yukon Government and First Nations will be consulted prior to implementation of an MRP.

Table 7-8: ABM Lake Water Quality Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define the Situation - Review water quality data to assess the potential impact of the trigger being reached. Add additional water quality monitoring station(s) or increase monitoring frequency, as required; - Review existing data and water quality models to determine the possible cause of the COPI concentration increases. Undertake detailed field investigation if additional data are required; - Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; - Identify personnel who will be responsible for key decisions related to the development/update and implementation of the MRP; and - Complete updates to the MRP following conclusion of any additional investigations.
Moderate	Design Preferred Mitigation Approach - Update the MRP to include a detailed evaluation of the mitigation options and selection of the preferred management response that will be implemented should the trend continue and high action level triggers be reached; - Design the preferred mitigation approach in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; - Provide recommendations for monitoring that would be implemented to assess the effectiveness of the proposed mitigation and update the AMP as necessary; and - Implement appropriate mitigations, if any, to reverse water quality trends prior to reaching the high trigger.
High	Implement, Monitor, Evaluate, and Adjust - Implement the preferred mitigation approach; - Continue water quality monitoring and update the MRP to include any revisions or adjustments based on more recent information; - Evaluate the effectiveness of the implementation of the management response; and - Adjust the MRP and AMP as needed.

The following is a list of potential mitigation options that may be included in the MRP for ABM lake water quality:

- Conduct one or more additional rounds of treatment with organic carbon and/or ferric iron;
- Pump water to the existing WTP if it has not been decommissioned;
- Deploy a mobile WTP; and
- Broadcast lime to ABM lake for in situ metals removal.

The performance of the mitigation options will be measured by continuing the water quality monitoring program and reviewing indicator concentrations. The corrective action will be deemed successful once the objectives of the MRP are met.

7.2.1.9 Reporting Requirements

Annual AMP reports will be submitted as part of the Water Licence and the Quartz Mining License reporting. These reports will include the results of annual AMP reviews, summaries of AMP trigger events and responses, AMP updates and engagement activities.

Reporting of all trigger activations will be provided within one month of confirming the trigger, via Waterline.

7.3 UNDERGROUND MINE WORKINGS

Table 7-9 presents the closure objectives specific to the underground Mine workings, grouped by value categories (e.g., physical stability, chemical stability, health and safety, land use, etc.). This table also summarizes relevant design criteria and closure measures that have been developed to achieve the objectives, and performance criteria which will be used to define achievement of the objectives in Post-closure monitoring.

Table 7-9: Underground Mine Workings Closure Measures Summary

Value	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Health and Safety	Reclamation of Mine openings and closure implementation avoids or minimizes adverse health and safety effects on the public, workers and wildlife.	No injuries or casualties as a result of interaction with closed Mine workings.	All underground working accesses are within the ABM open pit boundaries. Portal entrances will be backfilled to prevent access while the workings are flooded.
Land Use / Ecological Conditions and Sustainability	No active water treatment required to maintain chemical stability or environmental compliance.	Seepage from underground workings to ABM lake do not contribute to water management in Post-closure period.	Any seepage from underground workings will be captured and treated in the ABM lake during the Active Closure period.
Long-term Certainty	Minimize the need for long-term operations, maintenance and monitoring after reclamation activities are complete.	No long-term maintenance required for underground workings or openings.	Portals sealed with waste rock to prevent access during Active Closure/Transition Closure.

During the Active Closure period, or even prior to the completion of active surface mining, underground mining equipment and infrastructure will be removed, including dewatering equipment. The portal entrances will be closed and secured to prevent access to the portals and underground workings as they slowly flood during the Active and Transition Closure periods.

The portal entrances to the underground Mine are within the ABM open pit and will therefore, in Closure, become part of the ABM lake when flooded.

7.4 WASTE ROCK AND TAILINGS STORAGE FACILITIES

7.4.1 Class A Storage Facility

An alternatives assessment was undertaken to review, evaluate, and select a preferred waste rock and tailings management strategy (Section 2.4). The assessment determined that a co-disposal filtered tailings and waste rock facility located on the hillside to the west of Geona Creek in the Project Area was the preferred strategy for tailings and waste rock management and is referred to as the Class A Storage Facility.

The Class A Storage Facility is located on the western Geona Creek valley slope, with the majority of the Storage Facility slope facing northeast. The key Class A Storage Facility specifications are provided in Table 7-10. The cover will be installed progressively during Operations as each stage is completed. Details on the revegetation plan for this facility are presented in Section 7.1.

Table 7-10: Class A Storage Facility Designed Physical Specifications

Parameter	Class A Storage Facility
Elevation	1,400 masl to 1,495 masl
Aspect	Northeast
Final Surface Area (m ²)	740,000 m ²
Overall Slope	4H:1V
Bench Height (m)	n/a
Estimated Storage Capacity (Mm ³)	14 Mm ³

Table 7-11 presents the closure objectives specific to the Class A Storage Facility, grouped by value categories (e.g., physical stability, chemical stability, health and safety, land use, etc.). This table also summarizes relevant design criteria and closure measures that have been developed to achieve the objectives, and performance criteria which will be used to define achievement of the objectives in Post-closure monitoring.

Table 7-11: Class A Storage Facility Closure Summary

Values	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Physical Stability	Ensure long-term physical stability to minimize erosion, subsidence and slope failure	No signs of gully erosion or slope creep Geotechnical monitoring program does not return unacceptable levels of slope movement	Facility constructed at maximum 4H:1V overall slope. Buttress constructed at maximum 3H:1V overall slope. Engineered composite cover includes an 80 mil, textured HDPE geomembrane overlaying a approximately 0.5 m layer of compacted glacial till. Covered with a minimum of 3.0 m Class C material, approximately 0.3 m of growth media. Buttress constructed at toe of facility with Class C material. Selection of appropriately graded material for placement in the lower slope region to manage interflow waters and prevent excessive buildup of pore water pressure. Progressive reclamation will limit surface area exposed to erosional forces and will establish erosion control (revegetation) on reclaimed surfaces. Revegetation prescription and methods consider ecosystem unit and cover material properties to minimize erosion/slope failure potential.
	Able to withstand seismic events and severe climatic conditions	No significant failure of facility.	Facility located on stable foundation. Foundation material inspected by geotechnical engineer and unsuitable material to be removed and stored in the Overburden Stockpile. Minimum Factor of Safety (FOS): Static 1.5, seismic 1.0. Buttress constructed at toe of facility with Class C material to improve physical stability. Overburden material beneath buttress stripped to bedrock. Engineered cover system with waste rock layer for frost protection and improved physical stability.

Values	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Chemical Stability	Seepage volumes from the facility are minimized	Seepage quantity will be at or below predicted volumes.	Encapsulation of materials provided by engineered composite liner and cover systems (compacted glacial till and 80 mil, textured HDPE geomembrane). Progressive reclamation minimizes infiltration. Engineered composite cover and liner systems leakage is expected to range from 0.002 to 0.007 L/s.
	Ensure long-term chemical stability such that runoff and seepage quality is acceptable, without long-term reliance on active water treatment	Seepage quality will be at or below predicted COPI concentrations.	Encapsulation of materials provided by engineered composite liner and cover systems (compacted glacial till and 80 mil, textured HDPE geomembrane). Active water treatment systems (WTP) maintained until performance criteria achieved. Passive treatment systems (constructed as a contingency) to yield water quality acceptable for discharge in long term.
Land Use / Ecological Conditions and Sustainability	Restored capability for use by wildlife and TLU, and conditions are typical of surrounding area	The following ecosystem attribute variables are similar to control sites: Diversity – Richness and abundance of different functional groups Vegetation structure – cover and biomass Ecological processes – nutrient availability and seedling density Monitoring transects indicate signs of use by wildlife (e.g., sightings, browse, scat, burrows, trails) similar to control sites	Facility design maintains natural slopes, aspect and elevations, similar to surrounding area. Revegetation planned and executed in consideration of pre-existing vegetation communities and final facility features (elevation, slope, aspect) to maximize revegetation success and use by wildlife.
Financial Considerations / Long-term Certainty	Minimize outstanding liability and risks in Post-closure, and minimize the need for long-term operations, maintenance and monitoring in Post-closure	Monitoring surveillance and adaptive management programs are executed as planned without increasing maintenance demands	Facility constructed at maximum 4H:1V overall slope. Buttress constructed at maximum 3H:1V overall slope. Engineered composite cover with a minimum 3.0 m Class C material frost protection layer, and approximately 0.30 m growth media. Facility is designed for closure, minimal re-grading required at closure. Progressive reclamation minimizes reclamation work required at end of Operations. Design/location minimizes long-term risk associated with subsidence.

7.4.1.1 Closure Measures

The main components of the Class A Storage Facility cover system include:

- A surface layer of approximately 0.30 m growth media from local topsoil and overburden to support revegetation, which will be graded at surface to blend with the natural topography;
- A minimum of 3.0 m of Class C waste rock as a frost protection layer, to limit erosion, and improve physical stability of the facility;

- A minimum of 0.50 m of crushed Class C material placed above an 80 mil textured HDPE geomembrane; and
- A layer of approximately 0.50 m of compacted glacial till placed on the Class A tailings and waste rock material.

A summary of the cover material types and volumes, is provided in Table 7-12.

Table 7-12: Class A Storage Facility Cover Specifications

Cover Layer	Material Type	Thickness (m)	Approximate Volume (m ³)
Growth Media	Topsoil/Overburden Blend	~0.30	265,000
Frost Protection	Class C Waste Rock	Minimum 3.0	2,218,000
Liner Protective Layer	Zone F Material	~0.5	370,000
Geomembrane	Textured 80 mil HDPE	n/a	n/a
Compacted glacial till material	Glacial till	~0.5	370,000

Figure 7-4 presents the schematic of the composite cover system design for the Class A Storage Facility. To achieve infiltration performance of this cover system in the long-term, regular maintenance will be conducted on the cover. Monitoring will also be conducted to ensure the performance criteria are being met. Any contact water (runoff and seepage) with Class A material will report to the Class A Storage Facility Collection Pond via collection ditches and be treated at the WTP during Operations and Active Closure and until cover performance has been achieved. Details on the revegetation plan for this facility are presented in Section 7.1.

7.4.2 Class B Storage Facility

The Class B Storage Facility is located on the western Geona Creek valley slope, with the majority of the facility facing east. The facility is designed with an overall grade of 3H:1V with a crest elevation of 1,565 masl. The key Class B Storage Facility specifications are provided in Table 7-13.

Table 7-13: Class B Storage Facility Designed Physical Specifications

Parameter	Class B Storage Facility
Elevation	1,425 to 1,565 masl
Aspect	East
Final Surface Area (m ²)	700,500 m ²
Overall Slope	3H:1V
Bench Height (m)	15 m
Estimated Storage Capacity (Mm ³)	21 Mm ³

Table 7-14 presents the closure objectives specific to the Class B Storage Facility, grouped by value categories (e.g., physical stability, chemical stability, health and safety, land use, etc.). This table also summarizes relevant design criteria and closure measures that have been developed to achieve the

objectives, and performance criteria which will be used to define achievement of the objectives in Post-closure monitoring.

Table 7-14: Class B Storage Facility Closure Summary

Values	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Physical Stability	Ensure long-term physical stability to minimize erosion, subsidence and slope failure.	No signs of gully erosion or slope creep. Geotechnical monitoring program does not return unacceptable levels of slope movement.	Facility constructed at maximum 3H:1V overall slope. Cover includes composite compacted glacial till and 80 mil, textured HDPE geomembrane. Covered with a minimum of 3.0 m Class C material and approximately 0.3 m growth media. Revegetation prescription and methods consider ecosystem unit and cover material properties to minimize erosion.
	Able to withstand seismic events and severe climatic conditions.	No significant failure of facility.	Facility located on stable foundation – unsuitable overburden removed and till foundation. Minimum FOS: Static 1.5, Seismic 1.0.
Chemical Stability	Seepage volumes from the facility are minimized.	Seepage quantity will be at or below predicted volumes.	Cover and liner systems include composite compacted glacial till and 80 mil, textured HDPE geomembrane. Engineered composite cover and liner systems leakage is expected to range from 0.002 to 0.007 L/s.
	Ensure long-term chemical stability such that runoff and seepage quality meets water quality criteria, without long-term reliance on active water treatment.	Seepage quality will be at or below predicted concentrations.	Cover and liner systems include composite compacted glacial till and 80 mil, textured HDPE geomembrane. Facility covered with low permeability cover system. Passive treatment systems (constructed as a contingency) to yield water quality acceptable for discharge in long-term.
Land Use / Ecological Conditions and Sustainability	Restored capability for use by wildlife and TLU, and conditions are typical of surrounding area	The following ecosystem attribute variables are similar to control sites: Diversity – Richness and abundance of different functional groups Vegetation structure – cover and biomass Ecological processes – nutrient availability and seedling density Monitoring transects indicate signs of use by wildlife (e.g., sightings, browse, scat, burrows, trails) similar to control sites	Facility design maintains natural slopes, aspect and elevations, similar to surrounding area. Revegetation planned and executed in consideration of pre-existing vegetation communities and final facility features (elevation, slope, aspect) to maximize revegetation success and use by wildlife.
Financial Considerations /	Minimize outstanding liability and risks in Post-closure, and minimize the need for long-term	Monitoring surveillance and adaptive management programs	Facility constructed at maximum 3H:1V overall slope.

Values	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Long-term Certainty	operations, maintenance and monitoring in Post-closure	are executed as planned without increasing maintenance demands	Facility covered with compacted glacial till, 80 mil, textured HDPE geomembrane, minimum 3.0 m Class C material, and approximately 0.3 m growth media. Facility is designed for closure, minimal re-grading required at closure. Design/location minimizes long-term risk associated with subsidence.

7.4.2.1 Closure Measures

The main components of the Class B Storage Facility cover system include:

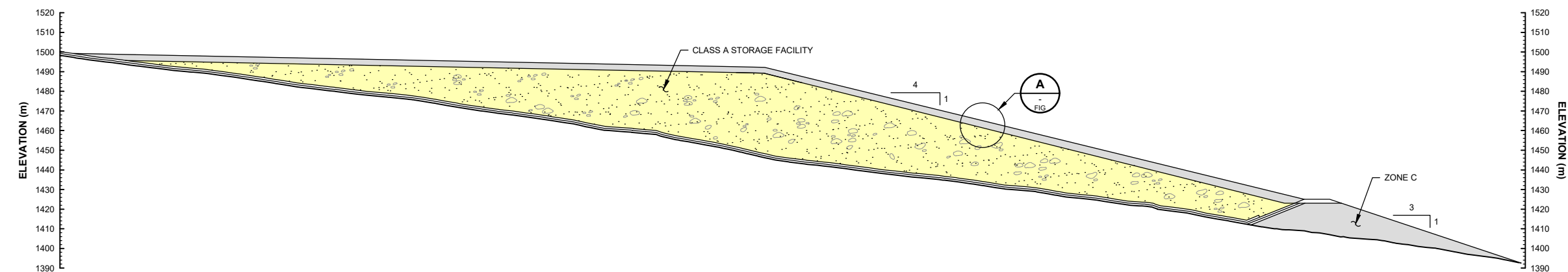
- A surface layer of approximately 0.3 m of growth media to support revegetation, which will be graded at surface to blend with the natural topography;
- A minimum of 3.0 m of Class C waste rock to act as a frost protection layer, to limit erosion, and to improve physical stability of the facility;
- A minimum of 0.5 m of crushed Class C material placed above an 80 mil, textured HDPE geomembrane; and
- Approximately 0.5 m of compacted glacial till placed above the Class B waste rock material.

During Closure, the cover system will shed surface water for collection in the Class B Collection Pond or to the environment once monitoring demonstrates it is acceptable for discharge. A summary of the cover design is provided in Table 7-15.

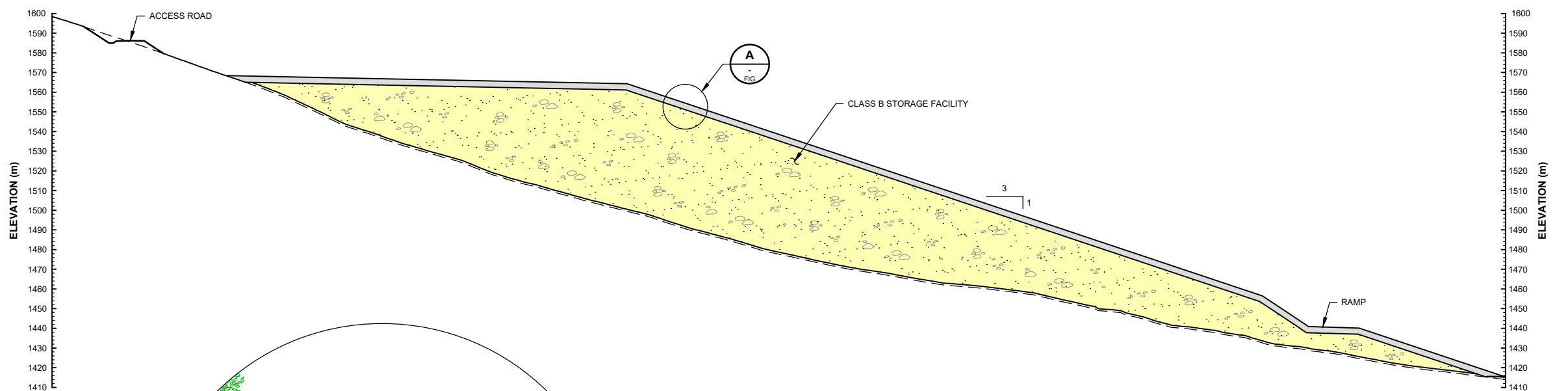
Table 7-15: Class B Storage Facility Cover Specifications

Cover Layer	Material Type	Thickness (m)	Approx. Volume (m ³)
Growth Media	Topsoil/Overburden Blend	~0.30	205,000
Frost Protection	Class C Waste Rock	Minimum 3.0	2,020,000
Liner Protective Layer	Zone F Material	~0.5	337,000
Geomembrane	Textured 80 mil HDPE	n/a	n/a
Compacted glacial till material	Glacial till	~0.5	337,000

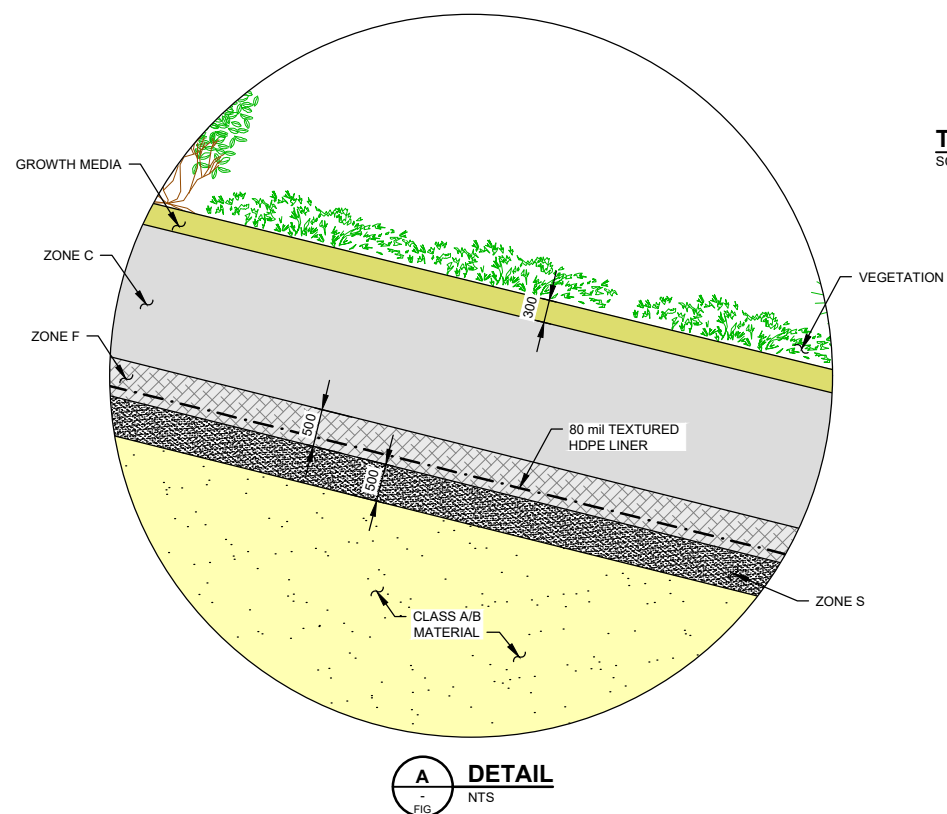
Figure 7-4 shows a schematic of the composite cover system design for the Class B Storage Facility. Regular monitoring and maintenance will be conducted on the cover to achieve infiltration performance of this cover system in the long-term. Any contact water with the waste rock will remain separate from the clean surface run-off and be directed to the Class B Storage Facility Collection Pond during Active Closure and until cover performance has been achieved. During Active Closure, seepage will be directed to the WTP prior to release to the environment.



TYPICAL CLASS A SECTION



TYPICAL CLASS B SECTION



A **DETAIL**
- NTS
FIG

- LEGEND:**
- | | |
|---|----------------------------|
|  | CLASS A/B MATERIAL |
|  | ZONE C |
|  | ZONE F |
|  | ZONE S |
|  | GROWTH MEDIA |
|  | 80 mil TEXTURED HDPE LINER |

NOTES:

1. BASED ON DESIGN INFORMATION FROM 2019 FEASIBILITY DESIGN REPORT.

DISCLAIMER:

THIS DRAWING REPRESENTS THE ITEM(S)/STRUCTURE(S) AS PER THE FEASIBILITY LEVEL DESIGN. ALL RATES, CAPACITIES, DIMENSIONS, WEIGHTS, TIMEFRAMES AND VOLUMES ARE SUBJECT TO DESIGN CHANGE ONCE THE FINAL LICENSE OR PERMIT CONDITIONS ARE KNOWN OR IN ACCORDANCE WITH SITE CONDITIONS ENCOUNTERED.



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KUDZ ZE KAYAH PROJECT

CLASS A AND B STORAGE FACILITY COVER SCHEMATICS



P/A NO. VA101-640/11	REF NO. 6
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FIGURE 7-4

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7.4.3 Class C Storage Facility

The Class C Storage Facility is located on the eastern Geona Creek valley slope, in a hanging valley. The key Class C Storage Facility design specifications are provided in Table 7-16.

Table 7-16: Class C Storage Facility Design Physical Specifications

Parameter	Class C Storage Facility
Elevation	1,450 to 1,530 masl
Aspect	West
Final Surface Area (m ²)	1,255,000 m ²
Overall Slope	3H:1V
Bench Height (m)	15 m
Estimated Storage Capacity (Mm ³)	41 Mm ³

Table 7-17 presents the closure objectives specific to the Class C Storage Facility, grouped by value categories (e.g., physical stability, chemical stability, health and safety, land use, etc.). This table also summarizes relevant design criteria and closure measures that have been developed to achieve the objectives, and performance criteria which will be used to define achievement of the objectives in Post-closure monitoring.

7.4.3.1 Closure Measures

The Class C Storage Facility will contain non-acid generating waste rock, and as such, a liner and/or cover that reduces net percolation and seepage is not required. The final cover for the Class C Storage Facility therefore includes:

- Approximately 0.30 m growth media to support revegetation.

This layer will be installed once the appropriate volume of waste has been stored in the facility as per the Mine Development and Operations Plan (BMC, 2024g).

Table 7-17: Class C Storage Facility Closure Summary

Values	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Physical Stability	Ensure long-term physical stability to minimize erosion, subsidence and slope failure.	No signs of gully erosion or slope creep. Geotechnical monitoring program does not return unacceptable levels of slope movement.	Facility constructed at maximum 3H:1V overall slope. Facility covered with growth media. Revegetation prescription and methods consider ecosystem unit and cover material properties to minimize erosion.
	Able to withstand seismic events and severe climatic conditions.	No significant failure of facility.	Minimum FOS: Static 1.5, Seismic 1.0.
Chemical Stability	Ensure long-term chemical stability such that runoff and seepage quality meets water quality criteria, without long-term reliance on active water treatment.	Seepage quality will be at or below predicted concentrations.	By definition and design, facility contains only non-reactive (non-potentially acid generating, non-ML) waste rock. Contingency passive treatment systems (CWTS) to yield water quality acceptable for discharge in long-term.
Land Use	Restored capability for use by wildlife and TLU, and conditions are typical of surrounding area.	The following ecosystem attribute variables are similar to control sites: Diversity: Richness and abundance of different functional groups Vegetation structure: cover and biomass Ecological processes: nutrient availability and seedling density Monitoring transects indicate signs of use by wildlife (e.g., sightings, browse, scat, burrows, trails) similar to control sites.	Facility design maintains natural slopes, aspect and elevations, similar to surroundings. Revegetation planned and executed in consideration of pre-existing vegetation communities and final facility features (elevation, slope, aspect) to maximize revegetation success and use by wildlife.
Financial Considerations / Long-term Certainty	Minimize outstanding liability and risks in Post-closure, and minimize the need for long-term operations, maintenance and monitoring in Post-closure.	Monitoring surveillance and adaptive management programs are executed as planned without increasing maintenance demands.	Facility constructed at maximum 3H:1V overall slope. Facility covered with growth media. Facility is designed for closure, minimal re-grading required at closure. Design/location minimizes long-term risk associated with subsidence.

7.4.4 Overburden Stockpile

Overburden stripped from the ABM open pit excavation is required (in part) for Closure and will be placed in a stockpile along the Geona Creek valley's east slope, north of the Class C Storage Facility. At Closure, any remaining overburden will be recontoured and revegetated. Topsoil stockpile management is discussed in Section 7.1.2 in relation to retention of nutrients and seed stock for revegetation and is further described in the Sediment and Erosion Control Plan (BMC, 2024k).

7.5 ORE STOCKPILE AND PADS

Mined ore will be stored temporarily near the Process Plant at the toe of the Class B Storage Facility, at the ROM pad and LGO stockpile. Table 7-18 presents the closure objectives specific to the ROM pad and LGO stockpile, grouped by value categories (e.g., physical stability, chemical stability, health and safety, land use, etc.). This table also summarizes relevant design criteria and closure measures that have been developed to achieve the objectives, and performance criteria, which will be used to define achievement of the objectives in Post-Closure monitoring.

7.5.1 Closure Measures

ROM or LGO material that has not been processed will not require relocation at Closure, as the area is located within the Class B Storage Facility footprint and will be encapsulated within the cover and liner systems at Closure. Details are summarized in Table 7-18.

Table 7-18: Ore Stockpile and Pads Closure Summary

Value	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Physical Stability	Ensure long-term physical stability to minimize erosion, subsidence and slope failure.	No signs of gully erosion or slope creep.	Features will be re-graded to promote positive drainage, if required, and covered with approximately 0.3 m growth media and revegetated, as part of the Closure cover system for the Class B Storage Facility.
Chemical Stability	Ensure long-term chemical stability such that runoff and seepage quality meets water quality criteria, without long-term reliance on active water treatment.	Water quality objectives and/or effluent quality standards are not exceeded due to contributions from pad runoff/seepage.	Active water treatment systems maintained until performance criteria are achieved, as per requirements for the Class B Storage Facility
Land Use	Restored capability for use by wildlife and TLU, and conditions are typical of surrounding area.	The following ecosystem attribute variables are similar to control sites: Diversity: richness and abundance of different functional groups. Vegetation structure: cover and biomass. Ecological processes: nutrient availability and seedling density. Monitoring transects indicate signs of use by wildlife (e.g., sightings, browse, scat, burrows, trails) similar to control sites.	Features will be reclaimed to maintain natural slopes, aspect and elevations, similar to surrounding area. Revegetation planned and executed in consideration of pre-existing vegetation communities and final facility features (elevation, slope, aspect) to maximize revegetation success and use by wildlife.
Financial Considerations / Long-term Certainty	Minimize outstanding liability and risks after reclamation activities are complete.	Closure risk assessment does not identify any moderate/high risks associated with pads.	Any remaining ore will be encapsulated within the liner and cover systems of the Class B Storage Facility (which is the same as the Class A Storage Facility).

7.6 WATER MANAGEMENT STRUCTURES AND SYSTEMS

Table 7-19 presents the closure objectives specific to the water management structures and systems, grouped by value categories (e.g., physical stability, chemical stability, health and safety, land use, etc.). This table also summarizes relevant design criteria and closure measures that have been developed to achieve the objectives, and performance criteria that will be used to define achievement of the objectives in Post-closure monitoring.

Table 7-19: Water Management Structures and Systems Closure Summary

Value	Specific Closure Objective	Closure Performance Criteria	Closure Design Criteria/Closure Measures
Physical Stability	Closure water management facilities are physically stable and performing in accordance with designs.	No major repairs required due to instability of water management structures.	Not applicable; all ponds, collection ditches and diversion channels are removed in Post-closure.
	Able to withstand seismic events and severe climatic conditions.	No significant failure of facility.	Not applicable; all ponds, collection ditches and diversion channels are removed in Post-closure.
Health and Safety	Reclamation eliminates or minimizes existing hazards to the health and safety of the public, workers and area wildlife by achieving conditions similar to local area features.	No significant injuries or casualties to humans or wildlife due to water collection, conveyance or passive treatment systems.	Site runoff patterns returned to pre-mining patterns/channels where possible/practicable.
Land Use	Reclamation and closure activities protect the aquatic, terrestrial and atmospheric environments from Mine-related degradation and restore environments that have been degraded by Mine-related activities.	Effluent Quality Standards will apply at final discharge locations during all closure periods. Water Quality Objectives at key receiving environment locations during all closure periods.	Operational waste rock management and Mine waste facility design (e.g., filtered tailings, stacked out of watercourse) designed to meet Closure principles of reducing impacted water and controlling sources and COPI mobilization. Composite cover and liner systems for the Class A and Class B Storage Facilities will minimize COPI mobilization. ABM lake treatment system will provide primary and secondary treatment of COPI concentrations prior to discharge from Project area.
Financial Considerations / Long-term Certainty	The need for long-term operations, maintenance and monitoring after reclamation activities are complete is minimized, and no active water treatment is required to achieve closure objectives.	Maintenance and monitoring efforts and durations do not significantly exceed planned levels. Active water treatment is maintained only during Active Closure and Transition Closure period as contingency.	No classified water-retaining dams (CDA, 2013 and 2014) will remain on site in the Post-closure Period. Drainage and conveyance networks are passive and mimic pre-mining patterns. Water treatment in Post-closure is passive in design.

7.6.1 Closure Water Quality Objectives

WQOs have been developed for the COPIs associated with the Project, listed in Table 7-20 and Table 7-21. Details of the methodology used to derive the WQOs are summarized in the Water Management Plan (BMC, 2024f) and detailed in Ensero and Minnow (2024). The development of the WQOs used a consistent framework that included the adoption of generic guidelines for the Project, the identification of COPIs, the evaluation of potential approaches to developing WQOs and Site Specific Water Quality Objectives Water Quality Objectives, and the derivation of WQOs based on CCME, BC ENV and Federal Water Quality Guidelines (FWQG) and Site Specific Water Quality Objectives Water Quality Objectives.

Table 7-20: KZK Water Quality Objectives Based on CCME and BC ENV Guidelines

Constituent	CCME Guideline Date	BC ENV Guideline Date	FWQG Guideline Date	Generic Guideline used for WQOs
Ammonia-N, unionized	2010	Not available	Not available	0.016 mg/L
Aluminum, total	1987	2023	2022	$(e^{[0.645 \ln(DOC)] + [2.255 \ln(hardness)] + [1.995 \cdot pH]} + [-0.284 \cdot (\ln(hardness) \cdot pH)] - 9.898) / 1000$ (mg/L) for hardness from 10 to 430 mg/L, pH from 6 to 8.7, and DOC from 0.08 to 12.3 mg/L
Antimony, Total	Not available	2023	Not available	0.074 mg/L
Cobalt, Total	Not available	2004	2017	$e^{[(0.414 \ln(hardness)) - 1.887]} / 1000$ mg/L for hardness between 52 and 396 mg/L.
Cyanide, Weak Acid Dissociable	Not available	1986	Not available	0.005 mg/L
Nickel, Total	1987	1987	Not available	0.025 mg/L if hardness (as CaCO ₃) ≤ 60 mg/L or unknown, $(e^{[0.76 \ln(hardness)] + 1.06}) / 1000$ mg/L if hardness > 60 mg/L and ≤ 180 mg/L, 0.15 mg/L if hardness > 180 mg/L
Nitrate-N	2012	2009	Not available	3 mg/L
Nitrite-N	1987	1988	Not available	0.06 mg/L
Selenium, Total	1987	2014	Not available	0.002 mg/L
Sulphate	Not available	2013	Not available	128 mg/L if hardness ≤ 30 mg/L; 218 mg/L if hardness > 30 mg/L and ≤ 75 mg/L; 309 mg/L if hardness > 75 mg/L and ≤ 180 mg/L; 429 mg/L if hardness > 180 mg/L and ≤ 250 mg/L
Thallium, total	1999	No final guideline	Not available	0.0008 mg/L
Uranium, Total	2011	No final guideline	Not available	0.015 mg/L
Cadmium, Dissolved	Not available	2015	Not available	$(e^{(0.736 \ln(hardness) - 4.943)}) / 1000$ mg/L for hardness between 3.4 and 285 mg/L; WER multiplier of 2.9 applied to guideline in May
Copper, Dissolved	Not available	2019	2021	Biotic Ligand Model derived guideline based on temperature, pH, hardness, and DOC inputs; SSWQO applies in selected winter months for KZ-15 (0.00117 mg/L; Jan to Mar) and KZ-15 (0.00134 mg/L; Nov to Apr)

Constituent	CCME Guideline Date	BC ENV Guideline Date	FWQG Guideline Date	Generic Guideline used for WQOs
Lead, dissolved	Not available	Not available	2020	$(e^{(0.514[\ln(\text{DOC})]+0.214[\ln(\text{Hardness})]+0.4152)})/100$ 0 mg/L for DOC between 0.5 and 31.5 mg/L and hardness between 5 and 511 mg/L
Manganese, Dissolved	2019	Not available	Not available	Online CCME calculator that is hardness and pH dependent for hardness ≥ 10 mg/L and ≤ 670 mg/L, and pH 5.4-9.0
Zinc, Dissolved	2018	2023	Not available	$(e^{(0.947[\ln(\text{hardness mg/L})] - 0.815[\text{pH}] + 0.398[\ln(\text{DOC mg/L})] + 4.625)}/1000)$ mg/L. The equation is valid between hardness 23.4 and 399 mg CaCO ₃ /L, pH 6.5 and 8.13 and DOC 0.3 to 22.9 mg/L

Green shading indicates guideline selected for water quality objective

Table 7-21: KZK Site Specific Water Quality Objectives

Constituent	Site Specific Water Quality Objectives (mg/L)			
	KZ-13	KZ-37	KZ-15	KZ-26
Arsenic, Total	0.037	0.037	0.037	0.037
Iron, Total	0.36	0.91	0.32	0.81
Fluoride	1.1	1.1	1.1	1.1
Selenium, Total	0.002 mg/L at sulphate ≤ 60 mg/L; and $(0.1736 * [\text{sulphate}]^{0.597})/1000$ (mg/L) at sulphate > 60 mg/L			
Copper, Dissolved	See Table 7-20	0.00134 mg/L Nov to Apr; FWQG in Table 7-20 for other months	0.00117 mg/L Jan to Mar; FWQG in Table 7-20 for other months	See Table 7-20

7.6.2 Closure Measures

7.6.2.1 Predicted Water Quality Performance During Closure Periods

A water quality model was developed for the Project to estimate the water quality in Mine discharge and receiving waters and to help guide water management for the Project with respect to water quality (Ensero, 2024). Water quality modelling was performed on a monthly time step throughout the Project life to estimate seasonal variation. Additionally, three different precipitation scenarios were run to undertake a sensitivity analysis:

- Mean annual precipitation (i.e., an “average” year);
- One in 50 (1/50) wet year; and
- One in ten (1/10) dry year.

Estimates of water quality for a range of COPI including fluoride, antimony, arsenic, cadmium, uranium, selenium, and zinc were produced at key monitoring locations on site and in the downstream receiving environment, which includes:

- ABM lake;
- Geona Creek (receiving environment monitoring station KZ-37);

- Upper and lower Finlayson Creek (sites KZ-15 and KZ-26, respectively); and
- South Creek (KZ-13).

It must be emphasized that this predictive modelling can only predict a range of concentrations and, in some cases, relative changes in concentrations or loadings. The water quality modelling is attempting to simulate a range of complex natural processes that have inherent variability. This modelling is useful to understand the potential range of controls that are needed to safely meet the closure objectives and, in addition, to identify the monitoring program during Operations and after Post-closure that will provide information to update this modelling and the environmental controls required.

During the Active and Transition Closure phases, COPI concentrations in South Creek (KZ-13) were estimated to return to baseline levels as the Fault Creek diversion is removed, allowing South Creek to revert to its pre-Project flow regime. Elsewhere, COPI concentrations in the Geona and Finlayson Creek receiving environments increased during the Active Closure phase due to drain-down of the Class A and B Storage Facilities. During the Active and Transition Closure phases water from the drain-down of these facilities will be treated to meet WQOs. No COPI exceedances were estimated in Finlayson Creek or South Creek during the Active and Transition Closure phases.

During the Active and Transition Closure phases, flooding of the ABM open pit will occur due to the cessation of local groundwater dewatering and the removal of the Fault Creek diversion. It is anticipated that the ABM open pit will take 15 years to fill before the ABM lake overflows into Geona Creek. Modelling suggests that the ABM lake will, without treatment, contain elevated concentrations of antimony, arsenic, cadmium, copper, lead, selenium, uranium, and zinc due to solubilization of the load accumulated on the pit floor and walls; however, in situ treatment of the ABM lake is anticipated to significantly lower the concentrations of these elements. Table 7-22 provides a summary of the modelled water quality of ABM lake with and without in situ treatment.

Outflow from ABM lake marks the start of the Post-closure phase, resulting in increases in some COPI concentrations in Geona Creek. A marginal exceedance of the arsenic WQO was estimated to occur in one month of the year in Geona Creek. Aside from the marginal exceedance of arsenic, no other exceedances of the WQOs were estimated for any other constituent in Geona Creek, Finlayson Creek or South Creek during Post-closure in the precipitation scenarios evaluated with mitigation measures in place.

Table 7-22: Modelled Water Quality of ABM Lake: With and Without in situ Treatment

Constituent	Units	Initial ABM Lake Chemistry at time of overflow into Geona Creek	ABM Lake Chemistry After In Situ Treatment at time of overflow into Geona Creek
Sulphate	mg/L	230	210
Hardness (as CaCO ₃)	mg/L	410	410
Nitrate-N	mg/L	0.28	0.028
Nitrite-N	mg/L	0.02	0.02
Ammonia-N	mg/L	0.22	0.11
Fluoride	mg/L	0.21	0.21
Antimony, Total	mg/L	0.014	0.0067
Arsenic, Total	mg/L	0.083	0.083
Calcium, Total	mg/L	120	120
Cobalt, Total	mg/L	0.005	0.005
Iron, Total	mg/L	1.5	0.15 ^a
Lead, Total	mg/L	0.041	0.004
Nickel, Total	mg/L	0.014	0.014
Selenium, Total	mg/L	0.011	0.0027
Thallium, Total	mg/L	0.0011	0.0011
Uranium, Total	mg/L	0.045	0.022
Aluminum, dissolved	mg/L	0.075	0.075
Cadmium, dissolved	mg/L	0.0062	0.00061
Copper, dissolved	mg/L	0.033	0.0016
Manganese, dissolved	mg/L	1.1	0.63 ^b
Zinc, dissolved	mg/L	0.82	0.081

^a Although iron is oversaturated with respect to ferrihydrite (Fe(OH)₃) under oxidizing conditions which are expected as ABM Lake forms, in situ treatment will promote reducing conditions under which ferrihydrite and poorly crystalline iron oxyhydroxide minerals will dissolve. Therefore, to remain conservative, the model-estimated iron concentrations were reduced by an order of magnitude but not to the iron concentration at equilibrium with ferrihydrite.

^b Manganese concentration in equilibrium with rhodochrosite (MnCO₃).

7.6.2.2 Embankments and Ponds

The UWMP and LWMP and associated embankments will be decommissioned during Active Closure. Decommissioning will include removal of HDPE geomembranes, scarifying the disturbed surface areas, revegetating the pond areas, and re-establishing Geona Creek.

The Class C Storage Facility Collection Pond will be decommissioned during the Transition Closure period once the revegetated cover has been determined to be stable in the long-term. Following the revegetation of the Overburden Stockpile, and the area deemed stable from erosion, the Overburden Stockpile Collection Pond will be decommissioned.

Following the cessation of mining, the Pit Rim Pond will be decommissioned. Decommissioning of the Pit Rim Pond will include removal of the HDPE geomembrane, scarifying the surface and revegetating the pond area.

The Class A Storage Facility Collection Pond will be decommissioned following the determination that the cover is meeting its design criteria. The Class A Storage Facility Collection Pond will be decommissioned by removing the HDPE geomembrane, scarifying the surface and revegetating the pond area.

The Class B Storage Facility Collection Pond will be decommissioned as a water collection feature following the determination that the cover is meeting its design criteria. Upon the determination that the Class B Storage Facility water quality is stable in the long-term, the pond will be decommissioned by removing the HDPE geomembrane, scarifying the surface and revegetating the pond area.

7.6.2.3 Water Conveyance Systems

Temporary (Operations) water conveyance structures, including diversions, such as the Fault Creek diversion, will be removed at the cessation of mining. The decommissioning of the Fault Creek diversion and diversion ditches will redirect water back into the Geona Creek catchment and will contribute to the ABM open pit sub-catchment.

Surface water flows will be conveyed within the Mine footprint, and will exit the site in a controlled, stable fashion during Active Closure. This will be accomplished by maintaining diversions to reduce infiltration and erosion of reclaimed areas. Diversions will be maintained during Transition Closure to minimize contact of surface flow with Mine influenced soils. Modifications will be completed to flow patterns to achieve enhanced stability or accommodate water quality objectives during Transition Closure as Mine features are reclaimed (e.g., Class A Storage Facility, Process Plant). As an example, portions of the northwest diversion will be decommissioned in stages as the Mine features along the western side of the Geona Creek valley have been successfully reclaimed to return drainages to pre-mining conditions to the extent possible.

7.6.2.4 Active Water Treatment Systems

The Class A and Class B Storage Facility collection ponds will be pumped to the WTP throughout the Active Closure period and into the Transition Closure period until such time that the waste rock covers have been established. Once the Class A and Class B Storage Facility cover systems have been determined to meet their design criteria, the Class A and Class B Storage Facility collection ponds will be reclaimed and water will be passively released to Geona Creek if the water quality is deemed suitable.

Once water from the Class A and Class B Storage Facilities is released to Geona Creek, the WTP will be placed on standby, but available to treat water if required for the remainder of the Transition Closure period.

As the ABM open pit fills, lime, ferric iron and carbon sources will be added as required as described in Section 7.2 to treat the water as the ABM lake is formed. Once the ABM lake reaches 1,380 masl it

will begin to spill through the constructed wetlands and discharge to Geona Creek. The pipeline from the ABM open pit to the WTP will remain in place until it has been determined that the ABM lake does not require active treatment. Once the Project is determined to be geochemically stable, the active WTP will be decommissioned. Sludge produced from the active WTP during all Closure phases will be placed into the ABM open pit, which will provide additional alkalinity to the water.

7.7 OTHER MINE INFRASTRUCTURE

7.7.1 Closure Objectives and Criteria

The general objectives guiding the decommissioning of other Project infrastructure are to:

- Remove potential sources of environmental contamination and minimize erosion;
- Minimize safety risks to people and wildlife;
- Reclaim the site to an aesthetically acceptable level; and
- Develop habitat that will encourage future use by wildlife and land users.

Table 7-23 summarizes the specific closure objectives, performance and design criteria and closure measures related to the decommissioning of the Project mining, processing, and support infrastructure.

Table 7-23: Mine Infrastructure Closure Summary

Value	Specific Closure Objective	Performance Criteria	Design Criteria/Closure Measures
Physical Stability	All Mine-related structures and facilities are physically stable and performing in accordance with designs.	No signs of gully erosion or slope creep.	Features will be re-graded to promote positive drainage if required, covered with approximately 0.3 m growth media and revegetated.
Chemical Stability	Ensure long-term chemical stability such that surface water runoff and ground water quality is acceptable.	Surface water and ground water quality meets SSWQO.	Identification and removal of any soils impacted by fuel or other contaminants. Impacted soil will be treated in the Land Treatment Facility.
Health and Safety	Reclamation eliminates or minimizes existing hazards to the health and safety of the public, workers and area wildlife by achieving conditions similar to local area features.	No buildings remaining on site. All concrete footings and slabs broken and buried. All mobile equipment and Process Plant equipment removed from site at end of Active Closure.	Demolition of buildings and revegetate and re-contour when applicable. Destroy concrete slab areas, re-contour and revegetate when applicable. Mobile equipment will be sold. Any material left unsold will be landfilled on site. Sell Process Plant equipment.
Land Use	Restored capability for use by wildlife and TLU, and conditions are typical of surrounding area.	The following ecosystem attribute variables are similar to control sites: Diversity: Richness and abundance of different functional groups. Vegetation structure: cover and biomass Ecological processes: nutrient availability and seedling density. Monitoring transects indicate signs of use by wildlife (e.g., sightings,	Areas re-graded to maintain natural slopes, aspect and elevations, similar to surrounding area. Revegetation planned and executed in consideration of pre-existing vegetation communities and final facility features (elevation, slope, aspect) to maximize revegetation success and use by wildlife.

Value	Specific Closure Objective	Performance Criteria	Design Criteria/Closure Measures
		browse, scat, burrows, trails) similar to control sites.	
	Prevent contaminated soils from damaging local environment.	Results of soil sampling programs within acceptable levels for COPI.	Treat or remove fuel impacted soils in the Land Treatment Facility. Place any soils contaminated with processing reagents into Class A Storage Facility.
Long-term Certainty	No active water management required to maintain physical or chemical stability, or environmental compliance.	Monitoring surveillance and adaptive management programs are executed as planned without increasing maintenance demands. Passive treatment systems treating water to acceptable levels, and all active water treatment equipment removed from site.	Remove temporary (Operations) structures including stream crossings and, diversions. Remove water treatment tanks, clarifier, reagent mixing system, piping and electrical /instrumentation equipment. The WTP will be maintained in operational form until water quality objectives can be achieved and maintained through the use of passive treatment systems.

7.7.2 Closure Measures

7.7.2.1 Mine Camp and Related Infrastructure

Closure measures include dismantling and removing camp buildings, trailers, and related infrastructure. All materials will be salvaged, recycled, or landfilled in the WMF, as appropriate. BMC will develop a QA/QC program to ensure that no materials that could cause future impacts to the receiving environment will be placed in the WMF. If materials to be landfilled cannot be disposed of in the WMF or Class A Storage Facility, they will be disposed of off-site in an appropriate landfill facility. The graded camp pad will be scarified and re-contoured as required to promote positive drainage, and suitably revegetated to provide erosion protection as well as to match the surrounding natural vegetation.

7.7.2.2 Process Plant, Warehouse, Administrative Complex, and Related Infrastructure

Closure measures for the Process Plant as well as the associated Warehouse and Administration Complex include dismantling and removing buildings, trailers, and related infrastructure. Prior to dismantling and removal, buildings will be inspected for hazardous materials. Any hazardous materials will be removed and disposed of either on or off site in an appropriate landfill or storage facility. Non-hazardous materials that have no salvage value will be disposed of in the approved landfill at the site. Additional information is provided in the Waste Management Plan (BMC, 2020j) and the Hazardous Materials Management Plan (BMC, 2020l).

Prior to disassembly, buildings will be stripped of all non-attached equipment and materials such as shelving units, office furniture, and equipment. Wherever feasible, materials with salvage value will be sold for its value. Modular prefabricated trailer style buildings will, wherever economically feasible, be removed from the site and sold for their salvage value. The remaining service piping, cabling and skirting lumber will be removed and disposed of as either scrap or as salvageable material. Rigid steel frame buildings will be dismantled on site with the support steel being sold for salvage value wherever economically feasible.

Closure measures for the Process Plant building include salvage and removal of the process equipment and dismantling of the building.

Above ground concrete footings, foundations, concrete floor slabs and below grade concrete foundations will be broken to allow percolation of water and covered with suitable growth media to support revegetation. These covered slabs will be seeded with an appropriate vegetation mix to establish vegetative growth over these areas.

Confirmatory sampling of the soils beneath the concrete footings, foundations and floor slabs will be undertaken prior to covering with growth media to check that migration of contaminants beneath the concrete has not occurred. The specifics of the density of sampling and the contaminants that will be analyzed will be confirmed during detailed Closure Planning prior to the commencement of Active Closure.

All equipment related associated with the Process Plant, Warehouse, Administrative Complex, and related infrastructure will be cleaned before removal from site.

The Process Plant area will be re-contoured as required to promote positive drainage, and suitably revegetated to provide erosion protection as well as to match the surrounding natural vegetation.

7.7.2.3 Fuel Storage Areas

Closure measures for fuel storage areas include draining tanks of any remaining fuel and salvaging or recycling as appropriate. The liners will be removed from the areas and disposed of in an appropriate landfill. Any fuel contaminated soils, as determined through an Environmental Site Assessment (following the *Yukon Contaminated Site Regulations* (Yukon Government, 2002)) will be excavated and disposed of in the Land Treatment Facility.

7.7.2.4 Sewage Treatment Plant

The sewage treatment plants will be decommissioned by draining and flushing any tanks and piping with clean water to remove any residual treatment sludge and effluent. Residual sludge and effluent will be transported off site. The plants will be disassembled and salvaged or recycled as appropriate.

7.7.2.5 Water Treatment Plant

The WTP will remain in place during the Active and Transition Closure periods while ABM lake treatment and the Class A and Class B Storage Facility cover systems are constructed. The WTP will be maintained in operational form until WQOs can be achieved and maintained.

Closure measures for the WTP include disconnection of piping and equipment, which will be salvaged or recycled as appropriate. The WTP building will be disassembled with any salvageable materials collected. Remaining material will be placed in the site landfill, or to an off site landfill facility.

7.7.2.6 Waste Management Facility

The WMF will receive solid waste throughout the Mine life. As such, it will not be closed until the Active Closure period has completed. A decommissioning plan will be submitted to YG for the WMF. Once approved, the facility will be closed with a growth media and the area will be revegetated.

The Land Treatment Facility is located within the WMF and is expected to be required for accepting contaminated soils. The facility will remain operational until such time as all soils requiring treatment are fully treated. As the volume and contamination level of soils to be treated cannot currently be defined, closure planning for the Land Treatment Facility will be developed and refined as the closure activities commence so as to match the volume and contamination level of soils to be treated. The Land Treatment Facility HDPE geomembrane will be disposed of in an off site facility at the time of decommissioning. The area will be regraded and revegetated to match the surrounding topography.

7.7.2.7 Bulk Explosives Facility

At closure, any unused explosives, magazines, and other equipment will be returned to their respective suppliers or otherwise disposed of. The prill and emulsion silos will be decommissioned and salvaged as appropriate. The parking garage will be dismantled and salvaged. Any fuel contaminated soils will be excavated and placed in the Land Treatment Facility. The area will be recontoured to match local topography and revegetated.

7.7.2.8 Mobile Equipment

Mobile equipment such as vehicles, compressors, mobile electricity generators, and self-contained storage tanks, will be decommissioned and removed from site for sale, salvage, or recycling as appropriate.

7.7.2.9 Truck Shop

Truck shop equipment will be decommissioned and salvaged or recycled as appropriate. The truck shop building will be dismantled, and materials salvaged or recycled as appropriate. Debris which cannot be salvaged will be placed in the site landfill for disposal. Concrete footings, foundations, and floor slabs will be broken to allow percolation of water and covered with suitable growth media to support revegetation. These covered slabs will be seeded with an appropriate vegetation mix to establish vegetative growth over these areas.

Confirmatory sampling of the soils beneath the concrete footings, foundations and floor slabs will be undertaken prior to covering with growth media to check that migration of contaminants beneath the concrete has not occurred. The specifics of the density of sampling and the contaminants that will be analyzed will be confirmed during detailed Closure Planning prior to the commencement of Active Closure.

7.8 HAZARDOUS MATERIALS

7.8.1 Closure Objectives and Criteria

The objective for hazardous materials management at closure is to remove all unnecessary hazardous materials off site to minimize liabilities. Specific objectives for hazardous materials management are described in the Hazardous Materials Management Plan (BMC, 2020I), and include:

- Maintain a register of all hazardous materials at site to ensure all materials are accounted for and removed;
- Ensure proper storage, handling, and transport to minimize the specific hazards associated with each material;
- Reuse and recycle all possible hazardous materials and return materials to vendors where possible to minimize waste;
- Collect and manage hydrocarbon contaminated soils in an on site Land Treatment Facility to the extent possible to minimize transportation and disposal costs and retain usable soils at site for reclamation;
- Incinerate used oil and fuel filters, and hydrocarbon-soaked absorbents where waste management permits allow; and
- Use only certified transportation companies and disposal facilities for hazardous materials.

A summary for management of hazardous materials on site in Closure is presented in Table 7-24.

Table 7-24: Hazardous Materials Closure Summary

Value	Specific Closure Objective	Performance Criteria	Design Criteria/Closure Measures
Health and Safety	Eliminate risk to human and wildlife health and safety.	No access to hazardous materials. No hazardous materials incidents or spills.	Remove all non-essential hazardous materials. Proper storage and handling for hazardous materials.
Land Use	Eliminate risk of hazardous materials spills.	No hazardous materials on site.	Incineration of hazardous wastes and residual ash disposed in the on site landfill. Remove all remaining hazardous materials from site using certified waste transport companies and disposal facilities.
Long-term Certainty	Eliminate risk of hazardous materials spills. No residual liabilities from hazardous materials.	No hazardous materials on site.	Incineration of hazardous wastes and residual ash disposed in the on site landfill. Remove all remaining hazardous materials from site using certified waste transport companies and disposal facilities.

7.8.2 Closure Measures

All hazardous materials will be removed from site at Closure. Table 7-25 lists the potential hazardous materials on site at Closure and handling requirements for disposal and or removal of each. Incompatible substances will be stored separately to prevent contamination, fires, explosions,

gaseous emissions, leaching or other discharges, or other dangerous conditions according to the Material Safety Data Sheets. Any unused hazardous materials will be returned to vendors or sold where possible. Some residual hazardous wastes can be incinerated on site, and the residual ash disposed of in the on site landfill. Residual hazardous materials will be transported off site by certified hazardous materials transport companies and disposed of at certified facilities. When transporting hazardous materials, the containers will be labelled following Canadian *Transportation of Dangerous Goods Regulations* (SOR/2008-34).

Table 7-25: Potential Hazardous Materials at Closure and Disposal Requirements

Hazardous Material	Removal / Disposal Requirements
Mill reagents (e.g., lime, flocculants, activators, depressants, collectors, frothers)	Return unused reagents to vendors. Transport residual reagents and containers to certified disposal facilities.
Explosives	Return to vendor or disposal as directed by licensed explosives contractor
Waste diesel / gasoline	Burned on site if permit allows.
Surplus Fuels	Transported off site and used elsewhere or sold.
Aviation fuel	Managed by air service contractors for use on other contracts.
Solvents and lubricants (e.g., paint thinners and strippers, varnishes, degreasing fluids, mineral spirits and petroleum distillates)	Shipped to licensed recycle and/or disposal facility.
Used oil (waste oil) and fuel filters	Incinerated on site under valid permit with ash disposed of in on site landfill or transported to used oil disposal facility.
Propane	Transported off site and used elsewhere or sold.
Compressed gas	Shipped to licensed recycle or disposal facility.
Waste antifreeze	Transported off site to licensed disposal facility or waste materials (such as absorbent pads) incinerated and ash disposed of in on site landfill.
Lead acid batteries	Stored appropriately on wooden pallets with plastic wrap and shipped to a licensed recycle or disposal facility.
Aerosol containers	Shipped to licensed recycle or disposal facility.
Medical wastes (e.g., syringes, bandages)	Collected in purpose-built sharps containers and incinerated.
Hydrocarbon and/or metal contaminated soils	Managed in on site Land Treatment Facility while the on site facility is permitted, then removal and disposal off site.

7.9 ROADS AND OTHER ACCESS

7.9.1 Closure Objectives and Criteria

Closure of the Access and Site Roads will be guided by the following objectives:

- Limited effect on wildlife, in particular caribou breeding and migration path (for the Access Road route); and
- Reclaim roads to limit negative mining legacy.

For the Access Road, success in meeting these objectives will be achieved when closure monitoring programs indicate that impacts to wildlife from the existence and use of the Access Road are not significant. In addition, that there are zero health and safety incidents or instances of impact to

company reputation and social licence from the post-closure condition (and use, if any) of the Access Road.

For Site Roads, successful closure will be realized through completing revegetation of all disturbed road ways into stable landforms.

7.9.2 Closure Measures

As noted in Section 2.3.1, some RRDC members requested that the Access Road not be reclaimed but left open for traditional land use purposes. BMC intends to close and reclaim the Access Road as required by the Access Road Lease, but will participate in multi-party discussions (i.e. RRDC, Yukon Government, stakeholders) on this matter as required.

Once a decision has been made to permanently close the road, BMC will:

- Inspect the road and identify any site-specific road closure requirements (including any terrain hazard areas that may need specific closure prescriptions);
- Prepare a detailed road reclamation and closure plan based on the condition of the road;
- Inspect the site during reclamation, Closure and Post-Closure to ensure the reclamation objectives have been met; and
- Provide final confirmation that all deactivation activities have been completed as described in the detailed road reclamation and closure plan.

A Qualified Professional will conduct this work, including either a Registered Forest Technician (RFT), Registered Professional Forester (RPF), Professional Engineer (PEng) or a Professional Geoscientist (PGeo) with experience in the subject matter.

During reclamation and closure activities, public access will be restricted to the same extent as it currently is. The security station and gate at the access to the road from the Robert Campbell Highway will be manned and maintained and only authorized vehicles will be allowed on the road. Over the winter period, if there are limited site operations, the gate will be locked. Post-closure the access restriction strategies may include additional gates, signs and barriers.

Road reclamation (for both the Access Road and all Site Roads) will involve the removal of the culverts and drainage structures and decommissioning of the roadbed. The roadbed will be contoured and rounded throughout its length, and will include the following activities:

- In smaller cuts and fills, ditches will be filled in, and the soils shaped to match the surrounding topography;
- In large cuts and fills, the embankment or excavation footprint will be reshaped to a lesser extent, but all slopes will be flattened or rounded to better suit the surrounding terrain; and

- Surfaces of gradients less than 25% will be scarified where necessary using scarifiers on bulldozers, excavators and graders to better accept seeding.

All culverts, bridges, and drainage structures will be removed and disposed of off site at an appropriate location. The following activities are planned:

- Trenches resulting from the removal of culverts will be swaled or contoured to match the surrounding terrain;
- Where warranted due to fine grain soils, erosion protection will be installed in the remaining swales, to a point where the reclaimed watercourse meets with its original path in undisturbed soil;
- If ditches are to be left intact (potentially required in steeper sections) existing ditch erosion protection may be left in place; and
- The bridge at km 17 will be removed, and the abutments will be excavated to the level of the rip-rap placed during construction.

All exposed soils along the length of the road will be stabilized and contoured to prevent surface erosion, then seeded with an appropriate seed mix (Section 7.1.2).

7.10 BORROW MATERIALS PLANNING

A preliminary investigation into available material for covers and construction purposes has been conducted. Table 7-26 presents the volumes of material for the cover systems described in Section 7.4.

Table 7-26: Borrow Materials and Volumes for Basins and Covers

Material Type	Source	Estimated Volume Required (m ³)	Estimated Volume Available (m ³)
Class C Waste Rock for Frost Protection for Class A and B Storage Facility	Class C Waste Rock from ABM open pit	4,238,000	41,300,000
Glacial Till for Class A Storage Facility	Overburden from ABM open pit and other site facilities	740,000	9,000,000
Glacial Till for Class B Storage Facility Cover System	Overburden from ABM open pit and other site facilities	674,000	9,000,000
Growth media for revegetation on Class A, Class B and Class C Storage Facilities	Topsoil and overburden from facility preparation	850,000	2,240,000

The estimated growth media volume available for reclamation is assumed to be a combination of topsoil as well as the upper layer of overburden. This material will be readily available for Closure as it will be excavated and stored next to the facilities, from where it was stripped, in topsoil stockpiles.

The Class C material required is based on a minimum 3.0 m thickness frost protection layer required for the Class A and Class B Storage Facility cover systems and may be tapered and increased for geotechnical stability.

The glacial till required to construct the engineered composite cover systems of the Class A and Class B Storage Facilities will be sourced from ABM open pit stripping and/or foundation clearing for other Project infrastructure that will be stored in the Overburden Stockpile during Operations.

7.11 MONITORING AND MAINTENANCE

The closure monitoring program builds on the operational monitoring program for the Project outlined in the Sediment and Erosion Control Plan (BMC, 2024k). The Active Closure period is expected to last approximately three years and will include regular monitoring, maintenance, and reporting in addition to monitoring plans developed in the execution plans for the closure components. The Transition Closure period lasts for a further approximately 12 years while the ABM lake fills. When monitoring has shown that closure performance criteria have been met, less frequent monitoring and maintenance will be required. Post-closure monitoring will last until all reclamation objectives are met.

It should be noted that the monitoring and maintenance plan presented here will be refined through Construction and Operations as new data are collected and programs change through adaptive management. Closure monitoring program updates will be discussed and agreed with Yukon Water Board, EMR, and Kaska as the Project moves into Closure. The term “monitoring” is used herein to describe both sampling activities and visual inspections.

This section discusses the monitoring activities that will continue during Active Closure, Transition Closure, and Post-closure to ensure reclamation objectives are met. The different components planned for monitoring during the closure periods are:

- Physical and chemical stability of engineered facilities;
- Surface and groundwater quantity and quality;
- Reclamation and wildlife use; and
- Aquatic resources (benthic invertebrates and fish).

The objectives of the monitoring programs are to:

- Provide qualitative and/or quantitative characterizations of important conditions over time through the various closure phases;
- Allow for the comparison of these conditions with performance criteria established to evaluate if closure measures are meeting identified closure objectives; and
- Allow for the comparison of these conditions with thresholds established in the Closure Adaptive Management Plan (Section 7.12.2).

Closure monitoring results and closure progress will be included in annual reporting to Yukon Water Board, EMR, RRDC, and LFN. Reporting will include:

- Presentation of monitoring results;
- A discussion of the effectiveness and success of reclamation;
- Development and implementation of supplemental or corrective measures to successfully reclaim sites where the initial measures were not successful (if any); and
- Identification and documentation of outstanding environmental issues along with, where warranted, the plans and a schedule for resolution. Issues that have been successfully mitigated will be listed as resolved.

7.11.1 Physical and Chemical Stability of Engineered Facilities

The Class A, Class B and Class C Storage Facilities must maintain physical and chemical stability in Closure to achieve the established objectives, as they will remain on site as engineered landforms. Natural processes such as wind and water erosion, settlement, and permafrost degradation can affect geotechnical stability, and by association, geochemical stability. The design criteria for the facilities are described in the Feasibility Design of Tailings Waste and Water Management Facilities Report (KP, 2019a), and include consideration for the facilities to be constructed, operated, and closed in a manner that will support this Closure objective of remaining on site as landforms.

The design engineers will specify and periodically update monitoring program(s) and action levels based on the performance of each structure during Construction, Operations and Closure as part of the Operations, Maintenance and Surveillance Manual(s) to be developed for the Project (and regularly updated throughout the Project life). The Operations, Maintenance and Surveillance Manual(s) will be reviewed by Kaska prior to it being finalized. Geotechnical monitoring will be performed annually and occur for the following facilities:

- Class A, B, and C Storage Facilities;
- Foundations of decommissioned Process Plant and infrastructure until fully reclaimed;
- Water collection ponds, spillways, and conveyance systems until fully decommissioned and reclaimed;
- Underground areas until all equipment and personnel are removed and flooding begins;
- ABM open pit ramp and walls until flooded; and
- Service and haul roads until open cross drains are constructed to convey water in original watercourses.

General monitoring activities for geotechnical physical stability will include:

- Completion of consistent monitoring records from established points of observation from Construction through to Post-closure; and

- Inspection for deformation of any of the facilities that could affect Closure objectives or criteria.

General monitoring activities for geochemical stability will include:

- Observations of changes that could indicate chemical instability (e.g., seeps and stains); and
- Sampling and testing (included in the water quality monitoring program).

There will be minimal maintenance required for infrastructure in Closure. Maintenance activities will include erosion control on slopes and debris removal from spillways, channels, and culverts.

Additional detail related to monitoring for the specific facilities is summarized in Table 7-27 and provided in the following sections.

Table 7-27: Summary of Closure Period Monitoring for Physical Stability of Engineered Facilities

Monitoring Program	Monitoring Locations	Timing	Active Closure	Transition Closure	Post -Closure
Physical Stability	Engineered facilities	Summer	Annual	Annual for Years 1 and 2, and every three years thereafter, assuming physical stability has been demonstrated.	1 per 5 Years

7.11.1.1 Engineered Facilities

The key objective of monitoring the engineered facilities is long-term physical and chemical stability. Monitoring of the Class A, B, and C Storage Facilities will occur biennially during Active Closure and once per three years during Transition Closure, with reduced frequency (initially once per five years) in Post-closure if previous monitoring provides sufficient evidence of stability.

Monitoring will be undertaken by suitably qualified professionals, and will include:

- Inspection and assessment of physical stability of the Class A, B, and C Storage Facilities;
- Inspection and assessment of geochemical performance of Class A and B Storage Facilities, including testing performance of cover and liner systems as necessary;
- Inspection of reclaimed Process Plant and ancillary facilities areas, and site roads to ensure slopes are stable and not eroding;
- Inspection of any remaining diversion ditches and berms;
- Inspection of ground conditions, such as possible effects of seasonal freeze/thaw and permafrost; and
- Identification and inspection of unanticipated seepage (including volume and quality).

Continuous monitoring equipment will be employed where necessary to assess physical stability of the Class A, B, and C Storage Facilities.

Monitoring instrumentation may include:

- Extensometers to measure axial displacement, which provides information on the displacement of the rock mass;
- Inclinometers to measure horizontal displacement; and
- Piezometers, such as vibrating wire piezometers, will allow for continuous monitoring of the pore-water pressure to determine the stability of slopes.

Photographic/satellite image analysis may also be used to monitor slope stability of the facilities.

7.11.1.2 ABM Open Pit

The key objectives for monitoring the ABM open pit in Closure are to check pit wall stability once dewatering has ended, and to manage water quality in the ABM lake in preparation for discharging to Geona Creek. A pit wall failure could produce waves in the ABM lake that might result in an uncontrolled release of water from the ABM open pit or result in physical mixing of the ABM lake strata that may adversely affect water quality. Risks and appropriate mitigation strategies, related to the ABM open pit and ABM lake in Closure are addressed in the FMEA included in Appendix A. Water quality monitoring will be conducted to ensure that mitigation measures are effective, and the ABM lake and releases meet required water quality criteria.

Monitoring of the ABM open pit during and after flooding will involve water quality and physical inspections to meet closure objectives and performance criteria. Activities for monitoring include:

- Monitoring geotechnical stability of the ABM open pit walls;
- Monitoring water level in the ABM lake during flooding and outflow rates once fully flooded;
- Water quality monitoring in the ABM lake through depth and at the discharge point once fully flooded; and
- Inspecting the integrity of barriers including the double perimeter berms and signage.

Water quality monitoring of the ABM lake will begin approximately one year after the ABM open pit has started to fill with water so as to allow safe access and water sampling by boat or other means. Separate samples will be collected at the surface (i.e., top 2 m), and mid depth, and at 5 m above the pit floor to assess how well mixed the ABM lake is and track the development of any stratification. Water quality data will inform any in situ treatment that may be necessary to limit the ABM lake metal concentrations.

The parameters measured in the water quality samples are the same as those listed for surface and groundwater monitoring in Section 7.11.2. The transition from Transition Closure to Post-closure is deemed to occur once the ABM lake starts to overflow. If stable water quality is observed, the sampling frequency will be reduced for the remainder of the Post-closure period.

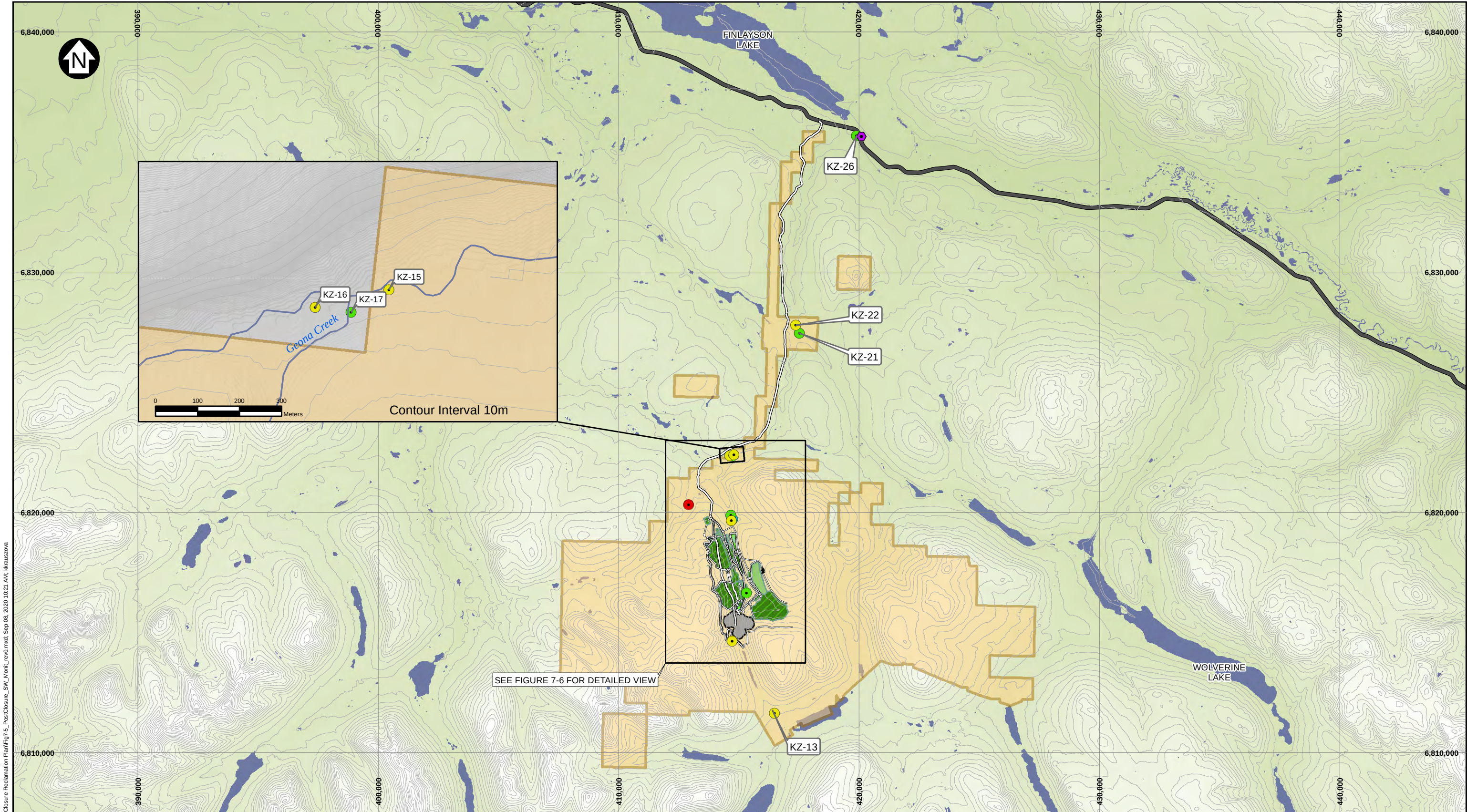
7.11.2 Surface and Groundwater Monitoring

Water quality monitoring will be performed to determine the progress and efficacy of site reclamation to confirm that WQOs in the receiving environment are being met, and to identify whether any AMP triggers are met.

The surface and groundwater quality monitoring locations, frequencies, parameters and Quality Assurance and Quality Control (QA/QC) procedures for Operations are set out in detail in the EMSRP (BMC, 2024m). These will be revised for Active, Transition and Post-closure, as appropriate, as the EMSRP is a “living document”, and will continue to be revised, incorporating ongoing data collection and results and observations made during the Construction and Operations phases of the Project, and eventually be amended to be applicable for the Closure phases of the Project. One of the revisions that will be made for the Post-closure phase will be to compare the surface and groundwater to the Guidelines for Canadian Drinking Water Quality (Health Canada, 2020); this is a commitment BMC has made to Kaska.

Surface water quality monitoring will occur at the sites indicated in Figure 7-5, and details of the surface water quality monitoring schedule are included in Table 7-28. The automated surface water hydrometric stations in Geona Creek, Finlayson Creek and South Creek will also continue to be monitored during Closure. Adaptive management strategies may need to be implemented to reduce the effects from the reduction of flows and water levels in the receiving environment of South Lakes once Fault Creek is diverted back to Geona Creek. BMC has committed to developing these strategies (if required) in collaboration with Kaska.

Groundwater quality monitoring will occur at the sites indicated in Figure 7-6, and details of the groundwater quality monitoring schedule are included in Table 7-29.



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LEGEND:

- CONTOUR (40 m INTERVAL)
- WATERBODIES
- RIVERS / STREAMS
- RECLAIMED MINE INFRASTRUCTURE
- BMC MINERALS (NO. 1) LTD MINERAL CLAIM AREAS
- PROPOSED TOTE ROAD/PROPOSED ACCESS ROAD
- PROPOSED MINE ROAD

SURFACE WATER QUALITY/HYDROLOGY

- AUTOMATED HYDROLOGY-ACTIVE
- SW WQ AND AUTOMATED HYDROLOGY-ACTIVE
- SW WQ AND HYDROLOGY-ACTIVE
- SW WQ-ACTIVE
- SW WQ AND AUTOMATED HYDROLOGY-PROPOSED

012345 Kilometers

NOTES:

- BASE MAP: PROJECT LIDAR TOPOGRAPHY.
- COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 9N.
- THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:150,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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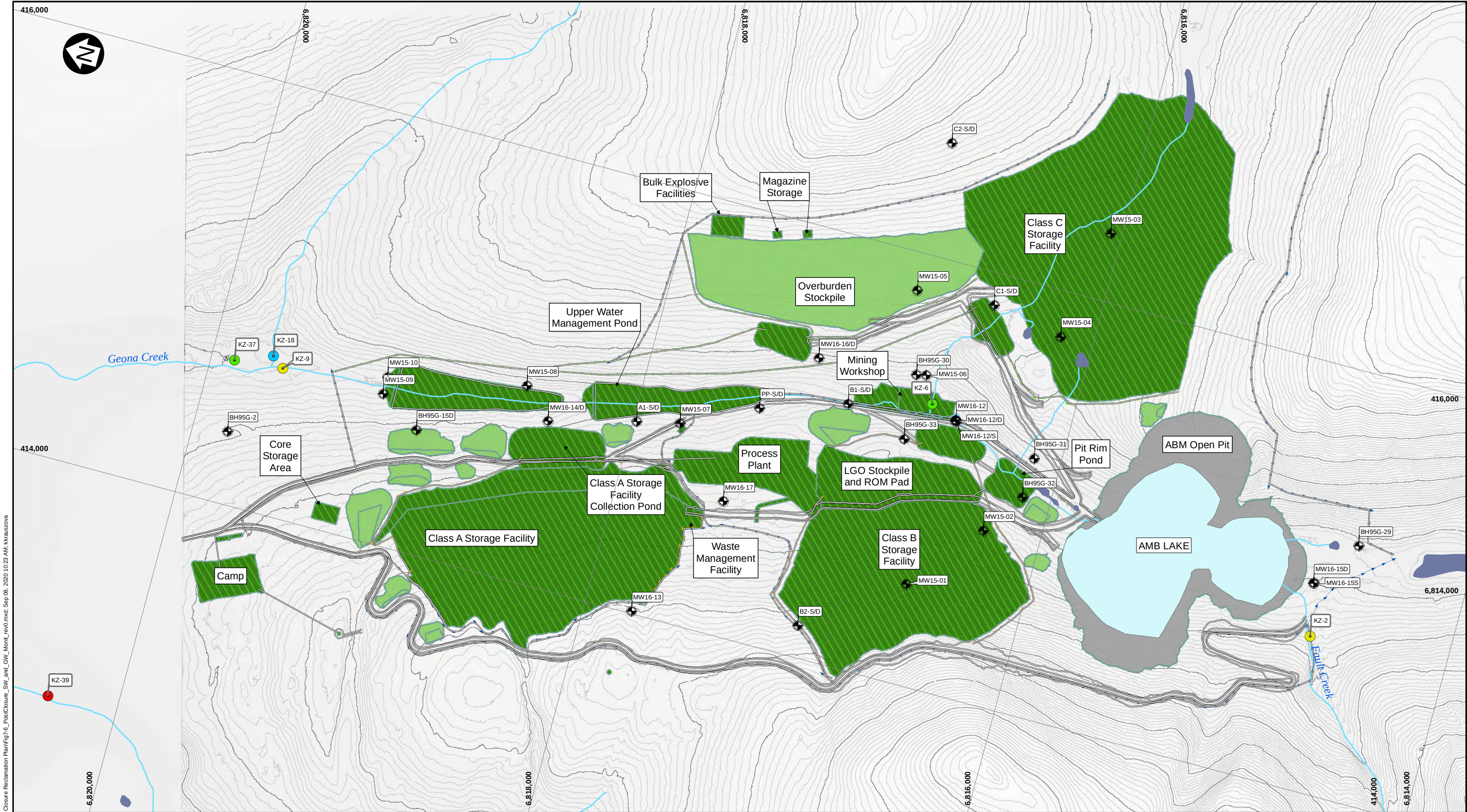
KUDZ ZE KAYAH PROJECT
POST-CLOSURE SURFACE WATER
QUALITY MONITORING LOCATIONS

PIA NO.
VA101-640/11

REF NO.
6

REV
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FIGURE 7-5



SAVED: M:\1010064011\A\GIS\Figures\Report 6 Closure Reclamation Plan\Fig7-6_PostClosure_SW_and_GW_Monit_rev0.mxd Sep 08, 2020 10:23 AM: kkrauszova

LEGEND:

- STREAM

—

CONTOUR 5 M

—

CONTOUR 50 M

—

ABM LAKE (EL. 1380 MASL)

—

OPEN PIT
- RECLAIMED

MATERIALS USED FOR RECLAMATION
- PROPOSED ROAD

—

DIVERSION CHANNEL (NON CONTACT)

—

COLLECTION DITCH (CONTACT CLASS A & B)

—

COLLECTION DITCH (CONTACT CLASS C & OVERBURDEN)

SURFACE WATER QUALITY/HYDROLOGY

- AUTOMATED HYDROLOGY-ACTIVE

SW WQ AND AUTOMATED HYDROLOGY-ACTIVE

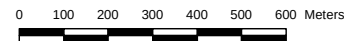
SW WQ AND AUTOMATED HYDROLOGY-PROPOSED

SW WQ AND HYDROLOGY, ACTIVE

SW WQ-ACTIVE

GROUNDWATER

- GROUNDWATER MONITORING WELL



NOTES:

1. BASE MAP: PROJECT LIDAR TOPOGRAPHY.
2. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 9N.
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KUDZ ZE KAYAH PROJECT

POST-CLOSURE SURFACE AND GROUNDWATER
MONITORING LOCATIONS WITHIN THE PROJECT AREA



PIA NO.
VA101-640/11

REF NO.
6

FIGURE 7-6

REV
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Table 7-28: Summary of Closure Period Monitoring for Surface Water

Station	Description	Analytical Suite	Operations	Active Closure	Transition Closure	Post-Closure
Surface Water Stations						
KZ-26	Finlayson Creek at Robert Campbell Highway	A,N,DOC, CN	M	M/Wd	M(2 years); Q(after 2 years)	M(3 years); Q(after 3 years)
KZ-22	Finlayson Creek 100 m downstream of East Creek	A,N,DOC, CN	M	M	M(2 years); Q(after 2 years)	M(3 years); Q(after 3 years)
KZ-21	East Creek at Mouth	A,N	M	M	-	-
KZ-16	Finlayson Creek immediately upstream of confluence with Geona Creek	A,N	M	M	M(2 years); Q(after 2 years)	M(3 years); Q(after 3 years)
KZ-39	Finlayson Creek upstream of haul road and KZ-16	A,N, DOC, CN	M	M	-	-
KZ-15	Finlayson Creek 250 m downstream of confluence with Geona Creek	A,N,DOC, CN	W/Wd	W/Wd	M(2 yrs); Q(after 2 years)	M(3 years); Q(after 3 years)
KZ-17	Geona Creek at Mouth	A,N	M	M	-	-
KZ-18	Unnamed East tributary to Geona Creek	A,N, DOC	M	M	-	-
KZ-37	Geona Creek downstream of unnamed East tributary (KZ-18)	A,N,DOC	W/Wd	W/Wd	M(2 years); Q(after 2 years)	M(3 years); Q(after 3 years)
KZ-9*	Geona Creek near proposed discharge location	A,N	M	M	M(2 years); Q(after 2 years)	M(3 years); Q(after 3 years)
KZ-2	Fault Creek	A,N	M	M	M(2 years); Q(after 2 years)	M(3 years); Q(after 3 years)
KZ-43	South Creek downstream of first South Lake	A,N	M	M	-	-
KZ-13	South Creek near mouth	A,N	M	M	-	-
Mine Site Stations						
KZ-5	Lower Water Management Pond, surface water	A,N,DOC, CN	Wd	Wd	-	-
KZ-5D	Lower Water Management Pond, water column within 5 m of bottom	A,N,DOC, CN	Wd	Wd	-	-
KZ-8A	Lower Water Management Pond Discharge to Geona Creek	A,N,DOC, CN	Wd	Wd	-	-
KZ-8B	Lower Water Management Pond Discharge to Finlayson Creek	A,N,DOC, CN	Wd	Wd	-	-
KZ-36	Upper Water Management Pond	A,N, CN	M/Wd	M/Wd	-	-
KZ-12A	Influent (Feed 1**) water to Water Treatment Plant	A,N, DOC, CN	Wd	Wd		

Station	Description	Analytical Suite	Operations	Active Closure	Transition Closure	Post-Closure
KZ-12B	Influent water (Feed 2**) to Water Treatment Plant	A,N, DOC, CN	Wd	Wd		
KZ-12C	Treated water from Water Treatment Plant to Process Plant	A,N, DOC, CN	Wd	Wd		
KZ-12D	Treated water from Water Treatment Plant to Lower Water Management Pond	A,N, DOC, CN	Wd	Wd	-	-
KZ-32	Pit Rim Pond	A,N	Md	Md	-	-
KZ-34	Class A Storage Facility Collection Pond, at outflow	A,N, CN	Wnf	Wnf	-	-
KZ-3	Class B Storage Facility Collection Pond, at outflow	A,N, CN	Wnf	Wnf	-	-
KZ-30	Class C Storage Facility Collection Pond, at outflow	A,N	Mnf	Mnf	-	-
KZ-31	Overburden Stockpile Collection Pond, at outflow	A,N	M	M	-	-
KZ-40	North non-contact diversion ditch upstream of confluence with Geona Creek	A,N	M	M	-	-
KZ-41	Contact Class C Storage Facility and Overburden Stockpile diversion ditch upstream of confluence with Geona Creek	A,N	M	M	-	-
KZ-42	South diversion ditch downstream of confluence of Fault Creek and south non-contact diversion ditch	A,N	M	M	-	-
ABM Lake						
KZ-38	ABM Pit Lake	A,N,DOC, CN, sulphide	n/a	M	M(June – Sept first 2 years); Q(Oct – May first 2 years); Q (after 2 years)	M (June – Sept first 3 years); Q(Oct – May first 3 years); Q(after 3 years)

KZ-9 Site to be discontinued once LWMP discharge feed station (KZ-8) is established during Operations.

W: Weekly; Wd: Weekly while discharging; Wnf: Weekly while not frozen; M: Monthly; Q: quarterly; Md: Monthly while discharging.

SA: two times each calendar year for the first three years and once per calendar year afterwards as per MDMER directive.

Field Parameters: In situ pH, temperature, conductivity, oxidation/reduction potential will be collected at all stations on the same monitoring frequency.

A: Physical parameters, conductivity, TSS, TDS, hardness, alkalinity, sulphate, ICP-total metals, ICP-dissolved metals.

N: Nutrients (Ammonia-N, Nitrate-N, Nitrite-N).

DOC: Dissolved organic carbon.

CN: Total and weak acid-dissociable cyanide.

Note: More frequent monitoring may be conducted to confirm efficacy of in situ ABM Lake treatment and/or if the AMP is triggered.

The ABM lake station will be split into two sub stations to allow for a monitoring location at surface and at least one additional location at depth in the lake (subject to stratification conditions of lake). Once sufficient open water is present in the ABM lake, the planned monitoring frequency will be monthly during Active Closure (when access is safe to do so) and for the first two years of Transition Closure and then quarterly thereafter. Additional monitoring on a weekly basis will be completed for four weeks following injection of in situ treatment reagents.

Table 7-29: Summary of Closure Period Monitoring for Groundwater

Monitoring Program	Monitoring Locations	Timing	Summary	Active Closure	Transition Closure	Post - Closure
Groundwater	Class A Waste Rock Storage Facility	Seasonal	Field and laboratory analysis	Quarterly	Quarterly (3 Years); Semi-annually (After 3 Years)	Annually
	MW15-07S, MW15-07D, MW15-08S, MW15-08D, MW15-09S, MW15-09D, MW15-10S, MW15-10D, MW16-13, MW16-14S, MW16-14D, MW16-17, B95G-2, BH95G-15S, BH95G-15D, A1-S, A1-D, A2-S, A2-D, PP-S, PP-D,					
	Class B Waste Rock Storage Facility					
	MW16-12S, MW16-12D, BH95G-32, BH95G-32S, BH95G-323D, BH95G-33S, BH95G-33D, B1-S, B1-D, B2-S, B2-D					
	Class C Waste Rock and Overburden Storage Facilities					
	MW15-06, MW16-16S, MW16-16D, BH95G-30, BH95G-31, C1-S, C1-D, C2-S, C2-D					
	ABM Open Pit					
	MW16-15S, MW16-15D, ABM1-D, ABM2-D, BH95G-29, BH95G-29D					

7.11.3 Monitoring of Reclamation and Wildlife Use

The purpose of the Closure monitoring is to determine if the reclamation measures have met the closure objectives (to reclaim the land as near as practicable to its original state). Areas of the Project that have been actively reclaimed will require monitoring to ensure the continued success of the closure program. The reclamation and monitoring programs will involve Kaska, to the extent possible.

Monitoring of reclaimed areas will take place annually during Active Closure, Transition Closure, and Post-closure to evaluate the revegetation establishment and the effectiveness in controlling erosion, as outlined in Table 7-30. Aerial reconnaissance is an effective method for the initial years and will be completed to identify any locations where severe erosion or drainage alteration has occurred as well as any additional locations warranting ground reconnaissance, further monitoring and additional reclamation prescriptions. Potential issues that may be identified through aerial reconnaissance include terrain instability (e.g., slope movement and trench subsidence), soil erosion or drainage alteration, poor vegetation cover establishment, groundwater seepage, watercourse crossings, and condition of access control management structures. As the site is reclaimed, the

program may be modified to only include ground reconnaissance of key areas that still require monitoring and maintenance to meet closure criteria.

Through monitoring and evaluation, additional reclamation measures will be employed in areas that have not revegetated successfully. Maintenance activities to support revegetation include scarifying, fertilizing, planting, reseeding, and erosion control measures. Post-closure, monitoring frequency will be reduced to areas that still need to meet closure criteria. Maintenance requirements are expected to be minimal in the Post-closure phase.

Revegetated areas will be inspected annually following initial planting until vegetation is successfully established and self-sustaining in accordance with performance criteria. The monitoring program will include measurements along established transect lines and plots to provide a detailed record of vegetation growth (including succession of species) and groundcover over time. The following components will be monitored to assess reclamation success:

- Soil for analysis of nutrients, pH, metal content and soil establishment until the vegetation is successfully established and self-sustaining in accordance with agreed criteria;
- Metals uptake in vegetation (including in the CWTS) measured periodically to determine if that uptake poses unacceptable risk to human, wildlife, and environmental health;
- Monitor sediments in CWTS for metals (including metals stability);
- Monitor revegetation progress such that it meets technical needs (e.g., maintaining physical stability), aesthetic needs (e.g., blends with surroundings), and future use targets, and does not impact the effectiveness of selected closure activities or become a source of metals due to uptake;
- Monitor reclaimed wetlands for biodiversity;
- Monitoring for propagation of non-native or undesirable species;
- Monitoring expansion of growth areas outside planted zones and determine if the effects are beneficial or detrimental to performance of closure measure; and
- Monitor wildlife use of revegetated areas to determine if viable wildlife habitat has been re-established.

Table 7-30: Summary of Closure Period Monitoring for Reclamation and Wildlife

Monitoring Program	Monitoring Locations	Timing	Summary	Active Closure	Transition Closure	Post - Closure
Terrestrial Resources: Revegetation Success	Specific locations where reclamation/revegetation occurred and other discrete locations	Mid-summer	Seedling survival, height growth, germination success, composition, natural succession	Annually	Annually (for 3 years) then TBD	TBD
Terrestrial Resources: Metals Concentrations	Specific locations where growth media were applied and other discrete locations	Mid to late summer	Monitoring of metals in soil and biota	Every 3 years	TBD	TBD
Terrestrial Resources: Wildlife	Established transects on reclaimed facilities; annual rut and late winter ungulate surveys	October rut, March late winter, summer during revegetation survey	Quantify species use from sightings and signs	Annually	TBD	TBD

7.11.4 Aquatic Resources

The objective of closure monitoring of aquatic resources is to ensure that downstream aquatic resources are being protected in the long-term. It is assumed that the success of the fish habitat offset program under a Canadian *Fisheries Act* authorization will be proven and no further fish population monitoring will be required.

Aquatic resource monitoring will include the Yukon permit requirements by water licence conditions and Environmental Effects Monitoring as required by the Federal *Metal and Diamond Mining Effluent Regulations*. During Closure, it is planned that the water licence conditions be aligned with the Environmental Effects Monitoring program. Details of the water licence and Environmental Effects Monitoring program for Operations are set out in the EMSRP (BMC, 2024m) and AMP (BMC, 2024n), and the planned schedule for the Closure phases is outlined in Table 7-31.

Table 7-31: Summary of Closure Period Monitoring for Aquatic Resources

Monitoring Program	Monitoring Locations	Timing	Summary	Active Closure	Transition Closure	Post - Closure
Aquatic Resources: Benthos/Sediment/ Toxicity	KZ-9, KZ-13, KZ-15, KZ-16, KZ-17, KZ-21, KZ-26, KZ-37	Low flow (fall)	Field sampling and lab analyses	Every 3 years	Every 3 years	TBD

7.11.5 Traditional Land Use

The quality of country foods (specifically vegetation and wildlife) is related (in part) to the quality of soil in the environment in which they live. Spills during Construction, Operations and Closure Phases have the potential to affect soil quality however, because all spills and affected soils will be cleaned up at the time of release, and following completion of an Environmental Site Assessment to assess

site conditions (following the *Yukon Contaminated Site Regulations* (YG, 2002)), there is no potential for these foods to become impacted from exposure to a spill during Construction, Operations and Active, Transition and Post-closure. Confirmatory soil and vegetation monitoring will be undertaken (as mentioned above) in collaboration with Kaska and the results will be made available to the communities. The vegetation monitoring will include berries. Additional details regarding the soil and vegetation monitoring methods are provided in the EMSRP (BMC, 2024m).

This monitoring program will ensure that concentrations in the soils and vegetation at Closure are at levels which the traditional land users can safely use the land in the Geona Creek valley for traditional land use purposes. With this monitoring and the commitment to ongoing engagement the risk of the traditional land users of avoiding the Project area in Post-closure will be reduced.

7.12 PERFORMANCE UNCERTAINTY AND RISK MANAGEMENT

The planning for reclamation and closure of any Mine development project relies upon a number of assumptions and predictive undertakings (e.g., water quality modelling, waste cover performance, water treatment performance) related to anticipated future conditions and Closure measure performance. By its very nature, planning for future events and performance involves varying degrees of uncertainty. Some elements of Mine closure planning have a higher degree of certainty (e.g., performance of erosion control measures) than others (e.g., long-term site runoff water quality).

Successful Mine closure planning therefore requires planning and management tools which acknowledge this uncertainty and take appropriate measures to reduce the risk associated with uncertain outcomes in the Closure periods. This section summarizes some key efforts both already undertaken and planned to reduce this risk, as planning for Reclamation and Closure of the Project moves along the Closure planning continuum.

7.12.1 Risk Management

As monitoring of baseline and environmental conditions continues leading up to the Construction Phase, and as data collection from the monitoring programs continues through Mine Operations, closure planners will have the ability to use these data to calibrate predictive models used as the basis of Closure planning and design. As Closure approaches, measures can be adjusted if required if the predictive work changes through the calibration process. This will reduce risks to the Project in Closure associated with uncertainty regarding future conditions.

BMC has undertaken several formal risk assessments to evaluate potential areas of risk and determine subsequent mitigations (BMC, 2017b). Specifically, a multi-stakeholder FMEA was conducted in September 2018 to identify potential failure modes and the resulting consequences during the Closure phases of the Project. The FMEA was conducted as a formal risk assessment process that sought to inform the selection of Closure options of the various components of the Project and identify mitigations to minimize the potential effects of the Project Post-closure. A summary of the FMEA is provided in Appendix A, and the outcome of that FMEA is an updated list of mitigations that, when applied, reduce the overall risk of the Project Post-closure.

The FMEA process used in the Closure FMEA was consistent with previous FMEA's held by BMC for Operations, as follows:

1. **Scenario identification:** the major Project components are analyzed to identify potential failure modes, hazard scenarios and their potential causes to identify resulting accidents and malfunctions to be addressed in the assessment;
2. **Effects analysis:** the likelihood of occurrence (i.e., probability) based on the Project design and consequence (i.e., severity) based on the potential environmental effects are identified for each of the accidents and malfunctions scenarios;
3. **Risk level determination:** the risk level is determined in the combination of the likelihood and consequence; and
4. **Mitigation:** for the effects with high or unacceptable risk levels, mitigation measures are identified to bring the risk level to an acceptable level.

The FMEA specifically considered the following Project components:

- ABM open pit;
- Underground;
- Class A, B, and C Waste Storage Facilities;
- LGO Stockpile and ROM Pad;
- Mine Infrastructure;
- Hazardous Materials;
- Access Road;
- Water Management Structures and Systems;
- Planned Early Closure; and
- Planned Temporary Closure.

The results and mitigations of the FMEA (Appendix A) have been incorporated into the design and implementation of reclamation and closure measures described herein. Risks for which there is a higher degree of performance uncertainty can be addressed in an adaptive management framework as discussed in the following section.

7.12.2 Adaptive Management Plan

Adaptive management is an approach to environmental management that is appropriate when a mitigation measure may not function as intended or when broad-scale environmental change is possible. Adaptive management plans are precautionary in nature and provide a level of security in long-term planning. Adaptive management plans also allow for the inclusion of improved science to be incorporated into mitigation measures as they are continually revised.

The Adaptive Management Plan for Closure will build upon the results and outcomes of the monitoring and adaptive management undertaken during Mine operations, as detailed in the AMP (BMC, 2024n). The AMP identifies the following components as requiring monitoring during the Operations phase of the Project:

- Air quality;
- Surface water quantity and quality;
- Groundwater quantity and quality;
- Wildlife;
- Geochemistry;
- Aquatic ecosystems and resources;
- Vegetation and soil; and
- Physical stability.

The adaptive management approach is as follows:

1. Determine management objectives;
2. Develop management strategies, the monitoring program, and thresholds;
3. Monitor the effectiveness of management strategies;
4. Evaluate and report the results of management strategies; and
5. Develop and implement alternative mitigation measures, if required.

The AMP focuses on Construction and Operations and will form the basis of Closure monitoring. Details of the adaptive monitoring for Closure will be developed once Operations have been underway for some time and have been validated to determine components requiring adaptive management during Closure.

8 RECLAMATION AND CLOSURE SCHEDULE AND EXECUTION STRATEGY

Three distinct Closure phases have been identified for the Project: Active Closure, Transition Closure and Post-closure. These have been identified for planning purposes because:

- In some cases, there are different objectives for different periods of time following the cessation of mining activities;
- There are distinct physical activities required in each stage to meet the Closure objectives; and
- The filling of the ABM open pit to create the ABM lake delays the final water drainage and discharge condition, and creates a transition period prior to the pit water commencing outflow to Geona Creek.

These separate periods are outlined below with the details regarding the associated schedule and execution strategy. Table 8-1 summarizes the Mine development and Closure phase schedule and execution strategy.

Table 8-1: Closure Schedule and Execution Strategy Summary

Development Period	Years	Site Conditions	Closure Activities
Mine Construction (Figure 5-1)	4	Construction of Mine facilities and stripping of open pit and waste facility footprints (progressively)	Removal and stockpiling of topsoil/overburden from ABM open pit and facility footprints. Diversion of Fault Creek into South Lakes. Sedimentation control.
Mining Operations (Figure 5-2)	10	Active mining operations underway	Continued removal and stockpiling of topsoil/overburden from facility footprints. Progressive reclamation of Waste Storage Facilities. Active water treatment.
Active Closure (Figure 5-3)	3	Active mining operations completed	Removal of ABM open pit equipment and infrastructure. Removal of underground infrastructure and equipment and sealing of portals. UWMP, LWMP Pit Rim Pond and Overburden Stockpile Collection Pond decommissioned. Construct CWTS. Remove Fault Creek diversion and re-direct Fault Creek into ABM open pit. ABM lake lime/carbon water treatment begins. Complete closure covers and revegetation of Class A, B and C Storage Facilities. Active water treatment of Class A and Class B Collection Pond water, as required. Routine monitoring and maintenance.
Transition Closure (Figure 5-4)	3	Pit filling	ABM lake water treatment continues as required using lime and carbon sources. ABM open pit spillway constructed. Some roads decommissioned. Class A, Class B, and Class C Collection Ponds decommissioned once water quality objectives are proven to be achieved and active water treatment is no longer required. Routine monitoring and maintenance.
	12	Pit finishes filling	Routine monitoring and maintenance. ABM lake water treatment continues as required using lime and carbon sources.

Development Period	Years	Site Conditions	Closure Activities
Post-closure (Figure 5-5)	10	ABM lake flows from engineered spillway to Geona Creek	Routine monitoring and maintenance. Site is considered to be in passive state.

8.1 ACTIVE CLOSURE PERIOD

The Active Closure period is the approximately three-year period immediately following cessation of Operations, where the most consequential decommissioning and reclamation work is completed. The general arrangement for Active Closure is shown on Figure 5-3.

Mining equipment will be removed, most infrastructure will be decommissioned, and the Fault Creek diversion will be removed to allow Fault Creek to return to its pre-mining channel and to begin filling the ABM open pit. ABM open pit in situ water treatment will begin and continue through Transition Closure.

Most major earthworks will be completed during this period. The areas of the Class A and B and C Storage Facilities not reclaimed progressively during Operations will be reclaimed. The UWMP, LWMP, the Pit Rim Pond and the Overburden Stockpile Collection Pond will be decommissioned.

The camp will be partially decommissioned. All operational water treatment and management systems (i.e., seepage collection and conveyance) will be retained and functional, and monitoring and inspection regimens will remain in place, unchanged from Operations.

Site roads that will not be required during Transitional Closure for monitoring and maintenance activities will be reclaimed.

8.2 TRANSITION CLOSURE PERIOD

The Transition Closure period is estimated to last approximately 12 years, during which time the ABM open pit continues to fill, ending when the ABM lake begins to outflow to Geona Creek. The Project layout for the Transition Closure period is shown on Figure 5-4.

The Collection Ponds for the Class A Storage Facility, Class B Storage Facility and Class C Storage Facility will remain on site and functional until such time as the water quality objectives and effluent discharge standards are met. The water treatment plant will be retained in a ready state as a contingency.

Monitoring and maintenance of the reclamation earthworks will be undertaken during this period as the waste cover systems and revegetation establish.

8.3 POST-CLOSURE PERIOD

The Post-closure period commences with the spilling of the ABM lake water into Geona Creek via the engineered spillway and CWTS. The Project layout for the Post-closure period is shown on Figure 5-5 (given that the CWTS is a contingency it is not presented in the figure).

The period is planned to be approximately 10 years of monitoring and maintenance. Once the objectives and performance criteria are achieved, the WTP and remaining infrastructure will be demobilized/decommissioned, and site water management will be passive in nature.

9 RECLAMATION AND CLOSURE LIABILITY

Reclamation and closure costing for the RCP has been updated to incorporate design refinements completed as part of the Feasibility Design of Tailings Waste and Water Management Facilities Report (KP, 2019a). Closure costing is the basis for the provision of security held by YG. The closure cost estimate is based on the YG guidance document Reclamation and Closure Planning for Quartz Mining Projects (YG, 2013).

Cost estimates were based on the following:

- Labour cost hourly rates were based on the most recent YG Fair Wage Schedule Category Rate. Rates are 'loaded' to 150% of the base rate to account for rostering, remote work and overtime;
- Equipment productivity rates for the various types of work were calculated based on the Caterpillar Performance Handbook version 48 (Cat, 2018);
- Equipment hourly rates are based on the 2025 / 2026 BC Road Builders Blue Book (BC Road Builders and Heavy Construction Association, 2025) (as Yukon Government third party equipment rental costs are no longer publicly available); and
- Earthwork volumes, disturbance areas and linear distances were based on the Feasibility Design of Tailings Waste and Water Management Facilities Report (KP, 2019a) and related design AutoCAD files.

Where possible, cost estimates were made using unit cost per volume calculated from equipment hire costs, equipment productivity rates and volumes/areas/lengths of earthwork.

Where the use of unit costs per volume/area/length were not applicable, an estimation of equipment and labour hours were used, derived from Ensero's operational and professional experience with other closure program costing estimates prepared for YG (i.e. Minto Mine, Keno Hill) and BMC's continual development and refinement of the Reclamation and Closure Plan.

Water treatment costing was estimated based on costs provided by Integrated Sustainability Consultants. Active treatment costs were included for the Active and Transition Closure phases. Passive treatment is included in the form of a capital cost for the construction of the CWTS and maintenance of the CWTS into Post-closure.

The annual costs for Closure care, maintenance, and monitoring were estimated, and applied for 25 years of Closure (three years Active Closure, 12 years Transition Closure and 10 years Post Closure). These costs were based on the monitoring and maintenance programs as described in Section 7.11 as well as the cost of an Active Closure, and Post-closure site environmental assessment. Additionally, instrumentation, vegetation maintenance, erosion maintenance, and transportation costs were included.

An overall rate of 15% was added to the estimated cost of implementation and Post-closure care, maintenance, and monitoring (PCCMM) to cover indirect costs such as insurance, taxes, and other administrative costs. Additionally, a cost contingency allowance of 20% was added to the total cost of closure implementation and PCCMM to account for uncertainties in the level of design at this time.

Provision for the effect of inflation on the estimated direct and indirect costs has been included for all scenarios, so these should be viewed as future values, rather than present values. The average inflation rate in Canada over the previous five years (2021 to 2026), as published by the Bank of Canada has been adopted (3.70% per year), with the number of years to commencement of closure accounted for in each scenario.

As the Project advances, the RCP and closure cost estimate will be reviewed every two years and Closure costs updated based on more detailed engineering plans and relevant operating experience. This estimate will be further refined in accordance with the continual review and revision of the RCP required by YG.

Closure cost calculations are detailed in the cost estimating tables as provided in Appendix E, updated and resubmitted as required.

9.1 CLASS C STORAGE FACILITY CLAIM FRACTION

A claim fraction exists within the footprint of the Class C Storage Facility. BMC intends to deal with the claims fraction through a new lands lease under the *Territorial Lands (Yukon) Act*.

The total footprint of the Class C Storage Facility is 1,267,000 m² and the footprint of the claims fraction (inside the Class C footprint) is 196,100 m², or approximately 15.5% of the total area.

For simplicity, BMC intends to hold the full financial security with the QML, with no financial security attached to the lands lease. As such, all financial security numbers in this plan include the area of the claims fraction.

The specific reclamation cost for the Class C Storage Facility is detailed in Appendix E.

9.2 RECLAMATION AND CLOSURE LIABILITY SUMMARY

The following sections outline the methodology and assumptions used for estimating reclamation and closure costs for the Project. A detailed breakdown of this estimate is provided in Appendix E.

9.2.1 General and Administration

Unit rates for general and administration items are largely based on experience from other similar Yukon projects, and include the following:

- On site management costs for 15 years (three for Active Closure and 12 for Transition Closure), including:
 - Pickup trucks;

- Equipment maintenance;
- Power and heat;
- Camp; and
- General administration.
- Transportation:
 - Employee transport; and
 - Road maintenance.
- Health and safety:
 - Development of a site-specific Occupational Health and Safety plan;
 - Worker orientation; and
 - First-aid supplies.

9.2.2 Exploration Disturbances

Exploration disturbance costs, such as drillhole abandonment, are based on previous Project experience.

9.2.3 Reclamation and Closure Planning

Reclamation and closure planning costs are based on experience from Yukon Projects, and include:

- Reclamation research;
- Development of Adaptive Management Plans; and
- Materials testing.

9.2.4 Open Pit and Underground Mine

Open pit and underground mining costs include nominal costs for equipment removal, access control and geotechnical control, based on experience from Yukon projects and includes:

- Equipment removal and cleaning and removal off site;
- Access controls:
 - Completing perimeter safety berms;
 - Blocking road access; and
 - Signage.
- Geotechnical controls:
 - Pit wall stabilization.

- ABM open pit in-situ water treatment; and
- Sealing of underground mine openings.

9.2.5 Waste Rock and Tailings

Reclamation and closure costs for the waste rock and tailings management facilities include:

- Crest regrading of the Class A, Class B, Class C Waste Storage Facilities and Overburden Stockpile as well as regrading of the topsoil stockpile areas; and
- Cover construction, including:
 - Composite cover including an 80 mil textured HDPE geomembrane for the Class A and Class B Storage Facilities; and
 - Growth media placement.

9.2.6 Surface Facilities

Reclamation and closure costs for surface facilities includes:

- Remediation of the LGO Stockpile and ROM pad;
- Demolition of the Process Plant and associated buildings, including:
 - Removal of salvageable equipment;
 - Dismantling of buildings;
 - Washing and decontamination of equipment;
 - Concrete demolition; and
 - Hauling of scrap materials.
- Remediation of the Fuel Storage Area, including:
 - Cleaning and decontamination of tanks;
 - Removal of tanks and piping; and
 - Removal of HDPE geomembrane.
- Removal of Process Plant reagents (off site); and
- Process Plant area land reclamation, including:
 - Soils testing;
 - Hauling of contaminated soils to the WMF;
 - Growth media placement; and
 - Site revegetation.

9.2.7 Water Storage Ponds

Reclamation and closure costs for all site water management facilities includes:

- Dam removal, including:
 - Engineering design for removal;
 - Pumping down water;
 - Breaching dam and relocating dam material;
 - Slope stabilization with erosion barriers;
 - Growth media placement; and
 - Site revegetation.

9.2.8 Infrastructure

Reclamation and closure costs for site infrastructure include:

- Camp and related infrastructure decommissioning, including:
 - Disconnection of services;
 - Removal of salvageable equipment;
 - Dismantling of buildings;
 - Hauling of scrap materials;
 - Removal of sewage system; and
 - Revegetation.
- Bulk explosives facility decommissioning, including:
 - Removal of salvageable equipment;
 - Removal of bulk materials;
 - Dismantling of buildings;
 - Disconnection of services;
 - Hauling of scrap materials; and
 - Growth media placement and revegetation.

9.2.9 Waste Disposal

Reclamation and closure costs for waste disposal includes:

- The Waste Management Facility, including:
 - Prepare and submit detailed closure plan;

- Removal of waste materials in accordance with the Waste Management Plan (BMC, 2024j);
- Removal of recyclables and special waste materials;
- Soil characterization of Waste Management Facility;
- Removal of contaminated soil from the Land Treatment Facility;
- Recontour; and
- Growth media placement and revegetation.

9.2.10 Roads and Trails

Reclamation and closure costs for roads and trails include:

- Recontouring;
- Scarification;
- Erosion barriers; and
- Site revegetation.

9.2.11 Water Management

Reclamation and closure costs for water management includes:

- Reclamation of the Fault Creek Diversion and other site diversions;
- Decommissioning of the Finlayson Creek pipeline;
- Monitoring well decommissioning; and
- 15 years of Active treatment costs (three for Active Closure and 12 for Transition Closure).

9.2.12 Sediment and Erosion Control

Operational diversion ditches will be removed at Closure. Costs associated with sediment and erosion control in Closure are covered in PCCMM cover repairs.

9.2.13 Mobilization and Demobilization Costs

Costs for mobilization of the construction fleet are based on unit rates sourced from the BC Road Builders Blue Book, assuming equipment is sourced from Whitehorse.

9.2.14 Interim Care, Maintenance, and Monitoring

Interim care and maintenance is required for security estimation purposes as it is associated with YG potentially having to take over the site. Interim care, maintenance and monitoring costs include:

- On site management costs for two years, including:
 - Pickup trucks;
 - Equipment maintenance;
 - Power and heat;
 - On site Caretaker;
 - Other part-time personnel (Electrician, Mechanic, Supervisor);
 - Camp costs;
 - Communications allowance; and
 - Miscellaneous supplies allowance.
- Transport costs, including:
 - Employee transport; and
 - Heavy equipment mobilization and demobilization.
- Site maintenance and equipment costs, including:
 - Road maintenance; and
 - Earthworks maintenance.
- Water treatment costs (two years); and
- Monitoring costs.

9.2.15 Post-Closure Care, Maintenance, and Monitoring

Rates for Post-closure care, maintenance and monitoring are based on information available from Minto Mine, Keno and other projects, with quantities appropriate for the Project. Environmental monitoring rates are based on monitoring locations outlined in the EMSRP (BMC, 2024m). Costs included in the closure estimate are calculated as a Net Present Value (NPV) based on the year they will be incurred, using a discount rate of 7%. NPV was calculated using the formula $NPV = C/(1 + i)^t$, where:

C is the full cost;

i is the discount rate; and

t is the number of years from present.

Post-closure care, maintenance and monitoring costs include the following:

- Environmental Assessment;
- Instrumentation (water quality, flowrate, meteorological);

- Water treatment, including:
 - Passive treatment operation and maintenance costs.
- Reclamation maintenance, including:
 - Cover repair; and
 - Revegetation repair.
- Site maintenance, including:
 - Road maintenance; and
 - Earthworks maintenance.
- Transport costs, including:
 - Employee transport; and
 - Heavy equipment mob-demob.
- Water quality monitoring (surface and groundwater);
- Monitoring, including:
 - Air quality, rock and soil geochemistry, biological, environmental reclamation measures.
- Instrumentation maintenance/replacement;
- Geotechnical monitoring:
 - Inspection, reporting, periodic instrumentation upgrades and/or replacement.

9.3 CURRENT, YEAR 2 AND YEAR 5 COST SUMMARY

The current, financial year 2 and financial year 5 reclamation and closure costs, including contingency are detailed in Appendix E, as described in Section 9.2.

The current liability is described in Section 9.3.1, details regarding the “Year 2” and “Year 5” liability are provided in Section 9.3.2 and Section 9.3.3, respectively. For the purpose of this estimate, “Year 2” refers to the two-year period commencing with formal receipt of the QML, and Year 2 Project Site Layout is shown in Figure 9-1. “Year 5” refers to the five-year period commencing with formal receipt of the QML, and Year 5 Project Site Layout is shown in Figure 9-2.

9.3.1 Current Reclamation and Closure Cost Estimate

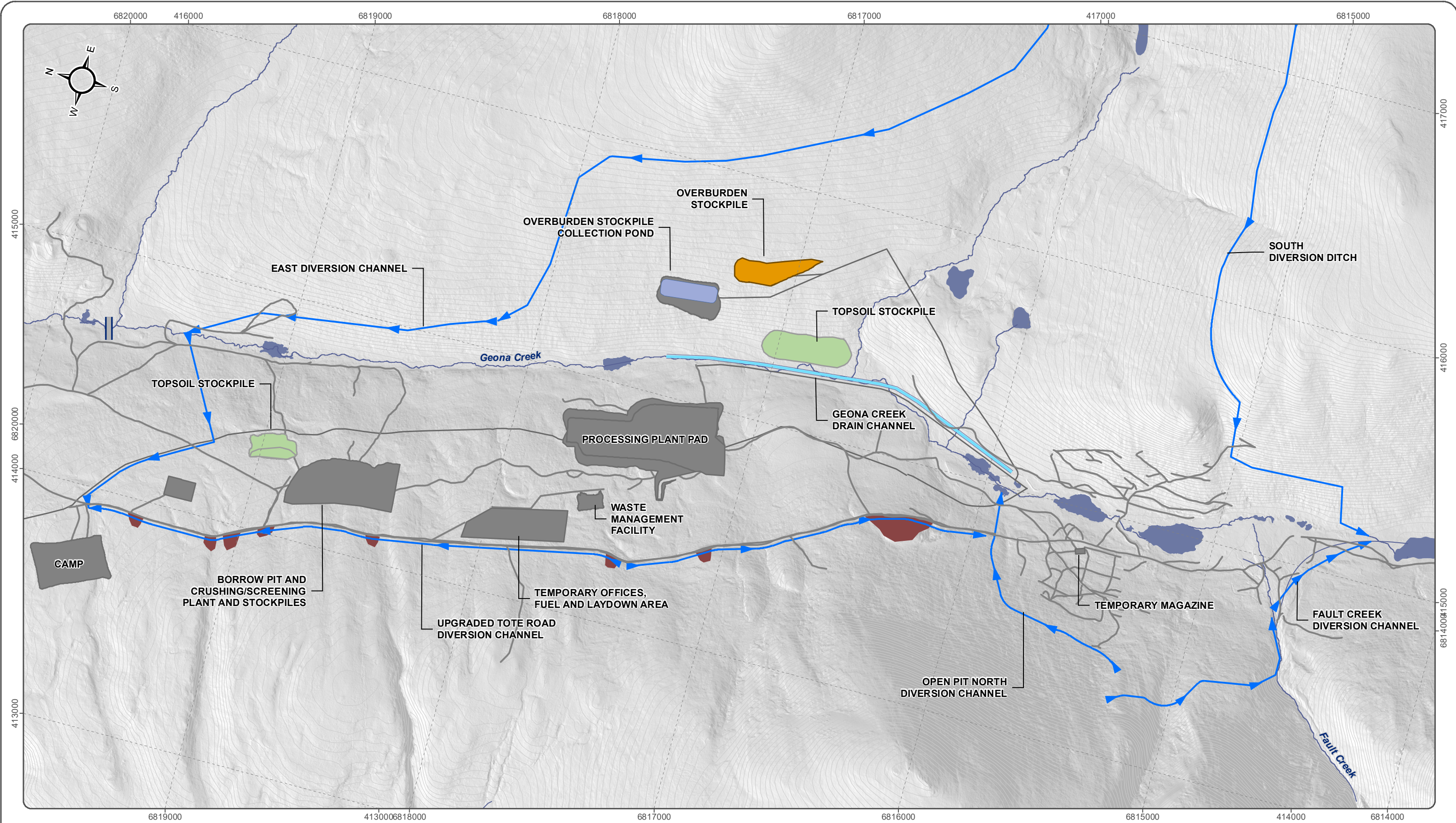
The site currently has a relatively low level of disturbance related to exploration related activities. Costs that will be incurred in this scenario include capping of monitoring wells and decommissioning and removal of site infrastructure (camp and offices).

9.3.2 Year 2 Reclamation and Closure Liability Estimate

The activities planned to be completed in the first two years following the receipt of the QML relate to one year of detailed design engineering and approximately one year of preliminary construction. Preliminary construction will consist of the following activities:

- Foundation preparation for the Process Plant (not including any concrete works);
- Storage of stripped topsoil in designated stockpiles for future reclaim and reuse;
- Storage of any unsuitable overburden in the overburden stockpile and construction of the overburden collection pond; Borrow pit stripping with temporary crushing/screening plant and material stockpiles;
- Temporary offices;
- Temporary fuel area;
- Waste Management Facility;
- Temporary service roads;
- Diversion Channels, including the construction of Fault Creek Diversion; and
- Temporary magazine.

Site infrastructure established by the end of Year 2 are illustrated in Figure 9-1 and include the Process Plant subgrade foundation excavations, overburden stockpile and overburden collection pond, temporary offices/fuel area, borrow pit area, temporary explosives facility and magazines, Waste Management Facility clearing and surface preparation, camp area, core storage area, roads and trails and diversion channels. Disturbed areas will be regraded and revegetated. The borrow pit will be utilized for Class C and overburden construction materials as needed. There will be no waste rock generated from preliminary construction activities. Appendix E summarizes the quantities of the Year 2 disturbance activities.



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Datum: NAD 83, Map Projection: UTM Zone 9N

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- | | | |
|------------------------------|-------------------|----------------------|
| Mine Infrastructure Facility | Borrow source | Mine Road |
| Pond | Drain Channel | Existing Watercourse |
| Stockpile, Overburden | Diversion Channel | Existing Waterbodies |
| Topsoil Stockpile | | |



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KUDZ ZE KAYAH PROJECT

FIGURE9-1
YEAR 2 PROJECT SITE LAYOUT

SEPTEMBER 2024

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9.3.2.1 Initial Site Development

Initial site development will focus on mobilization of an earthmoving fleet to site for bulk earthworks to construct the process plant pad. This fleet will also be used to complete the Upgraded Tote Road between the camp and Mine area, including construction of the diversion drain and initial pioneering of the Process Plant Access Road. Temporary facilities to enable this work will also be established, including fuel storage, temporary offices and temporary magazine.

Other works completed during this phase will include construction of the camp up to 350 room capacity in advance of full construction works and the Waste Management Facility for management of waste during construction works.

9.3.2.2 Site Water Diversion Works

This work covers the construction of the water diversion channels on the western and eastern slopes of the valley. Spoil from construction of the water diversion channels will be placed alongside the channels for future reclamation use.

A borrow pit will be opened within the Class A WSF (or other suitable area) for the production of rip rap as required for water diversion construction.

9.3.2.3 Process Plant and Infrastructure Construction

Construction of the Process Plant foundations (not including concrete) and other infrastructure within this general area. A laydown area for receipt and storage of goods prior to construction will be established within the Class A and/or Class B WSF footprints.

Temporary offices for management of the construction works will also be established within the footprints of the Class A and/or Class B WSF.

9.3.2.4 Water Management Infrastructure

The timing of construction of many aspects of the water management and waste rock infrastructure is seasonally dependent. Construction timing will overlap with other construction activities to varying degrees.

Water management facilities that may be developed are:

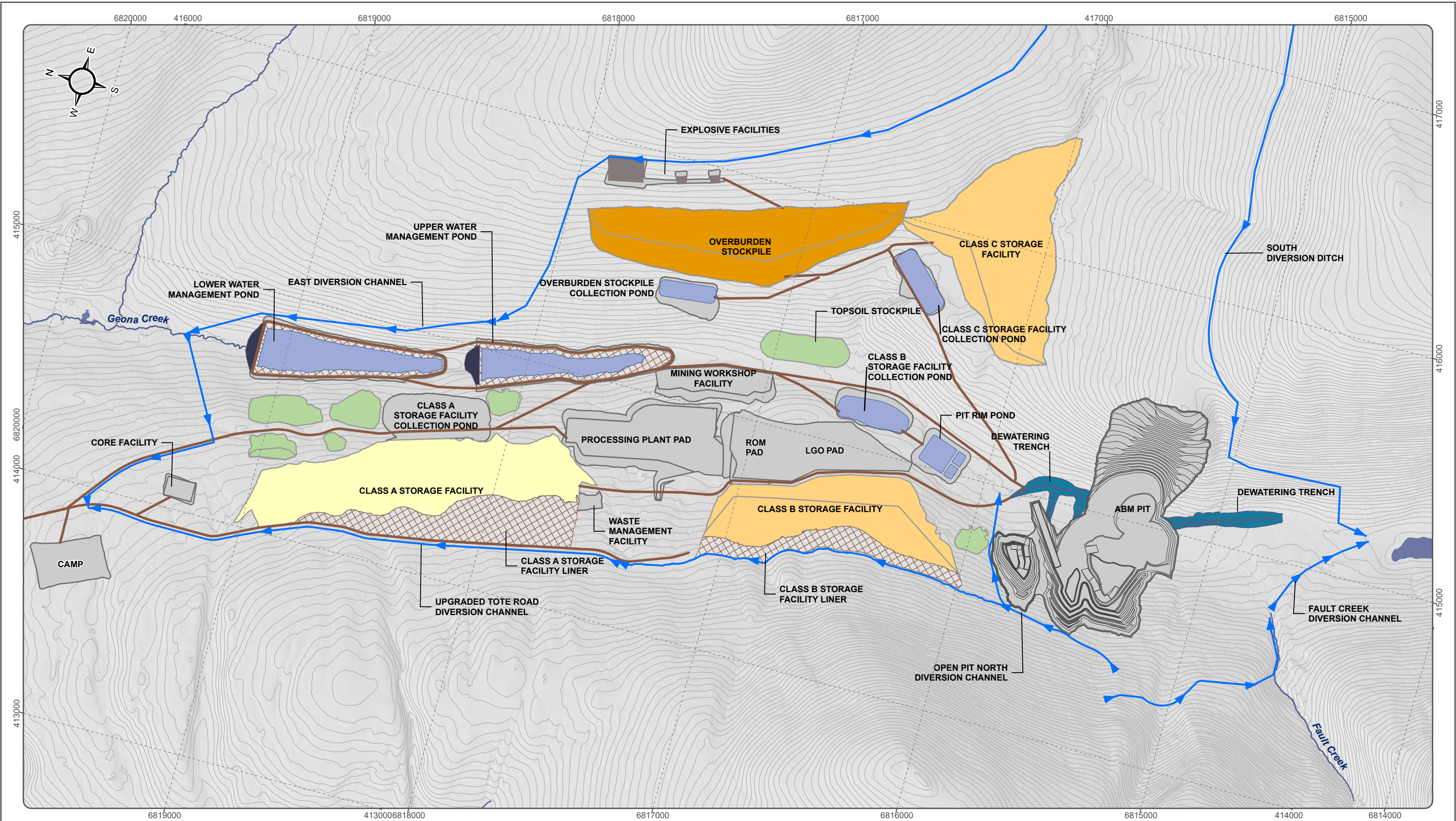
- Fault Creek Diversion;
- Diversion Ditches; and
- Temporary sedimentation ponds as required for construction.

9.3.3 Year 5 Reclamation and Closure Liability Estimate

It is expected that at the conclusion of a five year period from receipt of the QML that all site construction activities will have been completed and that the first year of production will have been completed, as illustrated in Figure 9-2. Site infrastructure will include:

- Accommodation facility;
- Core storage facility;
- Open pit mine, including overburden dewatering trenches;
- Processing plant facility, including the ROM Pad and LGO stockpile;
- Water treatment plant;
- Power generation facility, with associated diesel and LNG storage infrastructure;
- Class A, B and C waste storage facilities, and associated collection ponds;
- Overburden stockpile and associated collection pond;
- Topsoil stockpiles;
- Upper and Lower water management ponds;
- Pit rim pond;
- Site water diversion network;
- Mining workshop facility;
- Explosives storage facility;
- Site administration facilities;
- Waste management facility; and
- Site road network.

With only one year of mining completed, the quantity of waste rock and tailings placed in the waste storage facilities is less than that planned for the final site disturbance. Accordingly, it is expected that the period of time to complete closure activities is also reduced, with Active Closure estimated to be completed in two years and Transitional Closure in eight years. 10 years of Post Closure monitoring and maintenance is included, consistent with that of closure for the full Project development. Appendix E summarizes the quantities of the Year 5 disturbance activities.



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- Class A Storage Facility
- Class B and C Storage Facility
- Overburden Stockpile
- Topsoil Stockpile

- Dewatering Trench
- Pond/Water
- Dam
- Liner

- Diversion Channel
- Existing Watercourse
- Existing Waterbodies
- Tote Road And Proposed Roads



KUDZ ZE KAYAH PROJECT

FIGURE 9-2
YEAR 5 PROJECT SITE LAYOUT

MAY 2026

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(Last edited by: AnastasiyaMatlashevs;2026-05-05/20:07 PM)

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APPENDIX A:
KUDZ ZE KAYAH PROJECT RECLAMATION AND CLOSURE
PLAN FAILURE MODES AND EFFECTS ANALYSIS

Memorandum

To: Kelli Bergh, Environmental Manager, BMC Minerals (No.1) Ltd.

From: Mary Mioska, Alexco Environmental Group

CC: Jim Newton, Chief Mine Engineer, BMC Minerals (No.1) Ltd.
Kai Woloshyn, Alexco Environmental Group

Date: September 21, 2018

Re: Kudz Ze Kayah Project Reclamation and Closure Plan Failure Modes and Effects Analysis

1 INTRODUCTION

This memo summarizes the results of a multi-stakeholder Failure Modes Effects Assessment (FMEA) conducted September 6, 7, and 10, 2018 which identified potential failure modes and the resulting consequences during the proposed reclamation and closure phases of BMC Minerals (No.1) Ltd. (BMC) Kudz Ze Kayah (KZK) Project. The FMEA was conducted as a formal risk assessment process that sought to inform the selection of closure options of the various components of the KZK Project and identify mitigations to minimize the potential effects of the Project post-closure. The outcome of the FMEA is an updated list of mitigations, that, when applied, reduce the overall risk of the KZK Project post-closure.

The FMEA process used in the reclamation and closure FMEA was consistent with previous FMEA's held by BMC (e.g., KP, 2017) and follows the process outlined in Section 17 of the KZK Project Proposal (BMC, 2017a), as follows:

1. **Scenario identification:** the major Project components are analyzed to identify potential failure modes, hazard scenarios and their potential causes to identify resulting accidents and malfunctions to be addressed in the assessment;
2. **Effects analysis:** the likelihood of occurrence (i.e., probability) based on the project design and consequence (i.e., severity) based on the potential environmental effects are identified for each of the accidents and malfunctions scenarios;
3. **Risk level determination:** the risk level is determined in the combination of the likelihood and consequence; and
4. **Mitigation:** for the effects with high or unacceptable risk levels, mitigation measures are identified to bring the risk level to an acceptable level.

The FMEA specifically considered the closure aspects of the following components:

- ABM open pit;
- Underground Mine;
- Class A, B & C Waste Storage Facilities
- Ore Stockpiles and Pads;
- Mine Infrastructure;
- Hazardous Materials;
- Access Road;
- Water Management Structures and Systems;
- Planned Early Closure; and
- Planned Temporary Closure.

2 SUMMARY OF RELEVANT CLOSURE CONDITIONS

The FMEA considered the KZK Project closure conditions as defined in the Reclamation and Closure Plan. Broadly, this included three periods at the end of the operational mining period (Year 9): Active Closure Period (years 9 to 11), Transitional Closure Period (years 12 to 23), and the Post-Closure Period (years 24 to 40).

Active closure immediately follows the completion of mining operations, where the following activities are to be conducted:

- Removal of pit equipment and infrastructure;
- Removal of underground infrastructure and equipment, and sealing of portals;
- Remove Fault Creek diversion, re-direct Fault Creek into ABM open pit, pit lime/carbon water treatment begins, active water treatment (as required);
- Place waste covers on the Class A, B and C Waste Storage Facilities; and
- Decommission infrastructure and remove from site.

Transition closure is a 12-year period during which the ABM open pit continues to fill, ending when the ABM lake begins to overflow to Geona Creek, and includes the following activities:

- ABM Lake water treatment continues as required using lime and carbon sources; active water treatment if/as required;
- ABM open pit spillway constructed;
- Some roads decommissioned; and
- Routine monitoring and maintenance.

The post-closure phase is a 17 year period of routine monitoring and maintenance to confirm the water management and treatment system are functioning as designed. ABM lake water treatment using lime and carbon sources may be continued, and active water treatment will continue if/as

required. The upper water management pond will be decommissioning following confirmation that storage facility covers are meeting performance criteria.

3 FMEA WORKSHOP

3.1 PARTICIPANTS

The FMEA was held via in-person, whole day workshops on September 6 and 7, 2018 in Vancouver, BC. The FMEA was continued in the morning of September 10, 2018 via online conferencing (WebEx). In-person participants of the workshop on September 6 and 7 included:

- Kelli Bergh, Environmental Manager, BMC Minerals (No.1) Ltd.;
- Jim Newton, Chief Mine Engineer, BMC Minerals (No. 1) Ltd.;
- Jim Harrington, President, Alexco Environmental Group Inc.;
- Robert Johnson, Delta Engineering Ltd. (consultant with Dena Cho Environmental and Remediation Inc.);
- Tesloa Smith, RRDC Elder with Dena Cho Environmental and Remediation Inc.;
- Dorothy Smith, RRDC Elder with Dena Cho Environmental and Remediation Inc.;
- Les Galbraith, Specialist Engineer, Knight Piésold Consulting;
- Madeline Pease, Project Engineer, Knight Piésold Consulting; and
- Mary Mioska, Senior Environmental Manager, Alexco Environmental Group Inc.

Participants in the September 10, 2018 WebEx workshop included:

- Kelli Bergh, Environmental Manager, BMC Minerals (No.1) Ltd.;
- Jim Newton, Chief Mine Engineer, BMC Minerals (No. 1) Ltd.;
- Robert Johnson, Delta Engineering Ltd. (consultant with Dena Cho Environmental and Remediation Inc.);
- Madeline Pease, Project Engineer, Knight Piésold Consulting; and
- Mary Mioska, Senior Environmental Manager, Alexco Environmental Group Inc.

3.2 WORKSHOP METHODOLOGY

The FMEA workshop followed methodology initially used for the Class A Storage Facility FMEA conducted in September 2017 (KP, 2017), which defines risk as the factor between likelihood and consequence as follows:

$$\text{Risk} = \text{Likelihood} \times \text{Consequence}$$

The likelihoods and consequence definitions are summarized in Table 3-1 and Table 3-2, respectively. Likelihoods and consequences were also modeled off the Class A Storage Facility FMEA, but with the

frequencies of the likelihood ratings changed to reflect the active, transitional and post-closure phases defined above. For example, as there will be a relatively high level of activity during the active and transitional closure phases, compared to the post-closure phase when there will be minimal site activity, the definition for a “possible” likelihood was changed to be reflective of the active and transitional closure phases, which is 15 years.

Consequence descriptions are defined for six categories: Environmental Impact (EI), Special Considerations (SC), Legal Obligations (LO), Consequence Costs (CC), Community / Media Reputation (C/MR) and Human Health & Safety (HHS) (Table 3-2). Each of these categories were ranked individually, and the highest ranking chosen to calculate the resulting risk. The descriptions of the consequences reflect specific matters related for the KZK Project. For example, the category “special considerations” has been applied in this case to relate directly to the potential impacts to traditional land use. For the consequence costs ranking, the costs have been adjusted to reflect the impact of costs on a company comparable to BMC. Whereas a larger multi-national company may not consider costs greater than \$10 million to be critical, but would rank critical costs at a much higher value. Conversely, a smaller company may rank cost greater than \$2.5 million to be critical.

Table 3-1: Likelihood Descriptions

Likelihood					
Rating	Very Rare	Unlikely	Possible	Likely	Almost Certain
	1	2	3	4	5
Frequency	1 in 1,000 year event	1 in 200 year event	1 in 15 year event	Less than 1 event per year	More than 1 event per year

Table 3-2: Consequence Descriptions

Categories	Low	Minor	Moderate	Major	Critical
	1	2	3	4	5
Environmental Impact (EI)	No impact	Minor localized or short-term impacts	Significant impact on valued ecosystem component	Significant impact on valued ecosystem component and medium-term impairment of ecosystem function	Serious long-term impairment of ecosystem function
Special Considerations (SC)	Some disturbance but no impact to traditional land use	Minor or perceived impact to traditional land use	Some mitigable impact to traditional land use	Significant temporary impact of traditional land use	Significant permanent impact on traditional land use

Categories	Low	Minor	Moderate	Major	Critical
	1	2	3	4	5
Legal Obligations (LO)	Informal advice from a regulatory agency	Technical / Administrative non-compliance with permit, approval or regulatory requirement Warning letter issued	Breach of regulations, permits or approvals (e.g. 1 day violation of discharge limits) Order or direction issued	Substantive breach of regulations, permits or approvals (e.g. multi-day violation of discharge limits) Prosecution	Major breach of regulation - willful violation Court order issued
Consequence Costs (CC)	< \$100,000	\$100,000 - \$500,000	\$500,000 - \$2.5 Million	\$2.5 - \$10 Million	> \$10 Million
Community / Media Reputation (C/MR)	Local concerns, but no local complaints or adverse press coverage	Public concern restricted to local complaints or local adverse press coverage	Heightened concern by local community, criticism by NGOs or adverse local/regional media attention	Significant adverse national public, NGO or media attention	Serious public outcry / demonstrations and adverse international NGO attention or media coverage
Human Health & Safety (HHS)	Low-level short-term subjective symptoms. No measurable physical effect. No medical treatment	Objective but reversible disability, impairment and/or medical treatment injuries requiring hospitalization	Moderate irreversible disability or impairment to one or more people	Single fatality and/or severe irreversible disability or impairment to one or more people	Multiple fatalities

The likelihood and consequence ratings results were multiplied to give a risk rating from 1 to 25, as shown in Table 3-3.

Table 3-3: Risk Ratings

Risk		
Very Low	0 to 3	Very Low
Low	4 to 6	Low
Medium	7 to 12	Medium
High	13 to 20	High
Very High	21 to 25	Very High

The FMEA framework also incorporated the nine Fundamental Reclamation and Closure Objectives as defined by the Yukon Water Board (YWB) and the Yukon Government Department of Energy, Mines and Resources (EMR) in their guidance document *Reclamation and Closure Planning for Quartz Mine Projects* (YWB and YG, 2013), detailed in Table 3-4. These objectives were helpful in framing the potential concerns for closure and helped guide the thinking of the participants.

Table 3-4: Fundamental Mine Reclamation and Closure Objectives (from YWB and YG, 2013, pg. 4-5)

Value	Reclamation and Closure Objectives
Physical Stability	- All mine-related structures and facilities are physically stable and performing in accordance with designs; and - All mine-related structures, facilities and processes can withstand severe climatic and seismic events.
Chemical Stability	Release of contaminants from mine related waste materials occurs at rates that do not cause unacceptable exposure in the receiving environment.
Health and Safety	- Reclamation eliminates or minimizes existing hazards to the health and safety of the public, workers and area wildlife by achieving conditions similar to local area features; and - Reclamation and closure implementation avoids or minimizes adverse health and safety effects on the public, workers and wildlife.
Ecological Conditions and Sustainability	- Reclamation and closure activities protect the aquatic, terrestrial and atmospheric environments from mine-related degradation and restore environments that have been degraded by mine-related activities; and - The mine site supports a self-sustaining biological community that achieves land use objectives.
Land Use	Lands affected by mine-related activities (e.g., building sites, chemical and fuel storage sites, roads, sediment ponds, tailings storage facilities, waste rock storage areas, underground workings, etc.) are restored to conditions that enable and optimize productive long-term use of land. Conditions are typical of surrounding areas or provide for other land uses that meet community expectations.
Aesthetics	Restoration outcomes are visually acceptable.
Socio-economic Expectations	- Reclamation and closure implementation avoids or minimizes adverse socio-economic effects on local and Yukon communities, while maximizing socio-economic benefits; and - Reclamation and closure activities achieve outcomes that meet community and regulatory expectations.
Long-term Certainty	Minimize the need for long-term operations, maintenance and monitoring after reclamation activities are complete.
Financial Considerations	Minimize outstanding liability and risks after reclamation activities are complete.

4 RESULTS

Risks were identified for the following components, in the order that they are listed in the Risk Register (Appendix A):

1. Site wide;
2. ABM open pit;
3. Underground mine;
4. Class A Storage Facility;
5. Class B Storage Facility;
6. Class C Storage Facility
7. Water management structures and systems;
8. Mine infrastructure (during the post-closure period only);

9. Access Road;
10. Planned early closure; and
11. Temporary closure.

The ore stockpiles and pads were also considered, but as these are formed from the base of the Class B Storage Facility and will be closed at the same time as the Class B Storage Facility, the risks associated with the closure phase of these components are considered in the risk assessment for the Class B Storage Facility.

Risks from hazardous materials were also considered; however, as BMC has committed to a site assessment for contaminated soils to be conducted during the transition closure phase, there are no post-closure risks associated with hazardous materials.

Risks were then identified using the nine closure objectives as a guide. The risks were numbered sequentially, with the component number listed above as the primary reference number. For example, the first risk identified under the Class A Storage Facility was numbered 4.1. Not all components had risks under each closure objective, for example, there were no risks identified under the “aesthetics” closure objective.

Similarly, for some risks, not all consequence categories were applied. For example, for those risks that were deemed risks to animals, there was no Human Health & Safety consequence rating. Those instances are identified by “n/a” in the Risk Register (Appendix A).

Some risks were not able to be assigned likelihoods or consequences, such as risks 11.7 and 11.8 which apply to the regulatory risk during temporary closure. These risks cannot be quantified, as they could range from minor to major Project costs, and the likelihoods cannot be estimated.

In total, 80 risks associated with closure of the KZK Project were identified; however, some were deemed already mitigated by the proposed design and closure activities. These were left in the Risk Register with the associated design and mitigation measures listed for information, but no risk ratings were assigned to those risks. Of the 44 risks that were assigned likelihood and consequence ratings, 16 were classified as Very Low risk, 26 were classified as Low risk, 4 were classified as Medium risk (Table 4-1).

The risks that were classified as Medium include:

- **Risk 2.5 ABM open pit, Human Health and Safety:** risks due to access to the high walls and the ABM lake post-closure (possible with a major consequence).
- **Risk 4.12 Class A Storage Facility, Long-term Certainty:** risks due to regulatory uncertainty around long term management of tailings storage facilities. De-classifying tailings storage dams is currently being reviewed by the Canadian Dam Association. As a tailings facility, the Class A Storage Facility may require long-term perpetual monitoring (likely with a moderate consequence).
- **Risk 9.3 Access Road, Land Use:** Unauthorized access to the closed mine via the reclaimed access road (likely with a moderate consequence).
- **Risk 11.5 Temporary Closure, Socio-economic Expectations:** Temporary closure would results in an interruption in jobs and contracts. It is expected that only approximately 20 jobs will be

available during temporary closure, compared to approximately 346 during mine operations (almost certain with minor consequence).

Table 4-1: Risk Ratings – Initial FMEA Results

		Risk				
Likelihood	5	2.7, 3.2, 11.4	11.5			
	4	5.7, 7.4		4.12, 9.3		
	3	10.2	2.6		2.5	
	2		2.2, 4.9, 5.9, 6.5, 8.1, 8.2, 8.4, 11.1	3.4, 4.5, 4.7, 5.4, 6.3		
	1	3.1, 4.8, 5.6, 5.8, 6.4	4.1, 5.1, 6.1, 6.2	2.4, 4.2, 5.2	2.3, 3.5, 7.1, 11.9	4.3, 5.3
		1	2	3	4	5
Consequence						

For the risks that were rated as medium or high, additional mitigation measures were adopted, and have been included in the Reclamation and Closure Plan. These additional mitigations include:

- **Risk 2.5:** As the main concern is access to the ABM open pit during winter with snow machines, double berms have been proposed to prevent access to the pit. Previously, only single berms were proposed.
- **Risk 9.3:** Full time gatehouse management may be required to ensure no unauthorized access. Currently, seasonal gatehouse management is proposed during the active and transition-closure phases. A fence along the Robert Campbell Highway connected to the Access Road entry has also been suggested.

Risk 11.5 is considered an un-mitigatable risk that is inherent to temporary closure. However, open and transparent communication by BMC in the event of a planned temporary closure, as well as the fulfillment of BMCs commitments under the Socio-economic Participation Agreement (SEPA) between the Company and Kaska will help lessen the consequences of a temporary closure scenario on those employees that may be temporarily laid off from the KZK Project.

Risk 4.12 is considered financial risks to BMC, which is a corporate consideration, but not one that can be mitigated through design or management.

In light of the above, the risk ratings for risks 2.5 and 9.3 were updated to be Low, and the resulting updated Risk Rating summarized in Table 4-2.

Table 4-2: Risk Ratings – Updated FMEA Results

		Risk With Updated Mitigations				
Likelihood	5	2.7, 3.2	11.5			
	4	5.7, 7.4		4.12		
	3	10.2	2.6			
	2		2.2, 2.5,4.9,5.9,6.5,8. 1,8.2,8.4	3.4, 4.5, 4.7,5.4,6.3,9.3		
	1	3.1, 4.8,5.6,5.8,6.4	4.1, 5.1,6.1,6.2	2.4, 4.2,5.2	2.3, 3.5,7.1, 11.9	4.3, 5.3
		1	2	3	4	5
		Consequence				

5 UPDATED DESIGN AND MITIGATIONS

The design and mitigations for the KZK project as detailed in the Project Proposal and subsequent Information Responses (BMC, 2017a, c, d; BMC, 2018) were considered in the FMEA, and are listed for the corresponding risks in the Risk Register (Appendix A). However, during the course of the workshop, additional mitigation measures were discussed, and BMC has committed to investigating the application of these mitigations in the refined design of the KZK Project. These additional mitigation measures are listed in Appendix A, and are as follows:

- Consideration of additional pumping of water from water management ponds to fill the pit faster during the transition closure phase;
- Adaptively manage the *in situ* treatment of the ABM open pit through ongoing monitoring of results, with the commitment to conduct a second round of treatment, or additional lime/alkaline material addition if required;
- Lowering the invert of the ABM open pit spillway to achieve positive pressure continuously into the pit. This will eliminate the risk of groundwater flowing from the ABM open pit to South Lake post-closure;
- Evaluating the potential for pumping all collection water from the Class A and B storage facilities to the ABM open pit starting in Year 9.5;
- Designing the ABM lake spillway to account for the potential for glaciation; and
- During temporary closure, apply 1 m glacial till cover to the Class A Storage Facility to prevent water ingress and oxygen ingress immediately upon temporary closure

6 REFERENCES

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APPENDIX A. RISK REGISTER

Table A-1: Initial Risk Register

RISK NO.	Closure Objective	RISK DESCRIPTION	CONSEQUENCE DESCRIPTION	RISK RATING										CLASSIFICATION	DESIGN AND MITIGATION MEASURES
				Likelihood	Consequence						Max.	SCORE			
					Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)					
ABM open pit														Mitigations/design: - shotcreting of the pit walls - lime dosing concurrently with organic amendment - Foundation concrete disposed in pit at end of mine life - Some waste rock will remain in pit at end of mine life	
2.1	Physical Stability	Localized wall failures	Localized sloughing of pit walls is consistent with design. Therefore, no risk associated with this failure in closure										No Risk	Design include: - Pit filling with groundwater, minimizes area of exposed rock (~150 m high wall)	
2.2	Physical Stability	Massive, sudden pit wall failure	Wall failure resulting in wave of ABM lake water, and remobilization of sediment	2	2	2	1	2	2	2	2	4	Low	- Spillway armoured to prevent impacts to wetland (if constructed) if there is a flood wave event	
2.3	Chemical Stability	Treatment not as efficient as predicted	Impacts to surface water via spillway	1	3	2	2	4	3	1	4	4	Low	- on-going humidity cells - refinement of proposed treatment during transition closure - Regular monitoring will be conducted prior to the ABM lake overflowing, therefore this would be identified quickly and re-treatment could be applied - Alkalinity benefits from Fault Creek inflow	
2.4	Chemical Stability	Treatment not as efficient as predicted	Impacts to groundwater leading to impacts to South Lakes	1	2	2	2	3	3	1	3	3	Very Low	- on-going humidity cells - refinement of proposed treatment during transition closure - Shotcreting of pit walls - Regular monitoring will be conducted when the ABM lake overflows, therefore this would be identified quickly and re-treatment could be applied - Alkalinity benefits from Fault Creek inflow	
2.5	Health and Safety	Human access	Access to high walls and lake	3	1	1	3	1	3	4	4	12	Medium		
2.6	Ecological Conditions and Sustainability	Animal access	Wildlife fatalities from falling over the edge	3	2	2	1	1	2	n/a	2	6	Low	Mitigations: - Wildlife barrier built with Class C rock - 2-3 m high berm at high wall locations - Benches in pit allow for escape routes	
2.7	Ecological Conditions and Sustainability	Animal use of the ABM lake and consumption of lake water	Water quality in ABM lake as it is filling is above use guidelines; once treated, the ABM lake meets CCME guidelines and is protective of wildlife use	5	1	1	1	1	1	n/a	1	5	Low		
2.8	Long-term certainty	Wet and dry years do not have a significant effect on the ABM open pit	No consequence										No Risk	See variable water balance model (KP, 2019)	
Underground Mine															
3.1	Physical Stability	Collapse of the underground workings (anything not paste backfilled) leading to localized subsidence of the pit wall		1	1	1	1	1	1	1	1	1	Very Low	Design includes: - paste backfill - portal is located below open ABM lake water level - portal bulkheaded	
3.2	Physical Stability	Localized rock failures		5	1	1	1	1	1	1	1	5	Low	Design includes: - paste backfill - portal is located below open ABM lake water level - portal bulkheaded	

RISK NO.	Closure Objective	RISK DESCRIPTION	CONSEQUENCE DESCRIPTION	RISK RATING									CLASSIFICATION	DESIGN AND MITIGATION MEASURES
				Likelihood	Consequence						Max.	SCORE		
					Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)				
3.3	Chemical Stability	Model inaccurately predicts better water quality than is experienced in closure (see ABM lake Chemical Stability)											No Risk	Design includes: - paste tailings - flooded pit treatment Mitigation: - Ongoing monitoring of pit water
3.4	Health and Safety	Unauthorized access (transition closure)		2	1	1	1	1	2	3	3	6	Low	Design includes: - Bulkhead - Flooded ABM lake
3.5	Health and Safety	Unauthorized access (post-closure)		1	1	1	1	1	1	4	4	4	Low	Design includes: - Bulkhead - Flooded ABM lake
Class A Storage Facility														
4.1	Physical Stability	Deformation of facility components leading to slumping or localized damage to the cover system (transition closure)	Slow movement of buttress leading to cracks in cover and increased runoff contact with Class A material and increased seepage	1	1	1	1	2	1	1	2	2	Very Low	Design include: - Foundation preparation will include removal of any unsuitable material - Removal of overburden beneath buttress to bedrock - Construction considers level lifts - Water Treatment Plant still in place - Class A collection pond still in place Mitigation includes: - Operating the facility in accordance with the OM&S
4.2	Physical Stability	Deformation of facility components leading to slumping or localized damage to the cover system (post-closure)	Slow movement of buttress leading to cracks in cover and increased runoff contact with Class A material and increased seepage	1	2	2	1	3	3	1	3	3	Very Low	Post-closure: - Assumes annual inspections (due to status as a tailings facility) up to year 40, then every 5 years thereafter
4.3	Physical Stability	Global instability	Release of Class A material: slumping of Class A material that does not make it to the creek; contact runoff does make it to the creek	1	2	5	3	5	3	1	5	5	Low	Design includes: - Dry stack, therefore eliminates risk of slurried tailings reaching the creek
4.4	Physical Stability	Failure to follow OM&S (see ratings for deformation and global instability above)	e.g., material placement with too much ice/snow, too much precipitation, tailings not dewatered to specified moisture content										No Risk	
4.5	Chemical Stability	Cover failure (during transition and post-closure phases)	Cover failure leads to infiltration e.g., liner not sealed to engineer's specifications	2	2	2	2	3	2	1	3	6	Low	- monitoring of piezometers and groundwater wells regularly during operations will identify failure early in the mine life - the scenario foresees isolated localized failure, not wide spread failure of the liner, as wide spread failure would be detected during operations
4.6	Chemical Stability	Higher than predicted weather events	No consequence due to design measures										No Risk	Design includes: - Probable Maximum Flood, earthquakes
4.7	Chemical Stability	Source term predictions under-estimate metal loadings from tailings and waste rock	Water quality leaving facility significantly worse than predicted	2	2	2	2	3	2	1	3	6	Low	Design assumes no benefit from encapsulated material and subsequently no benefit from the associated limited oxygen diffusion Mitigation includes: - ongoing humidity test work and geochemical model refinement - pump back wells and WTP in place during transition closure
4.8	Health and Safety	Uptake of metals to vegetation growing on the cover	Consumption of metals in plants by humans or animals; however, the concentrations will be very low, and the effect will be very localized due to the design of the cover	1	1	1	1	1	1	1	1	1	Very Low	Design: Physical barrier leading to prevention of contaminant transport - HDPE liner - 3 m of clean cover rock

RISK NO.	Closure Objective	RISK DESCRIPTION	CONSEQUENCE DESCRIPTION	RISK RATING										CLASSIFICATION	DESIGN AND MITIGATION MEASURES
				Likelihood	Consequence						Max.	SCORE			
					Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)					
4.9	Ecological Conditions and Sustainability	Vegetation does not grow to required standards to meet land use objectives	Land use objectives are not met, i.e., caribou avoid the area	2	2	1	1	2	1	1	2	4	Low	Mitigation includes: - ongoing monitoring of reclamation success	
4.10	Land Use	See Ecological Conditions and Sustainability													
4.11	Aesthetics	N/A due to mitigations											No Risk	Mitigations include: - 4:1 sloping - re-vegetation to local species (e.g., willows + trees, etc.)	
4.12	Long-term certainty	Regulatory uncertainty around long term management of tailings storage facilities	As a tailings facility, the Class A Storage Facility may require long-term, perpetual monitoring	4	1	1	1	3	1	1	3	12	Medium	Current design includes monitoring up until year 40 Mitigation may need to include bonding for long-term, perpetual monitoring	
4.13	Financial Considerations	See long-term certainty													
Class B Storage Facility													Design includes: - no progressive reclamation because of requirement to maintain a road for the duration of the mine life		
5.1	Physical Stability	Deformation of facility components leading to slumping or localized damage to the cover system (transition closure)	Slow movement of material leading to cracks in cover and increased runoff contact with Class B material and increased seepage	1	1	1	1	2	1	1	2	2	Very Low	Design include: - Foundation preparation will include removal of any unsuitable material - waste rock is free draining (therefore not concerned about how material is placed for stability purposes) - Water Treatment Plant still in place - Class B collection pond still in place Mitigation includes: - Operating the facility in accordance with the OM&S	
5.2	Physical Stability	Deformation of facility components leading to slumping or localized damage to the cover system (post-closure)	Slow movement of material leading to cracks in cover and increased runoff contact with Class B material and increased seepage	1	2	2	1	3	1	1	3	3	Very Low	Post-closure: - Assumes inspections concurrent with the Class A Storage Facility	
5.3	Physical Stability	Global instability	Release of Class B material: slumping of Class B material that does not make it to the creek; contact runoff does make it to the creek.	1	2	2	2	5	3	1	5	5	Low	Design include: - Foundation preparation will include removal of any unsuitable material - waste rock is free draining (therefore not concerned about how material is placed for stability purposes)	
5.4	Chemical Stability	Cover failure (during transition and post-closure phases)	Cover failure leads to infiltration e.g., liner not sealed to spec	2	2	2	1	3	2	1	3	6	Low		
5.5	Chemical Stability	Higher than predicted weather events	No consequence due to design measures										No Risk	Design includes: - Probable Maximum Flood, earthquakes	
5.6	Chemical Stability	Source term predictions under-estimate metal loadings from waste rock	Water quality leaving facility significantly worse than predicted	1	1	1	1	1	1	1	1	1	Very Low	Mitigation includes: - ongoing humidity test work and geochemical model refinement (see AEG, 2019) - Collection pond and Water Treatment Plant in place during transition closure. - Top and bottom liners prevent release	

RISK NO.	Closure Objective	RISK DESCRIPTION	CONSEQUENCE DESCRIPTION	RISK RATING										CLASSIFICATION	DESIGN AND MITIGATION MEASURES
				Likelihood	Consequence						Max.	SCORE			
					Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)					
5.7	Chemical Stability	Mis-classification of Class A material disposed of in Class B facility	Water quality leaving facility significantly worse than predicted	4	1	1	1	1	1	1	1	4	Low	Mitigations include: - OM&S - Waste Rock and Overburden Management Plan - collection and treatment of water	
5.8	Health and Safety	Uptake of metals to vegetation growing on the cover	Consumption of metals in plants by humans or animals; however, the concentrations will be very low, and the effect will be very localized due to the design of the cover	1	1	1	1	1	1	1	1	1	Very Low	Design: Physical barrier leading to prevention of contaminant transport - HDPE liner - 3 m of cover rock	
5.9	Ecological Conditions and Sustainability	Vegetation does not grow to required standards to meet land use objectives	Land use objectives are not met, i.e., caribou avoid the area	2	2	1	1	2	1	1	2	4	Low	Mitigation includes: - ongoing monitoring of reclamation success	
5.10	Land Use	See Ecological Conditions and Sustainability													
5.11	Aesthetics	N/A due to mitigations											No Risk	Mitigations include: - 3:1 sloping - re-vegetation to local species (e.g., willows + trees, etc.)	
Class C Storage Facility															
6.1	Physical Stability	Localized slope failure	Slow movement of material leading to localized sloughing	1	2	1	1	1	1	1	2	2	Very Low	Design includes: - 3:1 slope - Free draining rock - Material consolidated due to vehicle traffic	
6.2	Physical Stability	Global instability	Slumping of material down slope; would not reach Geona Creek	1	2	1	2	1	1	1	2	2	Very Low	Design includes: - waste rock is free draining (therefore not concerned about how material is placed for stability purposes)	
6.3	Chemical Stability	Mis-classification of Class A or B material disposed of in Class C facility	Results in measurable exceedances of water quality objectives	2	2	1	1	3	2	1	3	6	Low	Mitigations include: - ongoing test work during mining for waste segregation - North CWTS - 1.9 AP/NP cut-off - Factor of Safety >10 - OM&S - Waste Rock and Overburden Management Plan - collection and treatment of water	
6.4	Health and Safety	Uptake of metals to vegetation growing on the cover with roots system growing into the waste rock	Consumption of metals in plants by humans or animals; however, the concentrations will be very low, and the effect will be very localized due to the design of the cover	1	1	1	1	1	1	1	1	1	Very Low	Design: - Overburden + growth medium cover - no tailings stored in facility	
6.5	Ecological Conditions and Sustainability	Vegetation does not grow to required standards to meet land use objectives	Land use objectives are not met, i.e., caribou avoid the area	2	1	2	1	2	1	1	2	4	Low	Mitigation includes: - ongoing monitoring of reclamation success	
6.6	Land Use	See Ecological Conditions and Sustainability													
6.7	Aesthetics	N/A due to mitigations											No Risk	Mitigations include: - 3:1 sloping - re-vegetation to local species (e.g., willows + trees, etc.)	

RISK NO.	Closure Objective	RISK DESCRIPTION	CONSEQUENCE DESCRIPTION	RISK RATING										CLASSIFICATION	DESIGN AND MITIGATION MEASURES
				Likelihood	Consequence						Max.	SCORE			
					Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)					
Water management structures and systems														Assumes: - post-closure period when all ponds and ditches have been decommissioned - Active and transition phase risks have been captured in the Catastrophic Failure Assessment Report (Minnow, 2017)	
7.1	Physical Stability Chemical Stability	Failure of either of: Class A or B collection ponds or collection ditches (transition period - management ponds have been removed)	Release of contact Class A or B Storage Facility water to Geona Creek valley (physical and chemical downstream effects)	1	3	2	2	3	3	4	4	4	Low	- Foundation preparation - Embankments constructed with rock fill - Lined ponds - Designed to storm events with spillways	
7.2	Physical Stability Chemical Stability	Failure of the constructed wetlands	No consequence as wetlands are contingency only										No Risk	- Monitoring of wetlands through to Year 40 - Wetlands only required as contingency as water quality is acceptable for discharge	
7.3	Chemical Stability	Failure of the Water Treatment Plant	No consequence - collected water would be pumped to the ABM open pit										No Risk		
7.4	Physical Stability	Blockage of ABM lake spillway	Glaciation of spillway and water flows south towards South Lake	4	1	1	1	1	1	1	1	4	Low		
7.5	Physical Stability	Fault Creek returns to South Lake channel	Decreased flow in Geona Creek No consequence if ABM lake is already filled. If ABM lake is not already filled, on-site presence will ensure correct routing										No Risk		
Mine infrastructure (incl. landfill) During Post-Closure														Components remaining at closure: - WTP will continue to run and will require a reduced power load - fuel storage - reduced camp - Waste management facility During Post-Closure: - all mine infrastructure facilities removed - WTP is only removed once stable water quality conditions are achieved	
8.1	Chemical Stability	Mis-classification of Class C	ARD/ML material used for construction. Assume localized issue that can be easily removed	2	2	1	1	2	1	1	2	4	Low	Mitigation: - Factor of safety of >10 for division of Class C and Class B material - OM&S - QA/QC on gravel being crushed for road use - Annual inspections of roads and infrastructure will help identify seeps - Geochemical monitoring (AEG, 2019)	
8.2	Chemical Stability	Landfill leaching to the environment		2	2	1	1	2	1	1	2	4	Low	Design: - Lined facility - Storage areas for open burning, special waste, recycling, used reagent containers, etc. - Lined land treatment facility - Up and down stream groundwater wells to be installed - entire facility to be covered at closure	
8.3	Health and Safety	High concentrations of heavy metals around process plant	No consequence because all material removed										No Risk	Mitigation: - Removal of all contaminated material following removal of infrastructure - Concrete base removed and disposed of in pit - Contaminated material to be trucked off-site	

RISK NO.	Closure Objective	RISK DESCRIPTION	CONSEQUENCE DESCRIPTION	RISK RATING										CLASSIFICATION	DESIGN AND MITIGATION MEASURES
				Likelihood	Consequence						Max.	SCORE			
					Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)					
8.4	Ecological Conditions and Sustainability	Core racks left on site in perpetuity.	Animals could compromise the stability of the wooden core boxes. Concern around the racks falling into disrepair, leaching metals	2	1	2	1	1	1	1	2	4	Low	- Core racks to be made of metal and covered	
Access Road														Design: - 20 km long Access Road - to be decommissioned near the end of the post-closure (monitoring) period - gate will be manned until reclamation success is confirmed	
9.1	Physical Stability	No significant terrain hazards in area											No Risk		
9.2	Chemical Stability	No ML/ARD concerns with access road											No Risk	See ML/ARD report (AEG, 2019)	
9.3	Land Use	Unauthorized access		4	1	1	1	1	3	2	3	12	Medium	- access unauthorized until Lease expires - Seasonal gate house manning	
9.4	Ecological Conditions and Sustainability	Vegetation does not grow to required standards to meet land use objectives	Land use objectives are not met, i.e., caribou avoid the area	2	2	1	1	2	1	1	2	4	Low	Mitigation includes: - ongoing monitoring of reclamation success	
9.5	Long-term certainty	Regulatory uncertainty	Resource Roads Regulations currently being developed and may change the management regime and structure required for resource roads										No Risk	Cannot predict regulatory changes or the consequences of those changes until the regulations are implemented.	
9.6	Financial Considerations	If long term guard house is required, additional costs might be incurred		3	1	1	1	2	1	1	2	6	Low		
Early Closure (Planned)														- Early closure activities would be similar to LOM closure activities - Bonding would include 2-year + activities, so BMC would be fully bonded for the early closure scenarios - Planned early closure more likely to occur in Year 6 or 7	
10.1	Chemical Stability	With early closure, ABM open pit may fill prior to the treatment wetlands being established	Overflowing of pit water to the environment. Water quality may be worse, as more Class A in the upper horizon of the ABM open pit No consequence due to available mitigations										No Risk	Mitigation: - Conduct ABM open pit treatment with organic biological stimulation - Water Treatment Plant is in place, but may need lower discharge standards to discharge directly to Geona Creek without; or a temporary storage pond may need to be constructed to manage water - Could treat pit with Water Treatment Plant by re-circulation - Could hold off on Fault Creek diversion for 6 months - 1 year to minimize the time for the pit to fill	
10.2	Ecological Conditions and Sustainability	Reclamation research studies not completed	Field studies to refine ABM open pit treatment and constructed wetland treatment system	3	1	1	1	1	1	1	1	3	Very Low	- Facilities are progressively built out and progressively reclaimed - Water Treatment Plant in place to manage water short term while passive treatment systems are refined	
10.3	Socio-economic Expectations	Obligations of the SEPA not fulfilled due to early closure of the mine site	Financial hardship for the community due to loss of expected income										No Risk	Project economics are such that there is no likelihood of this happening	
10.4	Financial Considerations	Bond not sufficient to cover reclamation activities	No consequence because work would be undertaken by the Proponent										No Risk	- Bonding requirements for every two years of operations	

RISK NO.	Closure Objective	RISK DESCRIPTION	CONSEQUENCE DESCRIPTION	RISK RATING										CLASSIFICATION	DESIGN AND MITIGATION MEASURES
				Likelihood	Consequence						Max.	SCORE			
					Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)					
10.5	Financial Considerations	Bills and debts not paid due to early closure	No consequence because the closure will be planned for, and money will be available to pay all bills and debts										No Risk		
Temporary Closure														- Temporary closure can occur at any time, but may be more likely in Years 3-5 of operations - Temporary closure is a period of no milling or mining for more than 6 months but up to 5 years - Care and maintenance activities include: . Seasonal water treatment of the pit . No removal of facilities - The likelihood of temporary closure is VERY LOW overall	
11.1	Physical Stability	Water ingress into Class A Storage Facility	Water ingress weakens the strength of the stored material Saturation may lead to localized or global instability	2	2	1	2	2	2	1	2	4	Low	NEW MITIGATION: - Apply 1 m glacial till cover to prevent water ingress & oxygen ingress - Should be applied immediately upon temporary closure	
11.2	Chemical Stability	After 6 years, Class A Storage Facility material could start to generate ARD	Water quality may be worse, but all water is collected in the Class A water management pond and then treated in the Water Treatment Plant No Consequence										No Risk	NEW MITIGATION: - Apply 1 m glacial till cover to prevent water ingress & oxygen ingress - Should be applied immediately upon temporary closure	
11.3	Health and Safety	N/A due to mitigations											No Risk	Mitigations: - On-site presence at all times - Gate manned year-round - Occupational Health and safety maintained	
11.4	Land Use	Incremental increase in land use interruption	Longer period when the land is removed from use	5	n/a	1	n/a	1	1	n/a	1	5	Low	- Land use disruption payments would continue during temporary closure	
11.5	Socio-economic Expectations	Interruption in jobs and contracts	Only ~20 jobs during temporary closure compared to 346 during operations	5	n/a	n/a	n/a	2	1	n/a	2	10	Medium	Mitigations: - same as planned early closure - open and transparent communication with stakeholders	
11.6	Long-term certainty	Temporary closure may increase the risk of permanent closure	Permanent closure will be planned - see permanent closure consequences										Very Low		
11.7	Long-term certainty	Regulatory risk during temporary closure	May be forced into permanent closure, or other unknown or changing regulatory environment										No Risk	unable to quantify, could range from minor to major Project costs, and unable to assign likelihood	
11.8	Financial Considerations	Regulatory risk during temporary closure	May be forced into permanent closure, or other unknown or changing regulatory environment										No Risk	unable to quantify, could range from minor to major project costs, and unable to assign likelihood	
11.9	Financial Considerations	Proponent risks due to continued mine site sustaining, but without income	Temporary closure is not considered in Project Economic calculations, therefore the unaccounted for risks may impact the ability of the company to continue to operate	1	n/a	n/a	n/a	4	n/a	n/a	4	4	Low	Mitigation is to NOT go into temporary closure - Generally, the project is less likely to go into temporary closure due to economic robustness of the Project (i.e., 5 metals being produced, and therefore, not as depended on individual metal prices)	

Table A-2: Revised Risk Register for Medium Rated Risks

RISK NO.	Closure Objective	RISK DESCRIPTION	CONSEQUENCE DESCRIPTION	RISK RATING									CLASSIFICATION	DESIGN AND MITIGATION MEASURES	ADDITIONAL MITIGATION MEASURES AVAILABLE	RISK RATING									MITIGATED CLASSIFICATION
				Likelihood	Consequence						Max	SCORE				Likelihood	Consequence						Max	SCORE	
					Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)							Environmental Impact (EI)	Special Considerations (SC)	Legal Obligations (LO)	Consequence Costs (CC)	Community / Media Reputation (C/MR)	Human Health & Safety (HHS)			
2.5	Health and Safety	Human access	Access to high walls and lake	3	1	1	3	1	3	4	4	12	Medium		Additional mitigation required: - need to prevent access to open pit in winter by snow machines - Double berms have been recommended	2	1	1	2	1	2	2	2	4	Low
4.12	Long-term certainty	Regulatory uncertainty around long term management of tailings storage facilities	As a tailings facility, the Class A Storage Facility may require long-term, perpetual monitoring	4	1	1	1	3	1	1	3	12	Medium	Current design includes monitoring up until year 35 Mitigation may need to include bonding for long-term, perpetual monitoring											
9.3	Land Use	Unauthorized access		4	1	1	1	1	3	2	3	12	Medium	- access unauthorized until Lease expires - Seasonal gate house manning	- full time gatehouse management to ensure no unauthorized access - Fence along highway and connection to Access Road entry	2	1	1	1	1	3	2	3	6	Low
11.5	Socio-economic Expectations	Interruption in jobs and contracts	Only ~20 jobs during temporary closure compared to 346 during operations	5	n/a	n/a	n/a	2	1	n/a	2	10	Medium	Mitigations: - same as planned early closure - open and transparent communication with stakeholders											

APPENDIX B: REVEGETATION TRIAL STUDY SUMMARY 2018



Revegetation Trial Study Summary 2018

Kudz Ze Kayah Project

June 2019

Written by Lisa Knight and Jody Inkster

Approved by Kelli Bergh

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Appendices

Appendix A	Soil Analysis by Maxxam Analytics
Appendix B	List of Pioneering Plant Species for Seed Harvesting

ACRONYMS

AEG	Alexco Environmental Group Inc.
BMC	BMC Minerals (No. 1) Ltd.
CCME	Canadian Council of Ministers of the Environment
CRCP	Conceptual Reclamation and Closure Plan
KZK	Kudz Ze Kayah
PLS	Pure Live Seeds
S-1	Subalpine-1
S-2	Subalpine-2
SNR	Soil Nutrient Regime
TEM	Terrestrial Ecosystem Map
TOC	Total Organic Carbon
YRC	Yukon Research Centre

1 INTRODUCTION

The overarching objective of the 2017 Conceptual Reclamation and Closure Plan (CRCP) of BMC Minerals (No. 1) LTD's Kudzu Ze Kayah (KZK) Project is "to return the Mine site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with traditional land use activities" (Alexco Environmental Group, 2017). Several studies will be undertaken over the various stages of the Project to determine the best restoration measures needed to accomplish the goals in the CRCP. A component of these studies includes revegetation with guidance from local practitioners and the Kaska Dena. Successful and appropriate revegetation is a vital component of Mine closure and as such studies are being undertaken at KZK to establish the best approaches to regenerate vegetation covers on disturbed areas.

In 2018, a five year program proposal titled, "2018 Revegetation Trial Study," contained several research questions, details on the installation of revegetation trial sites, and details on a native seed collection program (Access Environmental Group, 2018). This report presents the initial steps taken to establish a revegetation trial program in the Project area in 2018 which includes soil plot analyses, field photos, and program recommendations. Additionally, this report contains:

- Chapter 2: Methods – Outlines the procedures used in selecting trial site locations, site preparations, plot treatments, soil sampling, and native seed collections.
- Chapter 3: Results – A baseline chemical analysis of plot soil samples for nutrients and physical properties follows plus an update on the native plant seed collection program is provided.
- Chapter 4: Discussion – Outlines program challenges and provides recommendations primarily for 2019.

2 METHODS

The following section details the procedures used in establishing the revegetation trial sites, S-1 and S-2, and the native seed collection at KZK.

2.1 Trial Site Selection

The revegetation trial sites, S-1 and S-2, were selected based on the following criteria:

1. A disturbed site within the Project area with topsoil removed;
2. Outside of the proposed Mine footprint, so the site will not be disturbed by construction or operations during the monitoring period over the next five years (i.e., 2018-2022);
3. In the elevation range of the proposed Mine, to monitor plant regeneration under the same climatic conditions as the Mine footprint;
4. The site is well drained, levelled, and homogeneous (i.e., soil and vegetation types are alike throughout the disturbed site);
5. Easily accessed by monitors for observations and treatment adjustments;
6. Wildlife can freely move in and out of the site without impeding their movements;
7. Control of access is possible, so vehicular traffic is not a threat to trial sites; and

8. Surrounding area has an intact natural vegetation community to reduce ingress of invasive species at trial plots.

2.2 Trial Site Preparation

The procedure to prepare and install plots was the same at each trial site, S-1 and S-2. Four 50 m² plots were measured out, staked and labelled at each trial site. The ground was raked, large rocks or debris removed and any regenerating plants in the plots eliminated. Soil sampling consisted of taking five subsamples in each plot, which were combined and well mixed to yield a composite sample per plot for nutrient, mineral and physical properties analysis.

These are the steps involved in trial plot installations:

1. Delineated four 50 m² (e.g., 5 x 10 m) plots with a measuring tape, used wooden stakes to mark corners;
2. Removed large rocks and any remnant vegetation;
3. Raked each plot to break up soil clumps and removed woody debris;
4. Clearly labelled plot treatment type (i.e., control, full fertilization, half fertilization, or organics) and site name on the wooden stakes and flagging attached to the stakes;
5. Recorded soil moisture and the nutrient regime, nearby plant species, wildlife usage and other notable observations (e.g., disturbance type);
6. Collected a composite soil sample of each plot for analyses of elemental profile, nutrient level and conductivity (see section 2.3 for soil sampling methods);
7. Photographed prepared site with identifiable landmarks in the background; and
8. Installed "Do not disturb" and site name signs near the trial sites to discourage anthropogenic disturbances.

2.3 Soil Sampling

Five subsamples were collected from each plot. The soil sampling methods are outlined below for each plot:

1. Cleaned field equipment (i.e., shovels, trowels, and bucket) with distilled water and paper towels;
2. Donned new latex gloves at each plot tested;
3. Dug five soil pits to rooting depth (i.e., 20-30 cm);
4. Collected soil (about ten trowel shovels) from each pit and placed it in a 20 L bucket;
5. Thoroughly mixed soil collected from the plot;
6. Collected a 250 g composite sample and placed the sample into a labelled (e.g., project name, site name, and date) sample bag from each plot;
7. Stored samples in a cooler with ice packs; and
8. Shipped samples to the Maxxam Analytics lab, an accredited lab in Burnaby, BC.

Composite soil samples were analyzed for nutrients, mineral and texture (e.g., grain size). These analytes provide a baseline of the soil characteristics which will enable monitoring of changes and differences in

nutrient cycling due to different treatment efforts. A summary of the analytical results is included in the results section, and the certified lab reports by Maxxam Analytics are attached in Appendix A.

2.4 Plot Treatments

After the soil samples were collected the plots were treated. Each trial site contained four plots with different treatments applied. The following outlines the preparation and steps used for the different treatments:

1. Used a commercial seed supply that was certified weed-free. Weighed seeds based on brand's application rates (for a 50 m² plot) and placed seeds in a Ziploc bag;
2. Weighed fertilizer based on the brand's application rates (for a 50 m² plot) and placed fertilizer in a Ziploc bag;
3. Designated a control plot based on topography which limited runoff from treated plots. Kept plot as is with no treatments applied (i.e., no seeds, fertilizer, or additional organics);
4. Designated a half fertilized plot. Applied seed mix based on application rates with a hand-held broadcaster and applied half the amount of fertilizer based on the brand's application recommendation. Raked in fertilizer;
5. Designated a full fertilizer plot. Applied seed mix based on application rates with a hand-held broadcaster and applied a full application of fertilizer. Raked in fertilizer; and
6. Designated an organics plot. Additional organic soil (i.e., topsoil) from the surrounding disturbed area was scattered evenly throughout the plot; a rake was used to break up soil clumps, and no seeds or fertilizer were applied to this plot.

The commercial grass seed mix used for the trial plots was sourced from DLF Pickseed Canada in Edmonton, Canada. The grass species chosen for the mix are native to the KZK area and accustomed to growing in dry, nutrient-poor soils. All the plots, except the control, received the same amount of grass seeds based on suppliers' application rate. Technical papers were used to determine the number of live seeds per gram for each species. Other information on plant names, percentages and estimated number of seeds applied are shown in Table 2-1.

Table 2-1: Number of Seeds per Grass Species Applied in Trial Plots

Seed Mix	Botanical Name	Percentage	Number of Live Seeds per Gram ¹	Number of Seeds Applied per Plot
slender wheatgrass	<i>Agropyron trachycaulum</i>	37	353	26,122
rough fescue	<i>Festuca campestris</i>	25	654	32,700
Rocky Mountain fescue	<i>Festuca saximontana</i>	25	1498	74,900
tufted hairgrass	<i>Deschampsia caespitosa</i>	13	5510	143,260

¹ Slender wheatgrass and tufted hairgrass are based on a Pickseed technical paper (DLF Pickseed, 2018). Rough fescue and Rocky Mountain fescue are based on a Government of Alberta technical paper (Government of Alberta, 2001).

Grass seeds were applied to trial plots based on the supplier's recommended 32 kg/hectare which was calculated² to 0.20 kg/plot (i.e., $[32/10,000 = (0.0032)50]$). The percentage of seeds in the mix is based on weight. As the weight of seeds varies among species, there are a higher number of lighter, smaller seeds (e.g., tufted hairgrass) per unit of weight than the larger, heavier seeds (e.g., slender wheatgrass). This is assuming that the seed lot tested 100% for both germination and purity as noted on seed bags by Pickseed Canada (DLF Pickseed, 2018). Larger seeds are more robust and have a better chance of germinating than the smaller seeds. Larger seeds can also remain dormant for longer periods then germinate when growth conditions are favourable (Matheus & Omtzigt, 2013).

A Pure Live Seeds (PLS) calculation was applied to better understand rates of germination and survival of seeds per species for the 50 m² trial plots. The PLS is the number of seeds that are expected to germinate based on the seed provider's agricultural research (DLF Pickseed, 2018).

C-I-L fertilizer with a nutrient N-P-K ratio of 18-4-6 was applied to half the plots. This fertilizer was selected as it was high in nitrogen and contained a gradual release formula. The fertilizer was applied at a rate of 750 kg/ha which calculates to 0.075 kg/m², so fully fertilized plots received 3.75 kg of fertilizer and half fertilized plots were given 1.875 kg. The granular fertilizer was applied by the hand-held broadcaster. After the seed and fertilizer were applied, they were hand-raked into the ground to increase seed contact with the soil and to reduce runoff. The various treatments are summarized in Table 2-2.

Table 2-2: Site S-1 and S-2 Trial Plot Treatments

Plot	Treatments	Seed Mix (kg/50 m ²)	Applied Fertilizer (kg/50 m ²)
Control	Left as is with no seeds, fertilizer, or organics applied	0	0
Half Fertilizer	Applied seeds and 1/2 recommended fertilizer	0.2	1.875
Full Fertilizer	Applied seeds and fertilizer	0.2	3.75
Organics	Applied seeds, no fertilizer	0.2	0

2.5 Native Seed Collection

In consultation with Kaska First Nations, Yukon government, and consultants, it is recommended to use seeds and cuttings from plants native to the KZK Project area during reclamation. Literature from reclamation and restoration research provides compelling evidence that native plants from self-sustaining plant communities do not require much maintenance and reduce the risk of introducing invasive species (Matheus & Omtzigt, 2013). Additionally, native plant species are more adaptable to growing in nutrient deficient soils than agronomic (i.e., industrialized) plant species (Minto Explorations Ltd., 2017). Finally, culturally important plants for the Kaska are a vital component to the reclamation of KZK.

A select group of grasses, forbs, scrub birch and willows species were picked in late August and September as the harvested species depended on seed availability and accessibility. These selected plant species are good candidates for revegetation trials and are culturally important for traditional uses. These seeds and others will be tested for their validity in the reclamation program.

² Rounded from 0.16 kg/plot to 0.20 kg/plot.

2.5.1 Grasses and Forbs

The following tasks were completed during the late summer and early autumn of 2018:

1. Areas were identified for native plant seed collections near the Project Footprint;
2. Students from the Yukon College's Environmental Monitoring program and KZK staff harvested grass and forb seeds from the identified areas;
3. Seeds were placed in labelled (species' name, collection date, and location) lunch-sized paper bags (5 1/8" x 3 1/8" x 10 5/8"); and
4. Seeds were dried in a drying room at KZK and stored for future use in 2019.

All seeds collected were handpicked and collected from native plant species in various subalpine environments on days with no precipitation. These subalpine regions included areas around the KZK camp, climate station, site S-1, and site S-2.

Grass inflorescences (i.e., group of flowers) were collected by snapping the spike containing the inflorescence off from purple reedgrass (*Calamagrostis purpurascens*), northern rough fescue (*Festuca altaica*), Alpine bluegrass (*Poa alpina*), and Alpine sweetgrass (*Hierochloa odorata*). Also, fruits from northern goldenrod (*Solidago multiradiata*) were collected in the same manner. Tilesius' wormwood (*Artemisia tilesii*) and mountain sagewort (*Artemisia norvegica*) seeds were handpicked directly from the seed heads.

2.5.2 Willow Species and Dwarf Birch

Willow stakes from little-tree willow (*Salix arbusculoides*) and felt-leaf willow (*Salix alaxensis*) were harvested in September 2018. As well as a culturally important species, scrub birch (*Betula glandulosa*) catkins (i.e., cylindrical flower clusters) were collected. Willow stakes and catkins were collected with the following procedure:

5. Flagged healthy looking willows that were relatively straight and about 2 to 4 cm in diameter;
6. Browsed willows were also selected as they are more resilient to browsers;
7. Harvested dormant willows meaning when about half the leaves had fallen off;
8. Cut the base of a willow stake with a clipper at an angle with a horizontal cut on top of the stake;
9. Debranched the stakes and cut to length about 0.5 to 1.5 m;
10. Willow species that are recommended for live staking were located, marked, harvested (when the leaves had mostly dropped) and stored in dry cold storage for spring planting at the revegetation site;
11. Scrub birch catkins were handpicked and stored in labelled (species' name, collection date, and location) paper bags (5 1/8" x 3 1/8" x 10 5/8") to overwinter;
12. Catkins were collected by hand pulling them directly off the branchlets;
13. Catkins were dried for a few days by storing them in the drying room located at the KZK camp; and
14. Bags of catkins were kept in cardboard boxes and stored in a dry, dark storage area for winter.

3 RESULTS

The following section includes trial site descriptions, a revegetation map, ecosystem classifications, photographs of the program, soil analysis results, and a summary of the native seed collection.

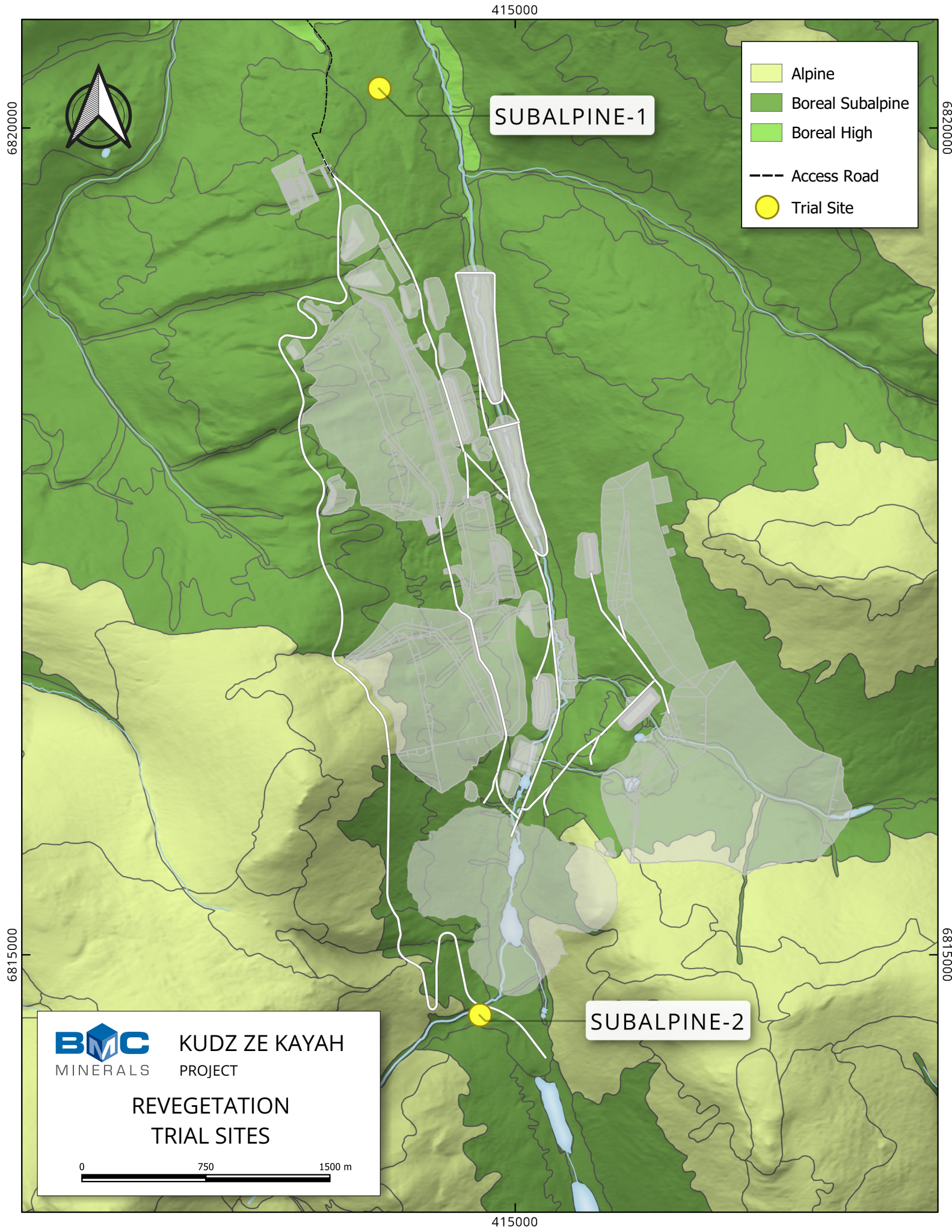
3.1 Descriptions of Trial Sites

In 2018, two sites were chosen for the revegetation trials. At each of these sites, there are four plots established. The first revegetation site is referred to as S-1. The “S” denotes that the site is in the subalpine bioclimatic zone or the site can also be referred to as Subalpine-1. The S-1 site is approximately 1 km directly northeast of the KZK camp on a decommissioned portion of an exploration trail (Figure 3-1). The second site, S-2 site or Subalpine-2, is just south of Fault Creek and approximately 75 m south of the junction of the creek and Tote Road (Figure 3-1). The S-2 site is situated on a decommissioned 2015 drill pad (i.e., drill holes K15-329 and K15-332).

Site characteristics on the two revegetation trial sites are provided in Table 3-1, which includes a brief description of surrounding plant communities and the corresponding Terrestrial Ecosystem Map (TEM) polygon classifications which are based on plant community profiles, nutrient and moisture regimes.

Table 3-1: Trial Site Characteristics

Variables	Site S-1	Site S-2
Location (UTM)	09V E 0414175, N 68202400	09V E 0414797, N 6814635
Elevation (masl)	1324	1420
Bioclimate Zone	Subalpine	Subalpine
Slope (%)	<5	<5
Aspect (°)	50	82
General Soil Characteristics	Sandy loams, slightly acidic (pH 5.94 to 6.24), poor nutrient content	Loamy sands, low nutrient (NPS) content marginally better than site S-1, but more acidic (pH 4.9 to 5.65)



Alpine

Boreal Subalpine

Boreal High

--- Access Road

● Trial Site

SUBALPINE-1

SUBALPINE-2

BMC MINERALS

KUDZE KAYAH PROJECT

REVEGETATION TRIAL SITES

0 750 1500 m

3.2 Terrestrial Ecosystem Map

In 2016, a Terrestrial Ecosystem Map (TEM) was created to decipher various plant communities at KZK based on plant compositions, nutrient and moisture regimes (Alexco Environmental Group, 2016). According to the TEM, each trial site is in a Subalpine Unit 01 ecosystem, although site S-2 is in an earlier successional stage polygon. The subalpine Site Unit 01 classification is a zonal ecosystem that best reflects the regional climate and is least influenced by the local topography and soil properties (Klinka, Green, Meidinger, & McLennan, n.d.). Both trial sites have similar physical and chemical characteristics, coarse-grained acidic soils with poor nutrient supply due to the removal of topsoil. The slopes at each site are very gentle and facing east which is the best situation to create trial sites where germination, growth, and survival can be determined for the regional climate type. The eastern aspect is considered neutral, avoiding northern or southern solar extremes (Matheus & Omtzigt, 2013).

3.2.1 Site S-1

The S-1 trial site is in Polygon 96 according to the TEM (Alexco Environmental Group, 2016). This polygon contains three ecosystem types, the S-1 trial plots are within the most common ecosystem of the three. This ecosystem is classified as Site Unit 31, meaning on average the soils are of medium to poor (relative) nutrient levels and sub-hygic (fresh) moisture content. Using the edatopic grid on the TEM, the Soil Nutrient Regime (SNR) is equal to "C" or "B", and the Soil Moisture Regime (SNR) is equal to 5 or fresh.

The vegetation code for this polygon is FSwRhEsFmLi-3a (subalpine fir – white spruce – Labrador tea – scrub birch – feather moss – lichen sp. – low shrub) which mostly matches the vegetation profile of the plant community surrounding the S-1 trial site. More specifically the area is an open forest of mature white spruce (*Picea glauca*). Dominant shrubs are scrub birch (*Betula glandulosa*), willows (*Salix* sp.), and Labrador tea (*Rhododendron tomentosum*). The ground cover consists of grasses (*Festuca altaica*, *Calamagrostis purpurascens*), feather mosses and a variety of forbs including Arctic lupine (*Lupinus arcticus*), northern goldenrod (*Solidago multiradiata*), tall bluebell (*Mertensia paniculata*), crowberry (*Empetrum nigrum*) and other representative species of the site unit.

The regenerating plant species in S-1 plots are noted as Curley's sedge (*Carex rupestris*), fireweed (*Chamerion angustifolium*), willow herb (*Epilobium latifolium*), common horsetail (*Equisetum arvensis*), and small-flowered woodrush (*Luzula parviflora*).

3.2.2 Site S-2

The S-2 trial site is in Polygon 33 according to the TEM (Alexco Environmental Group, 2016). This polygon is classified as Site Unit 01, meaning on average the soils are of medium nutrient levels and mesic moisture content.

The vegetation code for the polygon is EsWiFm-3a (scrub birch – willow – feather moss – low shrub) which generally matches the vegetation profile of the plant community surrounding the S-2 trial site. More specifically the area near the plots has primarily tall willow (*Salix* sp.) with less than 5% cover of scrub birch (*Betula* sp.). The ground cover consists of many forbs and grasses rather than feather moss. Forbs included fireweed (*Chamerion angustifolium*), tall larkspur (*Delphinium glaucum*), mountain sagewort and Tilesiu's mugwort (*Artemisia norvegica* and *tilesii*), Arctic lupine (*Lupinus arcticus*), northern goldenrod (*Solidago*

multiradiata), and tall bluebells (*Mertensia paniculata*). No remnant vegetation was left at S-2 due to clearing before plot establishment.

The S-2 site is situated on an active alluvial fan of which its most recent debris flood occurred between 1986 to 1992 (Coregeo and Associates, 2017). Consequently, the vegetation community is at an earlier succession stage than S-1. Some vegetation was naturally regenerating on the site, but no intentional grass seeding was apparent. The site was then cleared by a bulldozer and levelled in the fall of 2018 for the revegetation trial setup.

3.3 Plot Installation

In these trials, a commercial seed mix was applied to treatment plots. This dryland seed mix has been used at the KZK Project to revegetate disturbed areas, such as old drill pads and trails. To date, the seeds are growing abundantly in areas with soils that have visibly high organic content.

The plot installation process containing before and after photographs for site S-1 is in Figure 3-2 for site S-2 is in Figure 3-3.

Figure 3-2: Photographs of Site S-1 Before and After Trial Plot Preparation



Before plot preparation on August 12, 2018.



After plot preparation on August 29, 2018.

Figure 3-3: Photographs of Site S-2 Before and After Trial Plot Preparation



Site S-2 before plot preparation on August 30, 2018.



Site S-2 after plot preparation on September 12, 2018.

3.4 Soil Sample Analyses

3.4.1 Types of Plant Nutrients

There are a variety of types of nutrients that plants require for growth such as essential nutrients, macronutrients, and micronutrients. Essential plant nutrients include carbon, oxygen, and hydrogen which are absorbed from the air, whereas other nutrients including nitrogen are typically obtained from the soil (Bidlack & Jansky, 2014). The following macronutrients are absorbed through root systems from soil: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), sulphur (S), and magnesium (Mg) (Matheus & Omtzigt, 2013). Micronutrients (or trace minerals) required by plants include iron (Fe), boron (B), chlorine (Cl), manganese (Mn), zinc (Zn), copper (Cu), molybdenum (Mo), and nickel (Ni). These elements also exist as salts in soils, so plants consume these elements as ions (Bidlack & Jansky, 2014).

3.4.2 Available Nutrients and Properties of Soil Plots

The composite soil samples collected for each plot at both S-1 and S-2 sites were submitted to Maxxam Analytics to determine the number of nutrients and Total Organic Carbon (TOC) available in the growth substrate (i.e., soils). A metal profile is supplied that shows the number of micronutrients plus other metals existing in the soil. Some plants can absorb heavy metals from the soil, so a baseline of these concentrations is needed to determine if certain plants are translocating certain metal ions over time and if these plants are palatable to herbivores (Matheus & Omtzigt, 2013). Soil nutrients and properties of the revegetation plots are noted in Table 3-2.

Table 3-2: Soil Nutrients and Properties of Revegetation Plot Soils

Analysis Type		Site S-1				Site S-2			
	Units	Control Plot	Half Fertilizer	Full Fertilizer	Organics	Control Plot	Half Fertilizer	Full Fertilizer	Organics
Nutrients									
Nitrogen (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Phosphorus (P)	mg/kg	<1.0	1.0	<1.0	<1.0	3.4	1.3	1.5	1.6
Potassium (K)	mg/kg	7	13	14	10	40	24	24	29
Sulphur (S)	mg/kg	<2.0	3.0	<2.0	<2.0	2.5	<2.0	<2.0	<2.0
Total Organic Carbon (TOC)	mg/kg	8600	27,000	3900	6500	18,000	4000	3300	11,000
Soluble Parameters									
Conductivity	dS/m	0.094	0.14	0.12	0.14	0.16	0.076	0.087	0.10
pH	pH	5.95	5.97	6.13	6.24	4.90	5.25	5.65	5.20
Saturation	%	36	44	31	33	47	33	32	37
Physical Properties									
Sand	%	73	62	54	54	75	80	85	79
Silt	%	25	31	37	36	20	15	11	16
Clay	%	2.1	7.3	9.4	9.6	5.3	5.0	3.8	4.8
Texture	N/A	Loamy Sand	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Loamy Sand	Loamy Sand	Loamy Sand
Soil Properties									
Calcium Carbonate Equivalent	%	<0.6	<0.6	<0.6	<0.6	<0.60	<0.60	<0.60	<0.60
Soluble (2:1) pH	pH	6.77	6.74	6.99	6.90	5.76	6.18	6.44	6.06

TOC influences many soil characteristics including colour, nutrient holding capacity (i.e., cation and anion exchange capacities), nutrient turnover, moisture retention and aeration (Brady & Weil, 2010). Organic carbon provides a food source for microorganisms and helps improve stability through microorganisms binding soil particles together into aggregates or peds (DeLuca & Boisvenue, 2012). Additionally, bacteria excretions, root exudates, fungal hyphae, and plant roots can all contribute to better soil structure (Huang & Schoenau, 1996).

Comparing TOC results from KZK, the lab analysis indicates that most of the trial plots' carbon content is low, ranging from 3,300 mg/kg to 27,000 mg/kg. This is not surprising as the topsoil that would contain most of the TOC has been removed. Carbon levels are expected to increase over trial time from the introduction of vegetation.

3.4.3 Macronutrients and Micronutrients

The lab's soil analysis shows that the level of macronutrients (N, P, K, and S) at the KZK revegetation plots are very low. The topsoil which is the reservoir for these nutrients and organic carbon has been mostly removed, along with the populations of fungi and microorganisms that are necessary for nutrient cycling.

The revegetation trials enable Project management to understand what soil amendments will work best to ensure revegetation efforts are successful during progressive and closure reclamation. A soil metal profile which includes macro- and micronutrients is in Table 3-3. Additionally, more details on the importance of macronutrients follow:

- Plants require more nitrogen (N) than any other nutrient, but only a small portion of the nitrogen in the soil is available to plants; 98% of the nitrogen in the soil is in organic forms (Bidlack & Jansky, 2014). Soil microorganisms convert organic forms of nitrogen to mineral forms when they decompose organic matter and fresh plant absorb residual forms of nitrogen. This why it is necessary to provide fertilizer to poor nutrient soils to initiate plant growth till plant decomposition begins to provide a level of N-P-K to self-sustain (DeLuca & Boisvenue, 2012). In sandy soils, such as the KZK trial plots, an adequate soil nitrogen supply is between 25 to 50 mg N/kg soil (Brady & Weil, 2010).
- Potassium is an essential plant nutrient and is required in large amounts for proper growth and reproduction of plants (Bidlack & Jansky, 2014). Potassium is considered second only to nitrogen, when it comes to nutrients needed by plants, as it affects the plant shape, size, colour, taste and other measurements attributed to healthy produce. Plants absorb potassium in its ionic form (K+) (Matheus & Omtzigt, 2013).
- Sulphur (S) is an essential plant nutrient, necessary for protein synthesis and the formation of chlorophyll (Matheus & Omtzigt, 2013). Organic matter is the primary source of sulphate (SO₄-S) for plant uptake. Soils that are sandy, low in organic matter and found in upper to mid-slope positions are especially prone to sulphur deficiency since the small amount of SO₄-S released from organic matter is susceptible to leaching loss (Brady & Weil, 2010). The higher concentration of inorganic sulphur found in soil samples is likely being contributed by bedrock mineralization.
- Phosphorous is used by plants to form new roots and is important for the development of seeds which requires large amounts for proper growth and reproduction of plants (Flanagan & Van Cleve, 1983).

Table 3-3: Soil Analysis Metal Profile of Each Plot³

Analysis Type		Site S-1				Site S-2			
Total Metals by ICPMS	Units	Control Plot	Half Fertilizer	Full Fertilizer	Organics	Control Plot	Half Fertilizer	Full Fertilizer	Organics
Aluminum (Al)	mg/kg	13,600	12,000	13,200	13,400	10,500	8170	8390	10,400
Antimony (Sb)	mg/kg	0.30	0.41	0.61	0.52	0.96	0.63	0.57	0.84
Arsenic (As)	mg/kg	10.4	12.2	12.7	12.7	10.6	7.88	7.79	9.82
Barium (Ba)	mg/kg	137	122	120	131	144	103	101	138
Beryllium (Be)	mg/kg	0.36	0.34	0.37	0.43	0.36	0.32	0.29	0.40
Bismuth (Bi)	mg/kg	0.37	0.21	0.20	0.19	0.70	0.58	0.60	0.70
Cadmium (Cd)	mg/kg	0.809	0.810	0.465	0.413	2.24	1.11	1.20	1.64
Calcium (Ca)	mg/kg	4970	6200	4250	4570	3500	2930	2800	3430
Chromium (Cr)	mg/kg	36.0	34.2	50.8	42.5	27.3	21.1	23.7	26.7
Cobalt (Co)	mg/kg	12.7	11.4	13.1	13.0	10.3	7.96	8.70	10.0
Copper (Cu)	mg/kg	21.2	23.3	28.0	27.1	70.7	52.0	52.0	73.0
Iron (Fe)	mg/kg	27,900	26,100	27,100	28,000	24,400	20,000	20,300	24,800
Lead (Pb)	mg/kg	22.3	20.5	17.6	17.7	63.4	45.4	46.9	61.5
Lithium (Li)	mg/kg	14.3	12.8	14.0	15.9	12.1	10.7	10.3	13.0
Magnesium (Mg)	mg/kg	7770	7060	8590	7710	6900	5520	5530	6810
Manganese (Mn)	mg/kg	596	542	505	417	471	381	303	405
Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Molybdenum (Mo)	mg/kg	0.88	1.08	1.08	1.06	1.60	1.53	1.27	1.66
Total Nickel (Ni)	mg/kg	30.9	30.9	47.8	38.1	18.1	16.7	19.6	18.9
Phosphorus (P)	mg/kg	933	1100	1190	1080	908	774	735	880
Potassium (K)	mg/kg	1340	982	1090	1090	2290	1890	1950	2420
Selenium (Se)	mg/kg	0.55	1.01	0.63	0.83	0.94	0.76	0.56	1.02
Silver (Ag)	mg/kg	0.136	0.147	0.160	0.159	0.392	0.382	0.407	0.486
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100
Total Strontium (Sr)	mg/kg	16.2	23.6	17.0	17.4	13.4	10.5	11.1	13.1
Total Thallium (Tl)	mg/kg	0.136	0.113	0.126	0.130	0.223	0.157	0.162	0.200
Total Tin (Sn)	mg/kg	0.63	0.40	0.40	0.56	0.48	0.55	0.43	0.50
Total Titanium (Ti)	mg/kg	862	547	604	701	708	570	669	756
Total Uranium (U)	mg/kg	2.63	1.95	1.32	1.65	2.23	2.00	2.00	2.18
Total Vanadium (V)	mg/kg	43.0	38.7	42.3	45.1	31.4	24.5	26.6	31.4
Total Zinc (Zn)	mg/kg	121	117	101	104	330	237	258	300
Total Zirconium (Zr)	mg/kg	1.11	1.74	2.82	2.42	2.16	2.51	3.31	2.58

³ Micronutrients are highlighted in light orange. Other micronutrients concentration not analyzed are boron (B) and chloride (Cl).
Macronutrients are highlighted in light green.

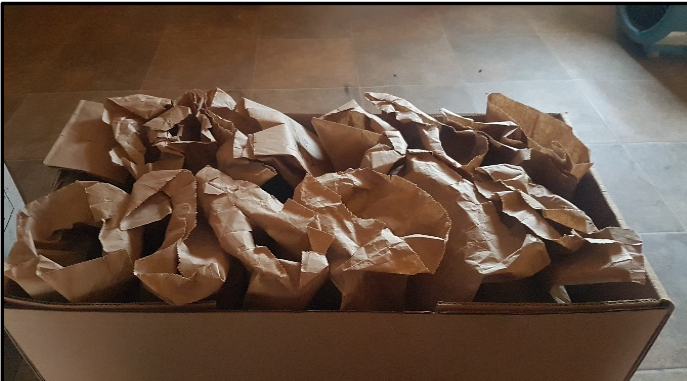
3.5 Native Seed Collection

Approximately 30 field hours went into this year's seed collection program including the willow stake harvest. Seed collection was assisted by First Nations students (Yukon College's Environmental Monitoring Program), and four Elders from Ross River and Watson Lake, Yukon. Grass seeds were collected from the climate station. Most of the forb species seeds were collected from the S-2 site before it was levelled by a bull-dozer in preparation for the revegetation trial plots. Overall, about 30 bags worth of seeds were collected and are currently stored on site. Finally, about thirty willow stakes were harvested from around the S-2 trial site and Fault Creek. A summary of the native seed collection is in Table 3-4 and photographs of the seed collection are in Figure 3-4.

Table 3-4: Native Seed Collection Summary

Collection Site	Common Name	Botanical Name	Weight of Seeds
Site S-1	scrub birch	<i>Betula glandulosa</i>	0.029 kg
Site S-2	mountain sagewort	<i>Artemisia norvegica</i>	0.006 kg
	Tilesius' wormwood	<i>Artemisia tilesii</i>	0.082 kg
	rough fescue	<i>Festuca campestris</i>	0.020 kg
Kudz Ze Kayah camp	northern goldenrod	<i>Solidago multiradiata</i>	0.046 kg
	rough fescue	<i>Festuca campestris</i>	-
Climate station	purple reedgrass	<i>Calamagrostis purpurascens</i>	0.045 kg
	Alpine bluegrass	<i>Poa alpina</i>	0.002 kg
	Sweetgrass	<i>Hierochloe hirta</i>	0.004 kg
	Piper's wood-rush	<i>Luzula piperi</i>	0.004 kg
	scrub birch	<i>Betula glandulosa</i>	-
Total weight			0.238 kg

Figure 3-4: Photos of Seed Collection and Storage

Seed Collection	Location
 Grass seed harvesting near the weather station.	 Seed gathering south of weather station.
 Local field assistant, Robby Dick, collecting willow stakes near the Subalpine-2 site.	 Dried seeds in winter storage at KZK Camp.

4 DISCUSSION

The following table, Table 4-1, summarizes the 2018 activities undertaken at KZK which correspond to the program's research questions found in the 2018 Revegetation Trial Study proposal (Access Environmental Group, 2018). Furthermore, planned 2019 activities are included in the table.

Table 4-1: Research Questions for Revegetation Study

Research Questions	2018 Activities	2019 Activities
What is the success rate on trial plots in fall/frost seeding and what are the corresponding soil characteristics?	Developed two revegetation trial plots in subalpine ecozones. Add more revegetation sites in 2019.	Use monitoring forms to document plant growth. Look for invasive plants and remove if any are found (document). Measure shoot-to-root ratios. Measure per cent covers and other variables (e.g., soils after die back, meteorological data collected for the growing season, vegetative cover, seeded species composition, natural colonization of other species etc.). Photograph from fixed points.
What is the success rate for willow staking on various sites?	Stockpiled willow stakes from two willow species (little-tree and felt-leaf)	Plant willow stakes in moist soils, on slopes. Harvest and plant additional willow species for testing. Monitor left growth after planting.
What is the success rate of fertilized trial plots?	Willow cuttings stockpiled. Plant and monitor growth rates in 2019.	Collect annual soil samples from trial sites and collect vegetation samples to determine metal uptake.
How much natural native plant regeneration occurs at both trial sites?	Documented growth at S-2 from 2015 drill site. Monitor controls at S-1 and S-2.	Continue monitoring S-1 and S-2 control sites. Formally assess seeded areas.
What grass, legume, and shrub seeds can be best collected at the site that are good revegetation candidates?	To be determined in 2019. Continue with seed collection. Dry seed mixture applied to S-1 and S-2.	A variety of seeds (up to 50 species) have been identified as possible candidates to collect seeds from. Will need to determine viable areas around KZK for seed collections.
When is the best timing and method to collect seeds from each species?	Dependent on species. Forbs likely in June/July. Grass species from July to August. Scrub birch catkins in late August-early September. Willows harvested in late September. Continue with research and monitoring.	Additional species will be collected in 2019 to determine collection periods at KZK.
What is the success rate for shrub species propagation with an external nursery?	To be determined in 2019. Need to identify available nurseries.	Support greenhouse initiative with Dena Cho. Identify local nurseries.

4.1 Challenges

Trial site selection was the most challenging part of the 2018 research program as most of the drill pad areas had been revegetated or were near the Tote Road where ongoing disturbance is expected during the life of the Project. At this point in the revegetation research, trial sites need to be in areas that are representative of the average growth conditions for testing germination and survival of selected plant seeds.

As this was the first year of collecting seeds at KZK, there were a few challenges. For instance, rain often limited the seed collection efforts, since it was not ideal for picking. Further, the collection time and having a few people dedicated to identifying and collecting seeds limited the collection efforts and the variety of seeds collected. Most seeds such as lupines, locoweed, mountain avens, louseworts, and Jacob's ladder, and arnica had dispersed by September. Also, the collection effort was limited by commitments to other KZK programs.

4.2 Program Recommendations for 2019

Another avenue of investigation is to test the viability of locally sourced seeds to regenerate native plants that have evolved to grow in the KZK area. This would require time to harvest, clean and prepare seeds of local plants considered good candidates for revegetation. Some local native plant seeds have already been harvested in 2018 and are stored at the KZK camp. Next season the native seed harvest program can be expanded, and more trial programs can be developed to test their regeneration capabilities. Other recommendations are:

- Proactively search for potential revegetation trial sites by noting areas that are or will be disturbed outside of planned Project Footprint;
- Involve Kaska Dena people in revegetation efforts to integrate traditional and local knowledge of KZK area and input into revegetation trial development;
- Native seed harvesting needs to be undertaken throughout the summer as selected plants mature at different times and there should be a focus on pioneering species (see Appendix B);
- Find nurseries to collaborate with on seed preparation, rearing of certain seedlings and growth enhancement methods;
- Monitor trial sites and plots throughout the growing seasons with the following steps:
 - Determine germination success rates of grass species at trial plots;
 - In late summer, measuring per cent cover of each plot overall and per species, use a 1 m² grid as an aid;
 - Select several mature grass samples per species from each plot and measure root and shoot lengths to ascertain a shoot-to-root ratio⁴;
 - Note general appearances of grass species grown in each plot (e.g., colour, size, stem, leaf and seed growth);

⁴Shoot-to-root ratio is a common means of determining the amount of plant tissues that have supportive functions to the amount of those that have growth functions. Plants with a higher proportion of roots can compete more effectively for soil nutrients, while those with a higher proportion of shoots can collect more light energy (Ericsson, 1995).

- Document evidence of wildlife or insect interaction with revegetation plots (e.g., tracks, scat, browsing, diggings, dens or nests);
 - Document evidence of disease or other pathology;
 - Take photographs of plots and individual plants to record growth characteristics, use a ruler for scale;
 - The occurrence and per cent cover of naturally colonizing plant species; and
 - Document and then remove any invasive plants found in and around plots;
- Collect soil samples from plots to evaluate nutrient cycling and physical characteristics by analysing for nutrient, physical and metal profiles;
- Conduct a mid-summer inventory of indigenous plant species in the area that may be used for revegetating disturbed areas at KZK;
- Future seed and fertilizer treatments should be formulated based on the results of the 2018 trial sites, available seeds, soil analysis and site conditions;
- Apply a dry seed mix to dry areas and a wet area seed mix for riparian sites;
- Optimize prescriptions of revegetation species mixes, integrating Kaska traditional knowledge for the area with Yukon revegetation guidance and commercially available naturalized species;
- Research germination and propagation techniques used by nurseries and start a propagation program to produce seedlings for trial sites at KZK, likely either in Ross River;
- Continue discussions on culturally important plants with Elders from Ross River and Watson Lake to ensure community involvement, input, and support;
- Have more field assistants including youth and Elders for next year's seed collection;
- Connect with the Yukon Research Centre (YRC) and other territorial based agencies for possible program collaboration and guidance in the revegetation program;
- Continue literature review and Kaska ethnography research;
- Document plant growth from reclaimed areas at KZK;
- Create herbarium with native plant specimens collected at KZK;
- Develop a work plan for the 2019 season and outline the steps needed to achieve the program's goals;
- Install additional sites in riparian areas near the South Lakes and the high boreal ecozone;
- Dedicate an area at KZK for seed storage and processing;

5 CONCLUSIONS

By the 2017 Conceptual Reclamation and Closure plan for the KZK Project, a revegetation research program was initiated to begin the process of developing a customized approach to reclamation at the proposed Project Footprint. The revegetation research will integrate traditional knowledge of the Kaska Dena, latest reclamation techniques, locally sourced vegetation and soil building enhancements. Collaboration with other agencies involved in northern reclamation endeavours will be an important component of the Project as innovations are tested at other Mine sites and through related research that addresses the challenges of reclamation of disturbed sites in northern climates.

The revegetation program will be expanded in the future; local seed harvesting efforts will increase, so a diversity of local plants can be tested for suitability. At this point, the test plots are in mesic areas with low nutrient soils which primarily reflect regional climatic growth conditions. Eventually, test site selection will include a wider spectrum of growth conditions such as wetter and dryer areas at KZK.

Recommendations included in the report are guidelines to further the revegetation investigations and provide methods for data collection to help determine best practices towards successful revegetation efforts.

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7 APPENDICES

Appendix A: Soil Analysis by Maxxam Analytics

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08457577

Attention: Lisa Knight

BMC MINERAL (NO. 1) LTD.
750 - 789 West Pender Street,
Vancouver, BC
CANADA V6C 1H2

Report Date: 2018/09/12

Report #: R2618312

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B875190

Received: 2018/08/31, 14:40

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Calcium Carbonate Equivalent (1)	4	N/A	2018/09/11	AB SOP-00019	Carter 2nd ed 20.2 m
Conductivity @25C (Soluble) (1)	4	2018/09/08	2018/09/09	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Elements by ICPMS (total)	4	2018/09/06	2018/09/07	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Potassium (Available) (1)	4	2018/09/10	2018/09/10	CAL SOP-00153 / AB SOP-00042	EPA 6010d R4 m
Nitrate-N (Available) (1)	4	2018/09/10	2018/09/10	CAL SOP-00152 / AB SOP-00023	SM 23 4110 B m
Phosphorus (Available by ICP) (1)	4	2018/09/10	2018/09/10	CAL SOP-00152 / AB SOP-00042	EPA 6010d R4 m
pH @25C (1:2 Calcium Chloride Extract) (1)	4	2018/09/08	2018/09/08	AB SOP-00033 / AB SOP-00006	SM 22 4500 H+B m
pH (2:1 DI Water Extract)	4	2018/09/07	2018/09/07	BBY6SOP-00028	BCMOE BCLM Mar2005 m
Sulphur (Available) (1)	4	2018/09/10	2018/09/10	AB SOP-00029 / AB SOP-00042	EPA 6010d R4 m
Soluble Paste (1)	4	2018/09/08	2018/09/08	AB SOP-00033	Carter 2nd ed 15.2 m
Texture by Hydrometer (1)	4	N/A	2018/09/10	AB SOP-00030	Carter 2nd ed 55.3 m
Texture Class (1)	4	N/A	2018/09/10	AB WI-00065	Auto Calc
TOC Soil Subcontract (2)	4	N/A	2018/09/12		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08457577

Attention: Lisa Knight

BMC MINERAL (NO. 1) LTD.
750 - 789 West Pender Street,
Vancouver, BC
CANADA V6C 1H2

Report Date: 2018/09/12

Report #: R2618312

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B875190

Received: 2018/08/31, 14:40

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Calgary Environmental

(2) This test was performed by Maxxam Ontario (From Burnaby)

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: DCruz@maxxam.ca

Phone# (604) 734 7276

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B875190
Report Date: 2018/09/12

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: LK

NPKS (AVAILABLE, PLUS TEXTURE, PH & EC)

Maxxam ID		UF6231	UF6232	UF6233	UF6234		
Sampling Date		2018/08/30 09:30	2018/08/30 10:00	2018/08/30 10:30	2018/08/30 11:00		
COC Number		08457577	08457577	08457577	08457577		
	UNITS	SUBALPINE-CONTROL	SUBALPINE-HALF	SUBALPINE-FULL	SUBALPINE-ORGANICS	RDL	QC Batch
Nutrients							
Available (NH ₄ F) Nitrogen (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	9135523
Available (NH ₄ F) Phosphorus (P)	mg/kg	<1.0	1.0	<1.0	<1.0	1.0	9135550
Available (NH ₄ OAc) Potassium (K)	mg/kg	7.0	13	14	10	2.0	9135519
Available (CaCl ₂) Sulphur (S)	mg/kg	<2.0	3.0	<2.0	<2.0	2.0	9135517
Soluble Parameters							
Soluble Conductivity	dS/m	0.094	0.14	0.12	0.14	0.020	9135349
Soluble (CaCl ₂) pH	pH	5.95	5.97	6.13	6.24	N/A	9134720
Saturation %	%	36	44	31	33	N/A	9134694
Physical Properties							
% sand by hydrometer	%	73	62	54	54	2.0	9135642
% silt by hydrometer	%	25	31	37	36	2.0	9135642
Clay Content	%	2.1	7.3	9.4	9.6	2.0	9135642
Texture	N/A	LOAMY SAND	SANDY LOAM	SANDY LOAM	SANDY LOAM	N/A	9130559
RDL = Reportable Detection Limit							
N/A = Not Applicable							

Maxxam Job #: B875190
Report Date: 2018/09/12

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: LK

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		UF6231	UF6232	UF6233	UF6234		
Sampling Date		2018/08/30 09:30	2018/08/30 10:00	2018/08/30 10:30	2018/08/30 11:00		
COC Number		08457577	08457577	08457577	08457577		
	UNITS	SUBALPINE-CONTROL	SUBALPINE-HALF	SUBALPINE-FULL	SUBALPINE-ORGANICS	RDL	QC Batch
Parameter							
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	N/A	9139681
Soil Properties							
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	<0.60	0.60	9137211
RDL = Reportable Detection Limit N/A = Not Applicable							

Maxxam Job #: B875190
Report Date: 2018/09/12

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: LK

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF6231	UF6232	UF6233	UF6234		
Sampling Date		2018/08/30 09:30	2018/08/30 10:00	2018/08/30 10:30	2018/08/30 11:00		
COC Number		08457577	08457577	08457577	08457577		
	UNITS	SUBALPINE-CONTROL	SUBALPINE-HALF	SUBALPINE-FULL	SUBALPINE-ORGANICS	RDL	QC Batch
Physical Properties							
Soluble (2:1) pH	pH	6.77	6.74	6.99	6.90	N/A	9131916
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	13600	12000	13200	13400	100	9131910
Total Antimony (Sb)	mg/kg	0.30	0.41	0.61	0.52	0.10	9131910
Total Arsenic (As)	mg/kg	10.4	12.2	12.7	12.7	0.50	9131910
Total Barium (Ba)	mg/kg	137	122	120	131	0.10	9131910
Total Beryllium (Be)	mg/kg	0.36	0.34	0.37	0.43	0.20	9131910
Total Bismuth (Bi)	mg/kg	0.37	0.21	0.20	0.19	0.10	9131910
Total Cadmium (Cd)	mg/kg	0.809	0.810	0.465	0.413	0.050	9131910
Total Calcium (Ca)	mg/kg	4970	6200	4250	4570	100	9131910
Total Chromium (Cr)	mg/kg	36.0	34.2	50.8	42.5	1.0	9131910
Total Cobalt (Co)	mg/kg	12.7	11.4	13.1	13.0	0.30	9131910
Total Copper (Cu)	mg/kg	21.2	23.3	28.0	27.1	0.50	9131910
Total Iron (Fe)	mg/kg	27900	26100	27100	28000	100	9131910
Total Lead (Pb)	mg/kg	22.3	20.5	17.6	17.7	0.10	9131910
Total Lithium (Li)	mg/kg	14.3	12.8	14.0	15.9	5.0	9131910
Total Magnesium (Mg)	mg/kg	7770	7060	8590	7710	100	9131910
Total Manganese (Mn)	mg/kg	596	542	505	417	0.20	9131910
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	9131910
Total Molybdenum (Mo)	mg/kg	0.88	1.08	1.08	1.06	0.10	9131910
Total Nickel (Ni)	mg/kg	30.9	30.9	47.8	38.1	0.80	9131910
Total Phosphorus (P)	mg/kg	933	1100	1190	1080	10	9131910
Total Potassium (K)	mg/kg	1340	982	1090	1090	100	9131910
Total Selenium (Se)	mg/kg	0.55	1.01	0.63	0.83	0.50	9131910
Total Silver (Ag)	mg/kg	0.136	0.147	0.160	0.159	0.050	9131910
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	100	9131910
Total Strontium (Sr)	mg/kg	16.2	23.6	17.0	17.4	0.10	9131910
Total Thallium (Tl)	mg/kg	0.136	0.113	0.126	0.130	0.050	9131910
Total Tin (Sn)	mg/kg	0.63	0.40	0.40	0.56	0.10	9131910
Total Titanium (Ti)	mg/kg	862	547	604	701	1.0	9131910
RDL = Reportable Detection Limit							
N/A = Not Applicable							

Maxxam Job #: B875190
Report Date: 2018/09/12

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: LK

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UF6231	UF6232	UF6233	UF6234		
Sampling Date		2018/08/30 09:30	2018/08/30 10:00	2018/08/30 10:30	2018/08/30 11:00		
COC Number		08457577	08457577	08457577	08457577		
	UNITS	SUBALPINE-CONTROL	SUBALPINE-HALF	SUBALPINE-FULL	SUBALPINE-ORGANICS	RDL	QC Batch
Total Uranium (U)	mg/kg	2.63	1.95	1.32	1.65	0.050	9131910
Total Vanadium (V)	mg/kg	43.0	38.7	42.3	45.1	2.0	9131910
Total Zinc (Zn)	mg/kg	121	117	101	104	1.0	9131910
Total Zirconium (Zr)	mg/kg	1.11	1.74	2.82	2.42	0.50	9131910
RDL = Reportable Detection Limit							

Maxxam Job #: B875190
Report Date: 2018/09/12

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: LK

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
-----------	-------

Results relate only to the items tested.

Maxxam Job #: B875190
Report Date: 2018/09/12

QUALITY ASSURANCE REPORT

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: LK

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9131910	Total Aluminum (Al)	2018/09/07					<100	mg/kg	3.2	40	113	70 - 130
9131910	Total Antimony (Sb)	2018/09/07	95	75 - 125	93	75 - 125	<0.10	mg/kg	1.8	30	113	70 - 130
9131910	Total Arsenic (As)	2018/09/07	102	75 - 125	95	75 - 125	<0.50	mg/kg	5.9	30	90	70 - 130
9131910	Total Barium (Ba)	2018/09/07	112	75 - 125	91	75 - 125	<0.10	mg/kg	3.2	40	100	70 - 130
9131910	Total Beryllium (Be)	2018/09/07	109	75 - 125	97	75 - 125	<0.20	mg/kg	3.3	30	112	70 - 130
9131910	Total Bismuth (Bi)	2018/09/07					<0.10	mg/kg	NC	30		
9131910	Total Cadmium (Cd)	2018/09/07	100	75 - 125	93	75 - 125	<0.050	mg/kg	16	30	97	70 - 130
9131910	Total Calcium (Ca)	2018/09/07					<100	mg/kg	7.9	30	105	70 - 130
9131910	Total Chromium (Cr)	2018/09/07	119	75 - 125	105	75 - 125	<1.0	mg/kg	6.2	30	117	70 - 130
9131910	Total Cobalt (Co)	2018/09/07	113	75 - 125	103	75 - 125	<0.30	mg/kg	1.5	30	107	70 - 130
9131910	Total Copper (Cu)	2018/09/07	111	75 - 125	100	75 - 125	<0.50	mg/kg	3.9	30	111	70 - 130
9131910	Total Iron (Fe)	2018/09/07					<100	mg/kg	0.11	30	114	70 - 130
9131910	Total Lead (Pb)	2018/09/07	95	75 - 125	99	75 - 125	<0.10	mg/kg	23	40	116	70 - 130
9131910	Total Lithium (Li)	2018/09/07	108	75 - 125	100	75 - 125	<5.0	mg/kg	12	30	104	70 - 130
9131910	Total Magnesium (Mg)	2018/09/07					<100	mg/kg			116	70 - 130
9131910	Total Manganese (Mn)	2018/09/07	NC	75 - 125	102	75 - 125	<0.20	mg/kg	3.2	30	114	70 - 130
9131910	Total Mercury (Hg)	2018/09/07	101	75 - 125	90	75 - 125	<0.050	mg/kg	15	40	84	70 - 130
9131910	Total Molybdenum (Mo)	2018/09/07	99	75 - 125	93	75 - 125	<0.10	mg/kg	2.8	40	106	70 - 130
9131910	Total Nickel (Ni)	2018/09/07	114	75 - 125	104	75 - 125	<0.80	mg/kg	5.8	30	117	70 - 130
9131910	Total Phosphorus (P)	2018/09/07					<10	mg/kg	2.5	30	111	70 - 130
9131910	Total Potassium (K)	2018/09/07					<100	mg/kg	11	40	103	70 - 130
9131910	Total Selenium (Se)	2018/09/07	109	75 - 125	99	75 - 125	<0.50	mg/kg	18	30		
9131910	Total Silver (Ag)	2018/09/07	86	75 - 125	80	75 - 125	<0.050	mg/kg	0.30	40	95	70 - 130
9131910	Total Sodium (Na)	2018/09/07					<100	mg/kg	7.1	40	104	70 - 130
9131910	Total Strontium (Sr)	2018/09/07	107	75 - 125	96	75 - 125	<0.10	mg/kg	4.6	40	104	70 - 130
9131910	Total Thallium (Tl)	2018/09/07	100	75 - 125	93	75 - 125	<0.050	mg/kg	NC	30	88	70 - 130
9131910	Total Tin (Sn)	2018/09/07	103	75 - 125	94	75 - 125	<0.10	mg/kg	3.7	40	103	70 - 130
9131910	Total Titanium (Ti)	2018/09/07	NC	75 - 125	100	75 - 125	<1.0	mg/kg				
9131910	Total Uranium (U)	2018/09/07	104	75 - 125	93	75 - 125	<0.050	mg/kg	0.30	30	99	70 - 130
9131910	Total Vanadium (V)	2018/09/07	NC	75 - 125	104	75 - 125	<2.0	mg/kg	5.7	30	115	70 - 130
9131910	Total Zinc (Zn)	2018/09/07	NC	75 - 125	105	75 - 125	<1.0	mg/kg	6.3	30	113	70 - 130

Maxxam Job #: B875190
Report Date: 2018/09/12

QUALITY ASSURANCE REPORT(CONT'D)

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: LK

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9131910	Total Zirconium (Zr)	2018/09/07					<0.50	mg/kg	NC	30		
9131916	Soluble (2:1) pH	2018/09/07			100	97 - 103			1.8	20		
9134694	Saturation %	2018/09/08							2.4	12	102	75 - 125
9134720	Soluble (CaCl ₂) pH	2018/09/08			101	97 - 103			0.84	N/A	99	98 - 102
9135349	Soluble Conductivity	2018/09/09			101	90 - 110	<0.020	dS/m	4.1	20	107	75 - 125
9135517	Available (CaCl ₂) Sulphur (S)	2018/09/10	99	75 - 125	101	80 - 120	<2.0	mg/kg	NC	35	104	75 - 125
9135519	Available (NH ₄ OAc) Potassium (K)	2018/09/10	95	75 - 125	98	80 - 120	<2.0	mg/kg	4.2	35		
9135523	Available (NH ₄ F) Nitrogen (N)	2018/09/10	103	75 - 125	102	80 - 120	<2.0	mg/kg	NC	30		
9135550	Available (NH ₄ F) Phosphorus (P)	2018/09/10	102	75 - 125	103	80 - 120	<1.0	mg/kg	NC	35		
9135642	% sand by hydrometer	2018/09/10							1.3	30	95	81 - 119
9135642	% silt by hydrometer	2018/09/10							2.0	30	106	85 - 115
9135642	Clay Content	2018/09/10							0.0084	30	103	82 - 118
9137211	Calcium Carbonate Equivalent	2018/09/11			94	80 - 120	<0.60	%	NC	35	98	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Job #: B875190
Report Date: 2018/09/12

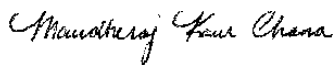
BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: LK

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager



Mandheraj Chana, Junior Project Manager



Harry (Peng) Liang, Senior Analyst



Rob Reinert, B.Sc., Scientific Spécialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required							
Company Name: BMC MINERALS LTD.	Company Name: BMC MINERALS LTD.	Quotation #: B50743	☒ Regular TAT 5 days (Most analyses)										
Contact Name: Accounts Payable	Contact Name: Lisa Knight	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS										
Address: 750 - 789 West Pender St.	Address: 750 - 789 West Pender St.	Project #: BMC-18-01	Rush TAT (Surcharges will be applied)										
Vancouver, BC PC: V6C 1H2	Vancouver, BC PC: V6C 1H2	Site Location: Kudz Ze Kayah	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days										
Phone: 778-379-9262	Phone: 867-335-4064	Site #:	Date Required:										
Email: accounts@bmcminerals.com	Email: spiderysilk@gmail.com	Sampled By: Lisa Knight											
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:							
☐ BC CSR Soil ☐ BC CSR Water ☒ CCME (Specify) ☐ Other (Specify) Soil Quality _____ ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) _____		Analysis Requested: _____ grain size analysis (texture) _____ Metals _____ nutrients including N, P, K, S _____ pH _____ electrical conductivity _____ calcium carbonate _____ percent organic matter _____		LABORATORY USE ONLY CUSTODY SEAL ☒ N COOLER TEMPERATURES Present Intact 4 4 3, 4, 4 COOLING MEDIA PRESENT ☒ N COMMENTS							
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM													
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	grain size analysis (texture)	Metals	nutrients including N, P, K, S	pH	electrical conductivity	calcium carbonate	percent organic matter	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1 subalpine-control		2018/08/30	9:30	soil	X	X	X	X	X	X	X	1	
2 subalpine-half		2018/08/30	10:00	soil	X	X	X	X	X	X	X	1	
3 subalpine-full		2018/08/30	10:30	soil	X	X	X	X	X	X	X	1	
4 subalpine-organics		2018/08/30	11:00	soil	X	X	X	X	X	X	X	1	
5													
6													
7													
8													
9													
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)						
Jody Inkster <i>Jody Inkster</i>		8/31/2018	10:00	KEVIN ANK		2018/09/07	13:00						



B875190_COC

60

Your Project #: B875190
Your C.O.C. #: B875190-ONTV-01-01

Attention: Diana Cruz

Maxxam Analytics
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2018/09/12

Report #: R5395872

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8N2371

Received: 2018/09/07, 09:15

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Total Organic Carbon in Soil	4	N/A	2018/09/12	CAM SOP-00468	BCMOE TOC Aug 2014

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Nazeema Rahaman, English, Project Manager

Email: NRahaman@maxxam.ca

Phone# (905)817-5700 Ext:5806

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Total Cover Pages : 1

Page 1 of 6

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HRJ951	HRJ952	HRJ953		
Sampling Date		2018/08/30 09:30	2018/08/30 10:00	2018/08/30 10:30		
COC Number		B875190-ONTV-01-01	B875190-ONTV-01-01	B875190-ONTV-01-01		
	UNITS	UF6231-SUBALPINE-CONTROL	UF6232-SUBALPINE-HALF	UF6233-SUBALPINE-FULL	RDL	QC Batch
Total Organic Carbon	mg/kg	8600	27000	3900	500	5724332
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

Maxxam ID		HRJ954	HRJ954		
Sampling Date		2018/08/30 11:00	2018/08/30 11:00		
COC Number		B875190-ONTV-01-01	B875190-ONTV-01-01		
	UNITS	UF6234-SUBALPINE-ORGANICS	UF6234-SUBALPINE-ORGANICS Lab-Dup	RDL	QC Batch
Total Organic Carbon	mg/kg	6500	6300	500	5724332
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Lab-Dup = Laboratory Initiated Duplicate					

TEST SUMMARY

Maxxam ID: HRJ951
Sample ID: UF6231-SUBALPINE-CONTROL
Matrix: Soil

Collected: 2018/08/30
Shipped:
Received: 2018/09/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Organic Carbon in Soil	COMB	5724332	N/A	2018/09/12	Charles Opoku-Ware

Maxxam ID: HRJ952
Sample ID: UF6232-SUBALPINE-HALF
Matrix: Soil

Collected: 2018/08/30
Shipped:
Received: 2018/09/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Organic Carbon in Soil	COMB	5724332	N/A	2018/09/12	Charles Opoku-Ware

Maxxam ID: HRJ953
Sample ID: UF6233-SUBALPINE-FULL
Matrix: Soil

Collected: 2018/08/30
Shipped:
Received: 2018/09/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Organic Carbon in Soil	COMB	5724332	N/A	2018/09/12	Charles Opoku-Ware

Maxxam ID: HRJ954
Sample ID: UF6234-SUBALPINE-ORGANICS
Matrix: Soil

Collected: 2018/08/30
Shipped:
Received: 2018/09/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Organic Carbon in Soil	COMB	5724332	N/A	2018/09/12	Charles Opoku-Ware

Maxxam ID: HRJ954 Dup
Sample ID: UF6234-SUBALPINE-ORGANICS
Matrix: Soil

Collected: 2018/08/30
Shipped:
Received: 2018/09/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Organic Carbon in Soil	COMB	5724332	N/A	2018/09/12	Charles Opoku-Ware

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.3°C
Package 2	5.7°C

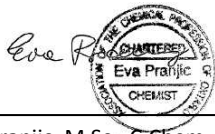
Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Method Blank		RPD		QC Standard	
			Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5724332	Total Organic Carbon	2018/09/12	ND, RDL=500	mg/kg	2.6	35	101	75 - 125
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement. QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy. Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.								

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08457869

Attention: Lisa Knight

BMC MINERAL (NO. 1) LTD.
750 - 789 West Pender Street,
Vancouver, BC
CANADA V6C 1H2

Report Date: 2018/09/26

Report #: R2625581

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B879462

Received: 2018/09/14, 11:40

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Calcium Carbonate Equivalent (1)	4	N/A	2018/09/20	AB SOP-00019	Carter 2nd ed 20.2 m
Conductivity @25C (Soluble) (1)	4	2018/09/20	2018/09/20	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Elements by ICPMS (total)	4	2018/09/20	2018/09/21	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Potassium (Available) (1)	4	2018/09/20	2018/09/20	CAL SOP-00153 / AB SOP-00042	EPA 6010d R4 m
Nitrate-N (Available) (1)	4	2018/09/20	2018/09/20	CAL SOP-00152 / AB SOP-00023	SM 23 4110 B m
Phosphorus (Available by ICP) (1)	4	2018/09/20	2018/09/20	CAL SOP-00152 / AB SOP-00042	EPA 6010d R4 m
pH @25C (1:2 Calcium Chloride Extract) (1)	4	2018/09/20	2018/09/20	AB SOP-00033 / AB SOP-00006	SM 22 4500 H+B m
pH (2:1 DI Water Extract)	4	2018/09/21	2018/09/21	BBY6SOP-00028	BCMOE BCLM Mar2005 m
Sulphur (Available) (1)	4	2018/09/21	2018/09/21	AB SOP-00029 / AB SOP-00042	EPA 6010d R4 m
Soluble Paste (1)	4	2018/09/19	2018/09/19	AB SOP-00033	Carter 2nd ed 15.2 m
Texture by Hydrometer (1)	4	N/A	2018/09/21	AB SOP-00030	Carter 2nd ed 55.3 m
Texture Class (1)	4	N/A	2018/09/21	AB WI-00065	Auto Calc
Total Carbon in Soil (LECO) Subcontract (2)	4	2018/09/26	2018/09/26		
TIC in Soils Subcontract (2)	4	N/A	2018/09/26		
TOC Soil Subcontract (2)	4	N/A	2018/09/26		

Remarks:

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Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08457869

Attention: Lisa Knight

BMC MINERAL (NO. 1) LTD.
750 - 789 West Pender Street,
Vancouver, BC
CANADA V6C 1H2

Report Date: 2018/09/26

Report #: R2625581

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B879462

Received: 2018/09/14, 11:40

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Calgary Environmental

(2) This test was performed by Maxxam Ontario (From Burnaby)

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: DCruz@maxxam.ca

Phone# (604) 734 7276

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Maxxam Job #: B879462
Report Date: 2018/09/26

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: JI

NPKS (AVAILABLE, PLUS TEXTURE, PH & EC)

Maxxam ID		UI0680	UI0681	UI0682	UI0683		
Sampling Date		2018/09/13 14:15	2018/09/13 13:30	2018/09/13 15:00	2018/09/13 15:45		
COC Number		08457869	08457869	08457869	08457869		
	UNITS	SUBALPINE2-CONTROL	SUBALPINE2-HALF	SUBALPINE2-FULL	SUBALPINE2-ORGANICS	RDL	QC Batch
Nutrients							
Available (NH ₄ F) Nitrogen (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	9151034
Available (NH ₄ F) Phosphorus (P)	mg/kg	3.4	1.3	1.5	1.6	1.0	9151059
Available (NH ₄ OAc) Potassium (K)	mg/kg	40	24	24	29	2.0	9151113
Available (CaCl ₂) Sulphur (S)	mg/kg	2.5	<2.0	<2.0	<2.0	2.0	9153148
Soluble Parameters							
Soluble Conductivity	dS/m	0.16	0.076	0.087	0.10	0.020	9152068
Soluble (CaCl ₂) pH	pH	4.90	5.25	5.65	5.20	N/A	9149626
Saturation %	%	47	33	32	37	N/A	9149602
Physical Properties							
% sand by hydrometer	%	75	80	85	79	2.0	9152297
% silt by hydrometer	%	20	15	11	16	2.0	9152297
Clay Content	%	5.3	5.0	3.8	4.8	2.0	9152297
Texture	N/A	SANDY LOAM	LOAMY SAND	LOAMY SAND	LOAMY SAND	N/A	9144668
RDL = Reportable Detection Limit N/A = Not Applicable							

Maxxam Job #: B879462
Report Date: 2018/09/26

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: JI

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		UI0680	UI0681	UI0682	UI0683		
Sampling Date		2018/09/13 14:15	2018/09/13 13:30	2018/09/13 15:00	2018/09/13 15:45		
COC Number		08457869	08457869	08457869	08457869		
	UNITS	SUBALPINE2-CONTROL	SUBALPINE2-HALF	SUBALPINE2-FULL	SUBALPINE2-ORGANICS	RDL	QC Batch
Parameter							
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	N/A	9160737
Soil Properties							
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	<0.60	0.60	9149625
Internal Sublet Analysis							
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	N/A	9160735
RDL = Reportable Detection Limit N/A = Not Applicable							

Maxxam Job #: B879462
Report Date: 2018/09/26

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: JI

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UI0680	UI0681	UI0682	UI0683		
Sampling Date		2018/09/13 14:15	2018/09/13 13:30	2018/09/13 15:00	2018/09/13 15:45		
COC Number		08457869	08457869	08457869	08457869		
	UNITS	SUBALPINE2-CONTROL	SUBALPINE2-HALF	SUBALPINE2-FULL	SUBALPINE2-ORGANICS	RDL	QC Batch

Physical Properties							
Soluble (2:1) pH	pH	5.76	6.18	6.44	6.06	N/A	9151117
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	10500	8170	8390	10400	100	9151117
Total Antimony (Sb)	mg/kg	0.96	0.63	0.57	0.84	0.10	9151117
Total Arsenic (As)	mg/kg	10.6	7.88	7.79	9.82	0.50	9151117
Total Barium (Ba)	mg/kg	144	103	101	138	0.10	9151117
Total Beryllium (Be)	mg/kg	0.36	0.32	0.29	0.40	0.20	9151117
Total Bismuth (Bi)	mg/kg	0.70	0.58	0.60	0.70	0.10	9151117
Total Cadmium (Cd)	mg/kg	2.24	1.11	1.20	1.64	0.050	9151117
Total Calcium (Ca)	mg/kg	3500	2930	2800	3430	100	9151117
Total Chromium (Cr)	mg/kg	27.3	21.1	23.7	26.7	1.0	9151117
Total Cobalt (Co)	mg/kg	10.3	7.96	8.70	10.0	0.30	9151117
Total Copper (Cu)	mg/kg	70.7	52.0	52.0	73.0	0.50	9151117
Total Iron (Fe)	mg/kg	24400	20000	20300	24800	100	9151117
Total Lead (Pb)	mg/kg	63.4	45.4	46.9	61.5	0.10	9151117
Total Lithium (Li)	mg/kg	12.1	10.7	10.3	13.0	5.0	9151117
Total Magnesium (Mg)	mg/kg	6900	5520	5530	6810	100	9151117
Total Manganese (Mn)	mg/kg	471	381	303	405	0.20	9151117
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	9151117
Total Molybdenum (Mo)	mg/kg	1.60	1.53	1.27	1.66	0.10	9151117
Total Nickel (Ni)	mg/kg	18.1	16.7	19.6	18.9	0.80	9151117
Total Phosphorus (P)	mg/kg	908	774	735	880	10	9151117
Total Potassium (K)	mg/kg	2290	1890	1950	2420	100	9151117
Total Selenium (Se)	mg/kg	0.94	0.76	0.56	1.02	0.50	9151117
Total Silver (Ag)	mg/kg	0.392	0.382	0.407	0.486	0.050	9151117
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	100	9151117
Total Strontium (Sr)	mg/kg	13.4	10.5	11.1	13.1	0.10	9151117
Total Thallium (Tl)	mg/kg	0.223	0.157	0.162	0.200	0.050	9151117
Total Tin (Sn)	mg/kg	0.48	0.55	0.43	0.50	0.10	9151117
Total Titanium (Ti)	mg/kg	708	570	669	756	1.0	9151117

RDL = Reportable Detection Limit

N/A = Not Applicable

Maxxam Job #: B879462
Report Date: 2018/09/26

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: JI

CSR/CCME METALS IN SOIL WITH HG (SOIL)

Maxxam ID		UI0680	UI0681	UI0682	UI0683		
Sampling Date		2018/09/13 14:15	2018/09/13 13:30	2018/09/13 15:00	2018/09/13 15:45		
COC Number		08457869	08457869	08457869	08457869		
	UNITS	SUBALPINE2-CONTROL	SUBALPINE2-HALF	SUBALPINE2-FULL	SUBALPINE2-ORGANICS	RDL	QC Batch
Total Uranium (U)	mg/kg	2.23	2.00	2.00	2.18	0.050	9151117
Total Vanadium (V)	mg/kg	31.4	24.5	26.6	31.4	2.0	9151117
Total Zinc (Zn)	mg/kg	330	237	258	300	1.0	9151117
Total Zirconium (Zr)	mg/kg	2.16	2.51	3.31	2.58	0.50	9151117
RDL = Reportable Detection Limit							

Maxxam Job #: B879462
Report Date: 2018/09/26

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: JI

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.3°C
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Results relate only to the items tested.

Maxxam Job #: B879462
Report Date: 2018/09/26

QUALITY ASSURANCE REPORT

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: JI

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9149602	Saturation %	2018/09/19							1.1	12	100	75 - 125
9149625	Calcium Carbonate Equivalent	2018/09/20			95	80 - 120	<0.60	%	4.3	35	110	75 - 125
9149626	Soluble (CaCl ₂) pH	2018/09/20			100	97 - 103			1.2	N/A	100	98 - 102
9151034	Available (NH ₄ F) Nitrogen (N)	2018/09/20	105	75 - 125	108	80 - 120	<2.0	mg/kg	NC	30		
9151059	Available (NH ₄ F) Phosphorus (P)	2018/09/20	103	75 - 125	100	80 - 120	<1.0	mg/kg	NC	35		
9151113	Available (NH ₄ OAc) Potassium (K)	2018/09/20	96	75 - 125	98	80 - 120	<2.0	mg/kg	6.1	35		
9151117	Total Aluminum (Al)	2018/09/21					<100	mg/kg	2.4	40	107	70 - 130
9151117	Total Antimony (Sb)	2018/09/21	99	75 - 125	97	75 - 125	<0.10	mg/kg	9.7	30	125	70 - 130
9151117	Total Arsenic (As)	2018/09/21	105	75 - 125	92	75 - 125	<0.50	mg/kg	4.0	30	100	70 - 130
9151117	Total Barium (Ba)	2018/09/21	NC	75 - 125	97	75 - 125	<0.10	mg/kg	0.82	40	111	70 - 130
9151117	Total Beryllium (Be)	2018/09/21	106	75 - 125	95	75 - 125	<0.20	mg/kg	9.3	30	111	70 - 130
9151117	Total Bismuth (Bi)	2018/09/21					<0.10	mg/kg	21	30		
9151117	Total Cadmium (Cd)	2018/09/21	102	75 - 125	94	75 - 125	<0.050	mg/kg	5.9	30	102	70 - 130
9151117	Total Calcium (Ca)	2018/09/21					<100	mg/kg	0.64	30	108	70 - 130
9151117	Total Chromium (Cr)	2018/09/21	98	75 - 125	97	75 - 125	<1.0	mg/kg	6.6	30	119	70 - 130
9151117	Total Cobalt (Co)	2018/09/21	101	75 - 125	96	75 - 125	<0.30	mg/kg	0.75	30	107	70 - 130
9151117	Total Copper (Cu)	2018/09/21	NC	75 - 125	96	75 - 125	<0.50	mg/kg	3.4	30	109	70 - 130
9151117	Total Iron (Fe)	2018/09/21					<100	mg/kg	1.2	30	110	70 - 130
9151117	Total Lead (Pb)	2018/09/21	100	75 - 125	104	75 - 125	<0.10	mg/kg	5.7	40	123	70 - 130
9151117	Total Lithium (Li)	2018/09/21	105	75 - 125	93	75 - 125	<5.0	mg/kg	2.6	30	105	70 - 130
9151117	Total Magnesium (Mg)	2018/09/21					<100	mg/kg	0.26	30	112	70 - 130
9151117	Total Manganese (Mn)	2018/09/21	NC	75 - 125	93	75 - 125	<0.20	mg/kg	4.5	30	111	70 - 130
9151117	Total Mercury (Hg)	2018/09/21	105	75 - 125	95	75 - 125	<0.050	mg/kg	NC	40	101	70 - 130
9151117	Total Molybdenum (Mo)	2018/09/21	106	75 - 125	95	75 - 125	<0.10	mg/kg	7.8	40	105	70 - 130
9151117	Total Nickel (Ni)	2018/09/21	94	75 - 125	93	75 - 125	<0.80	mg/kg	16	30	112	70 - 130
9151117	Total Phosphorus (P)	2018/09/21					<10	mg/kg	6.3	30	105	70 - 130
9151117	Total Potassium (K)	2018/09/21					<100	mg/kg	5.6	40	100	70 - 130
9151117	Total Selenium (Se)	2018/09/21	105	75 - 125	98	75 - 125	<0.50	mg/kg	8.2	30		
9151117	Total Silver (Ag)	2018/09/21	99	75 - 125	94	75 - 125	<0.050	mg/kg	39	40	143 (1)	70 - 130
9151117	Total Sodium (Na)	2018/09/21					<100	mg/kg	NC	40	101	70 - 130
9151117	Total Strontium (Sr)	2018/09/21	101	75 - 125	91	75 - 125	<0.10	mg/kg	4.9	40	112	70 - 130

Maxxam Job #: B879462
Report Date: 2018/09/26

QUALITY ASSURANCE REPORT(CONT'D)

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: JI

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9151117	Total Thallium (Tl)	2018/09/21	103	75 - 125	94	75 - 125	<0.050	mg/kg	7.0	30	100	70 - 130
9151117	Total Tin (Sn)	2018/09/21	108	75 - 125	98	75 - 125	<0.10	mg/kg	6.4	40	123	70 - 130
9151117	Total Titanium (Ti)	2018/09/21	NC	75 - 125	96	75 - 125	<1.0	mg/kg	2.2	40		
9151117	Total Uranium (U)	2018/09/21	110	75 - 125	94	75 - 125	<0.050	mg/kg	1.2	30	107	70 - 130
9151117	Total Vanadium (V)	2018/09/21	97	75 - 125	96	75 - 125	<2.0	mg/kg	0.27	30	115	70 - 130
9151117	Total Zinc (Zn)	2018/09/21	NC	75 - 125	97	75 - 125	<1.0	mg/kg	6.6	30	111	70 - 130
9151117	Total Zirconium (Zr)	2018/09/21					<0.50	mg/kg	5.8	30		
9151174	Soluble (2:1) pH	2018/09/21			100	97 - 103			1.1	20		
9152068	Soluble Conductivity	2018/09/20			100	90 - 110	<0.020	dS/m	3.2	20	108	75 - 125
9152297	% sand by hydrometer	2018/09/21							3.8	30	99	81 - 119
9152297	% silt by hydrometer	2018/09/21							9.0	30	95	85 - 115
9152297	Clay Content	2018/09/21							0.34	30	113	82 - 118
9153148	Available (CaCl ₂) Sulphur (S)	2018/09/21	NC	75 - 125	102	80 - 120	<2.0	mg/kg	5.9	35	99	75 - 125

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

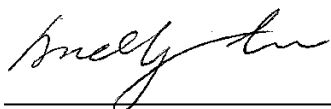
(1) Reference Material exceeds acceptance criteria for Ag. Reanalysis yields similar results.

Maxxam Job #: B879462
Report Date: 2018/09/26

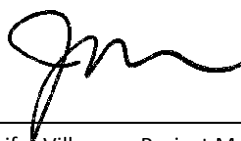
BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: JI

VALIDATION SIGNATURE PAGE

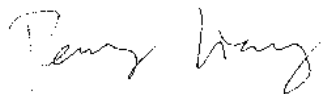
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Ph.D., P.Chem., Scientific Specialist



Jennifer Villocero, Project Manager



Harry (Peng) Liang, Senior Analyst

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Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required							
Company Name: BMC MINERALS LTD.	Company Name: BMC MINERALS LTD.	Quotation #: 850743	☒ Regular TAT 5 days (Most analyses)		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS								
Contact Name: Accounts Payable	Contact Name: Lisa Knight	P.O. #/ AFE#:			Rush TAT (Surcharges will be applied)								
Address: 750 - 789 West Pender St.	Address: 750 - 789 West Pender St.	Project #: BMC-18-01			☐ Same Day ☐ 2 Days								
Vancouver, BC PC: V6C 1H2	Vancouver, BC PC: V6C 1H2	Site Location: Kudz Ze Kayah			☐ 1 Day ☐ 3 Days								
Phone: 778-379-9262	Phone: 867-335-4064	Site #:			Date Required:								
Email: accounts@bmcminerals.com	Email: spiderysilk@gmail.com	Sampled By: Lisa Knight Jody Inkster											
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:							
☐ BC CSR Soil ☐ BC CSR Water ☒ CCME (Specify) ☐ Other (Specify) Soil Quality ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify)		Analysis Requested grain size analysis (texture) Metals nutrients including N, P, K, S pH electrical conductivity calcium carbonate equivalent percent organic matter		LABORATORY USE ONLY CUSTODY SEAL Present Intact 4 4 3,1,2 COOLING MEDIA PRESENT ☒ Y / N COMMENTS							
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM													
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	grain size analysis (texture)	Metals	nutrients including N, P, K, S	pH	electrical conductivity	calcium carbonate equivalent	percent organic matter	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1 subalpine2-control		2018/09/13	14:15	soil	X	X	X	X	X	X	X	1	
2 subalpine2-half		2018/09/13	13:30	soil	X	X	X	X	X	X	X	1	
3 subalpine2-full		2018/09/13	15:00	soil	X	X	X	X	X	X	X	1	
4 subalpine2-organics		2018/09/13	15:45	soil	X	X	X	X	X	X	X	1	
5													
6													
7													
8													
9													
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)						
Jody Inkster <i>Jody Inkster</i>		9/14/2018	10:00	MUPEDRO TRICK <i>MUPEDRO TRICK</i>		2018/09/15	09:25						



1043

Your Project #: B879462
Your C.O.C. #: B879462-ONTV-01-01

Attention: Diana Cruz

Maxxam Analytics
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2018/09/26
Report #: R5416010
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B802953

Received: 2018/09/18, 09:55

Sample Matrix: Soil
Samples Received: 4

Analyses	Date		Date Analyzed	Laboratory Method	Reference
	Quantity	Extracted			
Total Carbon in Soil	3	N/A	2018/09/25	CAM SOP-00468	Lloyd Kahn Method
Total Carbon in Soil	1	N/A	2018/09/26	CAM SOP-00468	Lloyd Kahn Method
Total Inorganic Carbon in Soils	4	N/A	2018/09/25		Calculation
Total Organic Carbon in Soil	3	N/A	2018/09/22	CAM SOP-00468	BCMOE TOC Aug 2014
Total Organic Carbon in Soil	1	N/A	2018/09/26	CAM SOP-00468	BCMOE TOC Aug 2014

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: B879462
Your C.O.C. #: B879462-ONTV-01-01

Attention: Diana Cruz

Maxxam Analytics
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2018/09/26

Report #: R5416010

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B802953

Received: 2018/09/18, 09:55

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Nazeema Rahaman, English, Project Manager

Email: NRahaman@maxxam.ca

Phone# (905)817-5700 Ext:5806

=====

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RESULTS OF ANALYSES OF SOIL

Maxxam ID		HTV720	HTV720	HTV721		
Sampling Date		2018/09/13 14:15	2018/09/13 14:15	2018/09/13 13:30		
COC Number		B879462-ONTV-01-01	B879462-ONTV-01-01	B879462-ONTV-01-01		
	UNITS	UI0680-SUBALPINE2- CONTROL	UI0680-SUBALPINE2- CONTROL Lab-Dup	UI0681-SUBALPINE2-HALF	RDL	QC Batch
Total Carbon (C)	mg/kg	17000	23000	3700	500	5749462
Total Inorganic Carbon (C)	mg/kg	ND	N/A	ND	500	5739703
Total Organic Carbon	mg/kg	18000	N/A	4000	500	5742203
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected N/A = Not Applicable						

Maxxam ID		HTV721		HTV722	HTV722		
Sampling Date		2018/09/13 13:30		2018/09/13 15:00	2018/09/13 15:00		
COC Number		B879462-ONTV-01-01		B879462-ONTV-01-01	B879462-ONTV-01-01		
	UNITS	UI0681-SUBALPINE2-HALF Lab-Dup	QC Batch	UI0682-SUBALPINE2-FULL	UI0682-SUBALPINE2-FULL Lab-Dup	RDL	QC Batch
Total Carbon (C)	mg/kg	N/A	5749462	2300	2300	500	5752009
Total Inorganic Carbon (C)	mg/kg	N/A	5739703	ND	N/A	500	5739703
Total Organic Carbon	mg/kg	4100	5742203	3300	N/A	500	5750716
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable ND = Not detected							

Maxxam ID		HTV723		
Sampling Date		2018/09/13 15:45		
COC Number		B879462-ONTV-01-01		
	UNITS	UI0683-SUBALPINE2- ORGANICS	RDL	QC Batch
Total Carbon (C)	mg/kg	11000	500	5749462
Total Inorganic Carbon (C)	mg/kg	680	500	5739703
Total Organic Carbon	mg/kg	11000	500	5742203
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				

TEST SUMMARY

Maxxam ID: HTV720
Sample ID: UI0680-SUBALPINE2-CONTROL
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Carbon in Soil	COMB	5749462	N/A	2018/09/25	Charles Opoku-Ware
Total Inorganic Carbon in Soils	LECO	5739703	N/A	2018/09/25	Automated Statchk
Total Organic Carbon in Soil	COMB	5742203	N/A	2018/09/22	Charles Opoku-Ware

Maxxam ID: HTV720 Dup
Sample ID: UI0680-SUBALPINE2-CONTROL
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Carbon in Soil	COMB	5749462	N/A	2018/09/25	Charles Opoku-Ware

Maxxam ID: HTV721
Sample ID: UI0681-SUBALPINE2-HALF
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Carbon in Soil	COMB	5749462	N/A	2018/09/25	Charles Opoku-Ware
Total Inorganic Carbon in Soils	LECO	5739703	N/A	2018/09/25	Automated Statchk
Total Organic Carbon in Soil	COMB	5742203	N/A	2018/09/22	Charles Opoku-Ware

Maxxam ID: HTV721 Dup
Sample ID: UI0681-SUBALPINE2-HALF
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Organic Carbon in Soil	COMB	5742203	N/A	2018/09/22	Charles Opoku-Ware

Maxxam ID: HTV722
Sample ID: UI0682-SUBALPINE2-FULL
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Carbon in Soil	COMB	5752009	N/A	2018/09/26	Charles Opoku-Ware
Total Inorganic Carbon in Soils	LECO	5739703	N/A	2018/09/25	Automated Statchk
Total Organic Carbon in Soil	COMB	5750716	N/A	2018/09/26	Charles Opoku-Ware

Maxxam ID: HTV722 Dup
Sample ID: UI0682-SUBALPINE2-FULL
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Carbon in Soil	COMB	5752009	N/A	2018/09/26	Charles Opoku-Ware

TEST SUMMARY

Maxxam ID: HTV723
Sample ID: UI0683-SUBALPINE2-ORGANICS
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Carbon in Soil	COMB	5749462	N/A	2018/09/25	Charles Opoku-Ware
Total Inorganic Carbon in Soils	LECO	5739703	N/A	2018/09/25	Automated Statchk
Total Organic Carbon in Soil	COMB	5742203	N/A	2018/09/22	Charles Opoku-Ware

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C
Package 2	7.7°C

Sample HTV720 [UI0680-SUBALPINE2-CONTROL] : Total Organic Carbon > Total Carbon: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Sample HTV721 [UI0681-SUBALPINE2-HALF] : Total Organic Carbon > Total Carbon: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Method Blank		RPD		QC Standard	
			Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5742203	Total Organic Carbon	2018/09/22	ND, RDL=500	mg/kg	3.1	35	105	75 - 125
5749462	Total Carbon (C)	2018/09/25	ND, RDL=500	mg/kg	27	35	101	75 - 125
5750716	Total Organic Carbon	2018/09/26	ND, RDL=500	mg/kg	0.80	35	99	75 - 125
5752009	Total Carbon (C)	2018/09/26	ND, RDL=500	mg/kg	1.9	35	101	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Appendix B: List of Pioneering Plant Species for Seed Harvesting

Restoration Candidate Plant Species for the Kudz Ze Kayah Project

The benefits of using native grass and forb seed in your project are:

- Native grasses and forbs provide a good source of forage for both domestic livestock and wildlife;
- At high elevations, native species are adapted to the short, harsh growing seasons where domestic grasses do not grow well;
- Native grasses and forbs are generally better adapted to low nutrient conditions; and
- and need fewer inputs to establish and maintain a vigorous stand.

The plants listed below have been observed in the Kudz Ze Kayah (KZK) study area and are referenced in the Yukon Revegetation Manual as candidates for northern revegetation projects. Site condition preferences of plants and usages can be further investigated.

This list is not exhaustive; further research will lead to the addition of other native plant species that are in the KZK area and can be utilized in revegetation efforts.

Grasses:

<i>Poa alpina</i>	Alpine bluegrass
<i>Anthoxanthum monticola</i>	Alpine sweetgrass
<i>Festuca altiai</i>	Altai fescue
<i>Beckmannia syzigachne</i>	American sloughgrass
<i>Poa palustris</i>	Fowl bluegrass
<i>Poa glauca</i>	Glaucous bluegrass
<i>Arctagrostis latifolia</i>	Polargrass
<i>Calamagrostis purpurascens</i>	Purple reed grass
<i>Festuca saximontana</i>	Rocky mountain fescue
<i>Elymus trachycaulus</i>	Slender wheatgrass
<i>Trisetum spicatum</i>	Spike trisetum
<i>Agrostis scabra</i>	Ticklegrass
<i>Deschampsia caespitosa</i>	Tufted hairgrass
<i>Elymus alakanus</i>	Violet wheatgrass

Forbs:

<i>Achillea millefolium</i>	Common yarrow
<i>Achillea sibirica</i>	Siberian yarrow
<i>Artemisia norvegica</i>	Mountain sagewort
<i>Artemisia tilesii</i>	Aleutian mugwort
<i>Chamerion angustifolium</i>	Fireweed
<i>Lupinus arcticus</i>	Arctic lupine
<i>Rumex arcticus</i>	Arctic dock
<i>Solidago multiradiata</i>	Northern goldenrod

Appendix B: List of Pioneering Plant Species for Seed Harvesting

Ground Covers (low growing shrubs):

<i>Arctostaphylos rubra</i>	Bearberry
<i>Arctostaphylos uva-ursi</i>	Kinnikinnick
<i>Dryas octopetala</i>	Eight-petal Mountain-avens
<i>Empetrum nigrum</i>	Crowberry
<i>Vaccinium uliginosum</i>	Bog blueberry
<i>Vaccinium vitis-idaea</i>	Lingonberry

Shrubs:

<i>Picea glauca</i>	White spruce
<i>Populus balsamifera</i>	Balsam poplar
<i>Betula papyrifera</i>	Paper birch
<i>Betula glandulosa</i>	Dwarf birch
<i>Potentilla fruticosa</i>	Shrubby cinquefoil
<i>Rhododendron groenlandicum</i>	Labrador tea
<i>Rosa acicularis</i>	Prickly rose
<i>Salix alaxensis</i>	Felt-leaf willow
<i>Salix arbusculoides</i>	Little tree willow
<i>Salix arctica</i>	Arctic willow
<i>Salix glauca</i>	Grey-leaf willow
<i>Salix planifolia</i>	Diamond-leaf willow
<i>Salix Polaris</i>	Polar willow
<i>Shepherdia canadensis</i>	Soapberry

Trees:

<i>Picea glauca</i>	White spruce
<i>Picea mariana</i>	Black spruce
<i>Populus balsamifera</i>	Balsam poplar
<i>Populus tremuloides</i>	Trembling aspen

APPENDIX C: ABM LAKE TREATMENT STUDY FINAL REPORT



ABM Lake Treatment Study Final Report

August 12, 2020

Prepared for:

BMC MINERALS No. 1

DISTRIBUTION LIST

# of copies	Company/Agency name
1	BMC Minerals (No. 1) Ltd.

REVISION HISTORY

Revision Date:	Issued By:	Revision Status:	Description:
A	Ensero Solutions Inc.	Draft	First draft submitted to BMC
B	Ensero Solutions Inc.	Draft	Revised following comments from BMC
C	Ensero Solutions Inc.	Final	Revised following comments from BMC

ENSERO SOLUTIONS SIGNATURES

Report prepared by:



8/12/2020

Rachelle Kleinberger, Ph.D.
 Scientist I

Report prepared by:



8/12/2020

Andrew Gault, Ph.D.
 Practice Lead - Geochemistry

Report reviewed by:



8/12/2020

Kai Woloshyn, M.Sc., P.Chem.
 VP Strategic Projects

EXECUTIVE SUMMARY

BMC Minerals (No.1) Ltd. (BMC) is proposing to develop the Kudz Ze Kayah Mine Project (the Project) in southeast Yukon, Canada. The Project will entail the creation of an open pit which will fill with water from Fault creek, groundwater, and surface runoff to create ABM Lake. While the ABM Lake water is predicted to have circumneutral pH, water quality modelling suggests that it may contain elevated constituents of potential interest (COPI) at closure (AEG, 2018). As such, *in situ* treatment of the ABM Lake is proposed to be initiated during lake formation to help reduce elevated COPI levels. Without treatment eight COPIs (arsenic, antimony, cadmium, copper, lead, selenium, uranium, and zinc) are expected to be elevated in ABM Lake relative to water quality objectives proposed for the receiving environment (AEG, 2018; AEG and Minnow, 2020) and proposed mitigation of these COPIs in the ABM Lake form the focus of the reporting described herein. The proposed *in situ* treatment process is an organic carbon injection to stimulate native microorganisms which will then form reducing conditions in the water column. These conditions will transform certain elements, such as selenium and uranium, into insoluble forms, and will precipitate chalcophile elements such as antimony, cadmium, copper, lead, and zinc as poorly soluble sulphide minerals. The insoluble phases formed will settle to the lake bottom for long term storage.

Overall, this testing has demonstrated that effective COPI removal can be achieved by organic carbon addition to ABM Lake water, consistent with the documented successful full field scale application of this technology at other North American pit lakes. Ferric iron addition with attendant mixing can also lower arsenic concentrations in ABM Lake to provide additional benefit to *in situ* treatment.

This report summarizes pilot-scale test work completed by Ensero Solutions Canada, Inc. (formerly known as Alexco Environmental Group Inc. [AEG]) to evaluate the dosage of organic carbon and the effects of soil amendment and temperatures on the efficacy of the proposed *in situ* treatment. This included 8 trials which were performed using 200 L barrels containing synthetic water that has a water chemistry consistent with the modelled chemistry of ABM Lake, amended with crushed waste rock to reflect the exposed rock surfaces in the open pit. Stage 1 of the testwork operated for 34 weeks during which glycerol was added to the trials to assess COPI removal under reducing conditions. Organic carbon was consumed by microbes, which resulted in reducing conditions and generally the lowest concentrations of antimony, cadmium, copper, lead, selenium, uranium, and zinc concentrations by the end of Week 14. The addition of 10 kg of soil in two carbon amended trials (Trials 3 and 4) resulted in comparable treatment for most COPIs during reducing conditions to that observed in Trials 1 and 2 which received a smaller 10 g of soil inoculum. At lower temperatures (5°C), reducing conditions were slower to be established, due to slower microbial metabolism at the lower temperature, which in turn resulted in the slower decrease of COPI concentrations compared to those trials operating at room temperature. COPI removal was lower if trials became carbon limited, which resulted in lowered treatment performance in Trial 1 and 6. Overall, the COPI removal percentage observed was similar to or higher than the assumed inputs to the water quality model, validating the model assumptions for *in situ* treatment of ABM Lake. Post-experiment testing indicated the formation of acid volatile sulphides, reflecting reducing conditions achieved during the test work. The microbiology test work indicated beneficial sulphide-producing, selenium-reducing, and uranium-reducing bacteria established in the trials with the addition of carbon, and the establishment was not inhibited at lower temperatures or with higher COPI concentrations.

As expected, arsenic concentrations were not lowered under the reducing conditions during Stage 1. Therefore, ferric iron dosing was investigated in Stage 2 of the *in situ* treatment trials over a 12 week period. Ferric iron, as ferric sulphate, was added using 10:1 and 20:1 iron to arsenic ratios (by mass) to the pilot-scale barrel trials either before or after carbon addition to evaluate arsenic removal in the presence of elevated iron under both oxidizing and reducing conditions. Ferric iron addition resulted in removal of approximately 40% to 65% of total arsenic as the iron hydrolyzed to form ferric (oxyhydr)oxide particles that scavenged arsenic from solution. Increased removal was observed for

dissolved arsenic using the 20:1 iron to arsenic ratio, indicating that the lower total arsenic removal is related to the presence of arsenic-bearing particulates in the water column; therefore additional settling time may improve total arsenic removal. Although the order of ferric and carbon dosing did not appear to influence the maximum total arsenic removal observed, greater removal of dissolved arsenic was observed at the end of Trial 5, which received ferric iron first under oxidizing conditions before transitioning to reducing conditions following carbon amendment. Ferric iron addition under oxidizing conditions resulted in minimal additional removal of other COPIs; however, subsequent transition to reducing conditions resulted in improved treatment of cadmium and copper at the highest iron dose. Given the lower than expected arsenic removal observed, smaller bench-scale (Stage 3) trials were conducted using 1.5 L of synthetic ABM Lake water amended with ferric iron at both 10:1 and 20:1 iron to arsenic ratios. These trials were sampled over 7 days and showed 50% and 90% total arsenic removal for the 10:1 and 20:1 iron to arsenic ratio experiments, respectively. Improved mixing of these bench-scale trials likely explains the higher arsenic removal observed than in the pilot-scale barrel trials.

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GLOSSARY

ABM Lake – Lake water body that will form in the ABM open pit during mine closure when Fault Creek is returned to its original watercourse and discharges to the ABM open pit.

Acidity – A measure of the capacity of water to neutralize base. Influences pH along with alkalinity.

Acid volatile sulphide (AVS) – Sulphide complexed with Fe (FeS) where the sulphide can preferentially exchange Fe for heavy metals (Ni, Zn, Cd, Pb, Cu, Hg) which are then more stably bound.

Alkalinity – A measure of the capacity of water to neutralize acids. Influences pH along with acidity.

Amendment – A chemical or organic material added to encourage specific conditions (e.g., aerobic/anaerobic, pH, ORP) or as a source of something that is needed for passive treatment (e.g., nutrients, alkalinity, binding sites).

Authigenic precipitates – Sedimentary minerals that form during chemical precipitation or recrystallization.

Carbon source – A source of carbon (energy/electrons) for microbes (see **electron donors**). Examples include ethanol, methanol, glycerol, acetate, sugar (glucose), molasses, wood chips, detritus (dead plant matter).

Chalcophile element – Elements that have a tendency to bond with sulphur resulting in the formation of insoluble sulphide minerals.

Chemical species – Refers to the oxidation state of a chemical (e.g., selenate and selenite are species of selenium).

Constituent of potential interest (COP) – Specific elements that have been identified for evaluation. For ABM Lake, these comprise antimony, arsenic, cadmium, copper, lead, selenium, uranium, and zinc.

Dissolved organic carbon (DOC) – Organic (carbon based) molecules in water, that have passed through a filter of 0.45 µm.

Dissolved oxygen (DO) – Diatomic oxygen (O₂) dissolved in water; oxygen can dissolve in water by diffusion from surrounding air, as a product of photosynthesis, or through forced aeration.

DNA – DNA or deoxyribonucleic acid, is a self-replicating material which is present in nearly all living organisms as the main constituent of chromosomes. It is the carrier of genetic information.

Electron donor(s) – A chemical compound that donates electrons to another compound (see **carbon source**). An electron donor is a reducing agent, which that by virtue of it donating electrons, is itself oxidized (see **oxidation** and **reduction**).

Explanatory parameters – Quantifiable parameters that assist in describing how water treatment reactions take place.

Genetic analysis – Analysis to assess the presence, identity, and diversity of different microbes in a sample.

Microbes – Microscopic organisms that can be uni- or multi-cellular. This includes algae, bacteria, fungi, viruses, and yeast.

Oxidation – The loss of electrons, or increase in valence state, by a molecule, atom, or ion. Can be driven by microbes. Process is complementary to chemical reduction.

Oxidation-reduction potential (ORP) – A measure of the tendency of a chemical species to acquire or donate electrons, thus becoming reduced or oxidized, respectively, measured in millivolts.

PCR – Polymerase chain reaction, or PCR, is a laboratory technique used to make multiple copies of a segment of DNA. PCR is very precise and can be used to amplify, or copy, a specific DNA target from a mixture of DNA molecules.

qPCR – qPCR stands for quantitative polymerase chain reaction and is a technology used for measuring DNA quantity using PCR.

Redox ladder - Typical reduction order based on chemical species and redox potential (Eh) in millivolts at pH 7.

Reduction (chemical) – The gain of electrons, or a decrease in valence state, by a molecule, atom, or ion. Can be catalyzed by microbes. Process is complementary to chemical oxidation.

Selenium reduction – Microbially mediated reduction of soluble Se(VI) and Se(IV) to insoluble elemental selenium.

Simultaneously extracted metals (SEM) – amounts of heavy metals such as nickel, zinc, cadmium lead, copper, and mercury in sediment, assessed in the context of AVS for excess sulphide (also see **acid volatile sulphide**).

Sorption – The physical and/or chemical process by which one substance becomes attached to another substance.

Specific conductivity (SPC) – A measurement of electrical conductivity in water that is typically expressed in $\mu\text{S}/\text{cm}$, which has been adjusted for temperature (25°C).

Sulphide – An inorganic anion of sulphur that can form stable complexes with metals and make them insoluble in water (remove them from the water).

Sulphide producing bacteria (SPB) – Bacteria that reduce sulphur compounds, such as sulphate, sulphite, thiosulphate, and sulphur, to produce sulphides and alkalinity.

Sulphide production – The reduction of sulphur compounds, such as sulphate, sulphite, sulphur and thiosulphate, to produce sulphides and alkalinity.

Terminal electron acceptor (TEA) – The final chemical species which receives an electron in an electron transport chain during oxidation of carbon.

Tessier sequential extraction – Procedure based on Tessier et al. (1979) which determines the form and stability of metals in the substrate through a series of chemical extractions.

Transfer – Processes that treat water by transferring a constituent to another location without changing its form. For example: absorption, adsorption, dilution, dispersion, filtration, precipitation (aqueous to solid), and volatilization.

Transform – Processes that change the chemical form or state of a constituent. For example: biodegradation, biotransformation, hydrolysis, ionization, oxidation, photolysis, and reduction.

Treatment process – The method by which a constituent is treated (Rodgers and Castle, 2008).

LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
μmol	micromoles
μm	micrometres
μS	micro Siemens
ABM Lake	ABM Open Pit Lake
AEG	Alexco Environmental Group Inc.
AVS	Acid Volatile Sulphides
BC	British Columbia
BMC	BMC Minerals (No.1) Ltd.
BVL	Bureau Veritas Laboratories
cm	centimetres
C:N:P ratio	Carbon:Nitrogen:Phosphorus
CdS	greenockite
COC	Chain of Custody
COPI	Constituent of Potential Interest
CuS	covellite
DNA	Deoxyribonucleic Acid
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
EDX	Energy Dispersive X-ray
Eh	Redox Potential
Ensero	Ensero Solutions Canada, Inc., formerly Alexco Environmental Group Inc.
g	gram
Global ARD	Global ARD Testing Services Inc.
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
kg	kilogram
L	litre
mg	milligrams
MKP	Monopotassium Phosphate
mV	millivolts
ORP	Oxidation-Reduction Potential
PAG	Potentially Acid-Generating
PbS	galena
PCR	Polymerase Chain Reaction
qPCR	Quantitative Polymerase Chain Reaction
RCP	Reclamation and Closure Plan
SEM	Scanning electron microscope
ΣSEM	Sum of Simultaneously Extracted Metals (used in relation to AVS)
SeRB	Selenium-Reducing Bacteria
SPB	Sulphide Producing Bacteria
SPC	Specific Conductivity
TEA	Terminal Electron Acceptor
URB	Uranium-Reducing Bacteria
UBC	University of British Columbia
USEPA	United States Environmental Protection Agency
WQO	Water Quality Objective
ZnS	sphalerite

1. INTRODUCTION

BMC Minerals (No.1) Ltd. (BMC) is proposing to develop the Kudz Ze Kayah Mine Project (the Project) in southeast Yukon, Canada. The Project is located in the Kaska Traditional Territory. The Reclamation and Closure Plan (RCP) proposed for the Project has been developed with the following main goal: *“To return the mine site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with traditional land use activities”*. The RCP illustrates the process by which closure measures have been designed to meet this goal and presents a framework for how attainment of the goal will be evaluated through post-closure monitoring programs.

The RCP includes removing the Fault Creek diversion following the cessation of mining. This will allow Fault Creek to return to its pre-mining channel and begin filling the ABM open pit, in due course creating the ABM Lake. The filling of ABM Lake is estimated to take approximately 15 years after which time it will overtop and discharge to Geona Creek. Water quality objectives (WQOs) have been proposed for the Project at receiving environment stations located on Geona Creek, South Creek, and Finlayson Creek (AEG and Minnow, 2020). WQOs are not proposed for ABM Lake, therefore the WQOs proposed for the closest receiving environment station (KZ-37) downstream of ABM Lake were used to identify elevated COPI concentrations anticipated in ABM Lake (AEG, 2018). Water quality modelling of the ABM Lake chemistry suggests that concentrations of antimony, arsenic, cadmium, copper, lead, selenium, uranium, and zinc will, without treatment, be present at levels that exceed WQOs in Geona Creek and will therefore require treatment prior to discharge (AEG, 2018). Therefore, the RCP includes *in situ* treatment of the ABM Lake water as it fills with the aim of lowering these trace element concentrations to meet required downstream WQOs.

To demonstrate the potential for successful implementation at the Project, this proposed treatment required refinement and additional proof-of-concept testing using local materials (e.g., ABM waste rock, local soil) and representative water chemistry to refine the treatment application methods, materials, and dosage quantities. To accomplish this, Ensero Solutions (formerly Alexco Environmental Group [AEG]) was retained to conduct tests aimed at further supporting the site-specific application of *in situ* lake water treatment. This report summarizes the results of bench- and pilot-scale testing for the ABM Lake *in situ* trials undertaken off-site, including:

- Research objectives (Chapter 2);
- Background, including treatment objectives, processes, and mechanisms (Chapter 3);
- Methods, including Project site material acquisition, trial design, synthetic water chemistry, trial setup, and sampling (Chapter 4);
- Treatment of constituents of potential interest (COPIs), including water quality results, scanning electron microscopy (SEM) and formation of acid volatile sulphides (AVS), COPI mineral forms and stability, and microbiology communities in the trials (Chapter 5);
- Summary of key findings (Chapter 6); and
- Conceptual implementation of *in situ* water treatment in ABM Lake (Chapter 7).

2. OBJECTIVES

The overall objectives of the off-site bench-scale and pilot-scale testing are to:

- Confirm *in situ* treatment is capable of lowering COPI concentrations in simulated ABM lake water; and
- Support predictions of the ABM Lake *in situ* treatment proposed for the Project upon cessation of mining.

3. BACKGROUND

3.1 *IN SITU* PIT LAKE TREATMENT

The Yukon Government states that “*reliance on long term active treatment is not considered acceptable for reclamation and closure planning*” (Yukon Energy, Mines and Resources, 2006). BMC recognizes that reliance on long-term “active treatment” is not acceptable; therefore, the Project is designed for a long-term closure scenario of minimal monitoring and maintenance.

The proposed *in situ* treatment involves injection of a calculated amount of soluble organic carbon (e.g., glycerol) into ABM Lake, which stimulates indigenous bacteria to produce sulphate-reducing conditions in the water column (Section 3.4). The dissolved sulphide produced under such conditions will react with chalcophile metals (elements with an affinity for forming sulphide minerals) in solution, such as antimony, cadmium, copper, lead and zinc, to form insoluble sulphide mineral precipitates (Section 3.4.4). The reducing conditions in the water column will also promote the reductive precipitation of selenium and uranium (e.g., as elemental selenium and uraninite (UO₂), respectively; Sections 3.4.2 and 3.4.3). Reducing conditions within the lake are expected to last a period of months which will allow for sufficient time for the precipitates that form to settle out of the water column.

The use of soluble organic carbon injections to significantly lower contaminant concentrations in pit lakes, underground mine workings, and shallow groundwater has been described in detail in numerous studies at locations across North America (e.g., Addison et al., 2005; Harrington, 2002; Harrington et al., 1999, 2004, 2009, 2015; Houston et al., 2005; ITRC, 2010; Lindsay, 2009; Morie et al., 2004; Murphy et al., 2008; Paulson et al., 2004; Saunders et al., 2004), including northern Canada (Gault et al., 2018). In particular, *in situ* treatment has been successfully implemented at numerous flooded open pits (Harrington, 2002; Harrington et al., 2004, 2009; ITRC, 2010; Paulson et al., 2004). *In situ* treatment uses a flooded open pit (or a portion thereof) as the reaction vessel for biologically reductive processes, treating water directly at the source. *In situ* treatment is performed through injection or placement of reagents into a flooded pit (e.g., organic carbon and nutrients) along with pumping aimed at circulating reagents throughout the desired water volume. This results in the formation of a reductive zone within a flooded pit, creating the conditions necessary for microbially mediated treatment of dissolved chalcophile metals which then form particulates that settle to the base of the pit and become buried over time as sediment naturally accumulates. The stability of these particulates becomes enhanced by burial and co-deposition of bulk iron sulphide phases in the sediment.

In situ treatment systems require relatively minimal construction and have low capital and operational costs. Treatment occurs quickly (within months) and is suitable for batch or periodic treatment of large volumes of mine-impacted water with high concentrations of metals. Treatment effects continue year-round and associated maintenance is minimal; however, periodic addition of reagents (e.g., glycerol, molasses) is sometimes needed to sustain treatment.

By treating water at the source within a flooded pit, COPs are retained in the pit lake sediment rather than being exposed to the surface environment. *In situ* treatment also provides an ancillary benefit of improving groundwater and seepage chemistry in the receiving environment should the flooded pit be a major source of such loading. Pit walls or waste materials placed in the pit can be stabilized by the creation of saturated biochemically reducing conditions where oxidative leaching is avoided or minimized.

The following case studies provide examples of *in situ* treatment implementation similar to the proposed ABM Lake water treatment.

3.1.1 CASE STUDY #1 SWEETWATER PIT LAKE (WYOMING, USA)

In situ treatment was employed to treat elevated selenium and uranium concentrations in the circumneutral pH pit lake at the Sweetwater uranium mine (Wyoming, USA). Addition of soluble organic carbon resulted in the decrease of nitrate-N concentrations from 1.1 mg/L to below detection within the first two weeks of treatment (Harrington, 2002). Within four months, uranium and selenium concentrations decreased from 8.1 to approximately 4.2 mg/L (target 5.0 mg/L) and 0.46 to approximately 0.004 mg/L (target 0.05 mg/L), respectively. The post-treatment concentrations remained at those levels for four years following *in situ* treatment (Paulson et al., 2004), with follow up sampling indicating that such levels have continued to be maintained beyond ten years of monitoring.

3.1.2 CASE STUDY #2 BARITE HILL PIT LAKE (SOUTH CAROLINA, USA)

The pit lake at the Barite Hill gold mine (South Carolina, USA) was the subject of *in situ* treatment using a phased chemical and microbiological treatment. Prior to treatment, this pit lake was acidic (pH 1.5 to 2) and had high trace element concentrations (Table 3-1). Carbide lime was used to raise the pit lake pH closer to circumneutral conditions, while injection of soluble organic carbon created sulphate-reducing conditions that sequestered the metals as metal sulphides and/or as less soluble reduced phases. Comparison of constituent concentrations before and after *in situ* treatment indicated greater than 70% removal of antimony from the pit lake water column and greater than 90% removal of other metal(loid)s of concern (Table 3-1; Harrington et al., 2009).

Table 3-1: Barite Hill Pit Lake Constituent Concentrations Before and After *In Situ* Treatment (Harrington et al., 2009)

Parameter	Concentration Before <i>In Situ</i> Treatment	Concentration After <i>In Situ</i> Treatment	Percent Reduction
	mg/L	mg/L	%
Antimony	0.02	<0.006	>70
Arsenic	0.968	<0.01	>99
Cadmium	1.57	<0.005	>99
Chromium	0.141	<0.01	>92
Copper	287	<0.01	>99
Lead	0.161	<0.01	>93
Nickel	0.404	<0.02	>95
Selenium	0.23	0.01	96
Zinc	40.2	<0.02	>99

3.1.3 CASE STUDY #3 ANCHOR HILL PIT LAKE (SOUTH DAKOTA, USA)

The Anchor Hill pit lake at the Gilt Edge Mine Superfund Site (South Dakota, USA) was also subject of *in situ* treatment resulting in significantly lower elevated metal(loid) and nitrate concentrations prior to a batch discharge of treated water. The acidic pit (pH 3) was treated with lime and sodium hydroxide to initially raise the pH before methanol and molasses were added to stimulate the development of sulphate-reducing conditions in the water column and associated metals removal. This resulted in near complete nitrate removal (from 55 to 0.01 mg/L) and reductions in pit lake trace element concentrations of between 86% and greater than 99% (Table 3-2; Harrington et al., 2004).

Table 3-2: Anchor Hill Pit Lake Constituent Concentrations Before and After *In Situ* Treatment (Harrington et al., 2004).

Parameter	Concentration Before <i>In Situ</i> Treatment	Concentration After <i>In Situ</i> Treatment	Percent Reduction
	mg/L	mg/L	%
Nitrate-N	55	0.013	>99
Arsenic	0.017	Below detection ¹	-
Cadmium	0.284	0.007	98
Copper	13.6	0.028	>99
Lead	0.0281	Below detection ¹	-
Nickel	0.348	0.048	86
Selenium	0.0222	<0.0009	>96
Zinc	6.66	0.15	98

¹ Detection limit not reported.

3.1.4 TECHNOLOGY SUITABILITY FOR COLD CLIMATE

Longer-term data are available for organic carbon injections to pit lakes, where resultant water treatment has extended over winter (e.g., Sweetwater and Barite Hill pit lakes; Harrington et al., 2009; Park et al., 2009; Paulson et al., 2004), and in some instances for many years after the last carbon injection event (e.g., Sweetwater pit lake; Paulson et al., 2004). It is important to note that both the Anchor Hill and Sweetwater pit lake locations experience cold winters, with the Sweetwater pit lake frozen/ice covered from early December until March. The pit lakes both freeze over during winter, but this has not impeded the constituent removal obtained by *in situ* treatment. Indeed, the ice cover may be beneficial in that it acts as a barrier to the mixing and diffusion of oxygen from the atmosphere into the lake. In this context, carbon additions at both Anchor Hill and Sweetwater pit lakes were typically performed in the late summer or fall to prolong the period that the lake would remain reducing and therefore maximize constituent removal. Furthermore, Ensero personnel have directed the carbon injection *in situ* treatment of the flooded mine workings at the Silver King mine (Keno Hill, central Yukon) since 2015. The water temperature in this mine typically varies between 2°C and 5°C year-round and has demonstrated prolonged constituent removal (cadmium and zinc; greater than or equal to 75% removal over two year period since commissioning of *in situ* treatment; Gault et al., 2018). This indicates that treatment of cold waters is feasible using this technology.

3.2 TREATMENT OBJECTIVES

In situ pit lake treatment is a water treatment system specifically designed to treat certain COPIs that may be present in impacted waters. The following summarizes the Project specific COPIs and their associated WQOs.

COPIs for the Project were identified as those constituents with baseline concentrations in surface water that exceeded WQOs, or those predicted to exceed the WQOs, during the Project phases in the absence of appropriate mitigation measures (AEG and Minnow, 2020). Twenty COPIs have been identified for the Project, which include aluminum, unionized ammonia, antimony, arsenic, cadmium, cobalt, copper, weak acid dissociable cyanide, fluoride, iron, lead, manganese, nickel, nitrate, nitrite, selenium, sulphate, thallium, uranium, and zinc (AEG and Minnow, 2020). Although WQOs are not proposed for ABM Lake itself, the WQOs proposed for the closest receiving environment station (KZ-37) downstream of ABM Lake were used to screen the concentrations anticipated in ABM Lake in the absence of *in situ* treatment (AEG, 2018). Based on water quality modelling, eight COPIs are predicted to exceed the Project KZ-37 WQOs (AEG, 2018). The eight COPIs that were the focus of *in situ* treatment trials discussed in this report include total arsenic, antimony, lead, selenium, and uranium, and dissolved cadmium, copper, and zinc (the assignment of total and dissolved refers to the fraction for which a WQO was developed; AEG and Minnow, 2020). The applicable WQOs are summarized in Table 3-3 alongside the assumed COPI removal inputs to the water quality model for *in situ* treatment (AEG, 2018). The COPI concentrations used in the model for ABM Lake after the implementation of *in situ* treatment are also presented in Table 3-3; these are referred to as the “treatment targets” in this report and are used as a comparator for the trial data. While these eight COPIs comprise the focus of this report, data are available for all twenty Project COPIs, except for cyanide and fluoride which were not evaluated as part of the *in situ* treatment trials. Cyanide is a product of ore processing during mining operations and is therefore not anticipated to be present in ABM Lake. Fluoride is naturally elevated in surface waters at the Project site (AEG, 2019a), but is expected to be present in ABM Lake at levels well below the WQO (AEG, 2018; AEG and Minnow, 2020).

Table 3-3: Estimated Concentrations of Constituents of Potential Interest in ABM Lake upon Full Flooding, Predicted Percent Removal, and WQOs

COPI	Units	ABM Lake Concentration ¹			Water Quality Objective at Station KZ-37
		Upon Filling (Year 26)	Predicted Percent Removal used in Water Quality Model (AEG, 2018)	Predicted <i>in situ</i> Treated Concentration used in Water Quality Model (AEG, 2018) ²	
Total Antimony	mg/L	0.019	50%	0.0097	0.009
Total Arsenic	mg/L	0.058	0%	0.058	0.037
Dissolved Cadmium	mg/L	0.004	90%	0.0004	0.000377 – 0.000456
Dissolved Copper	mg/L	0.019	90%	0.0019	0.00144
Total Lead	mg/L	0.029	50%	0.015	0.012 – 0.017
Total Selenium	mg/L	0.0096	50%	0.0048	0.00243 – 0.00316
Total Uranium	mg/L	0.034	50%	0.017	0.015
Dissolved Zinc	mg/L	0.38	90%	0.038	0.039 – 0.073

¹ From Kud Zé Kayah water quality model report (AEG, 2018).

² These “treatment targets” are presented for comparison with the trial results in Section 5

3.3 TREATMENT PROCESS

The pilot-scale *in situ* treatment test work outlined herein has been designed to treat COPIs that are insoluble under sulphate-reducing conditions, specifically antimony, cadmium, copper, lead, selenium, uranium, and zinc. Arsenic treatment is specifically discussed in Section 3.4.5. The *in situ* treatment is designed to stimulate microbes in the system that naturally occur in/on the water, rock, and soil in the system through addition of organic carbon. The microbes oxidize the reduced carbon “food” source (e.g., ethanol, glycerol) and transfer the electrons released to a terminal electron acceptor (TEA). The TEAs are generally used in the order most energetically favorable (i.e., most energy generated) by microbes. Of the major TEAs typically present in mine-impacted surface waters and soils/sediments, dissolved oxygen (DO) is utilised first followed by nitrate (NO_3), then selenate (Se(VI)), manganate (Mn(IV)), ferric iron (Fe(III)), uranyl (U(VI)), and sulphate (SO_4) (Borch et al., 2010), creating a “redox (reduction-oxidation) ladder” (Figure 3-1). The order of TEA utilization can also be influenced by pH and TEA concentration.

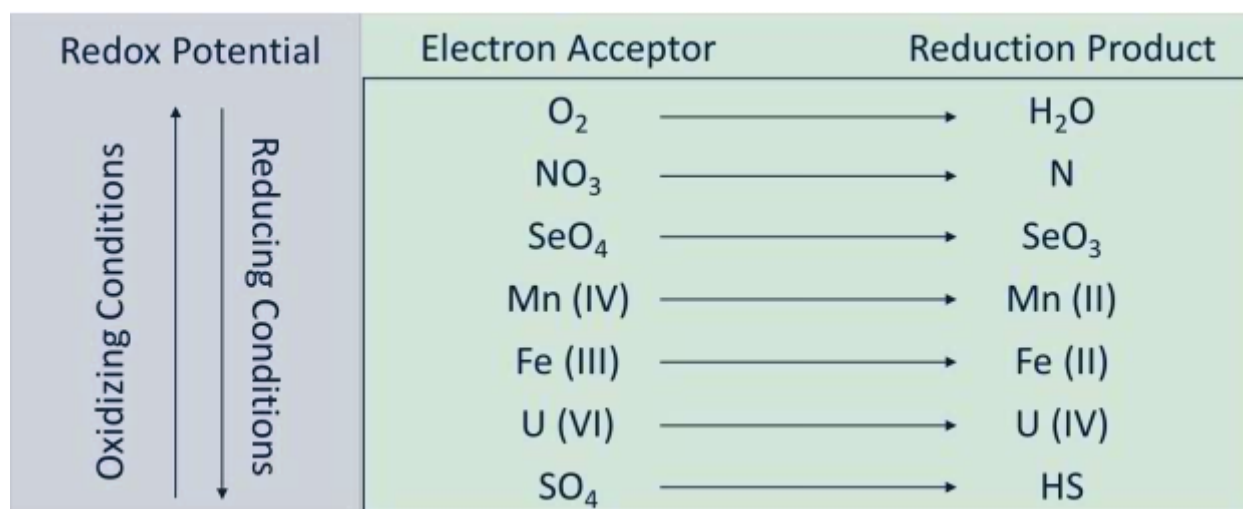


Figure 3-1: Redox Potential and Terminal Electron Acceptors

Summarized based on theoretical redox ladder (Borch et al., 2010)

TEAs are monitored through the *in situ* pilot-scale trials in order to evaluate conditions that are established in the systems. The theoretical order of TEA consumption is not absolute, but it is a useful to guide treatment design and performance evaluation. The *in situ* pilot-scale trials have been designed to target sulphate-reducing conditions, to remove TEAs above sulphate in the redox ladder (e.g., nitrate, selenium, uranium; Figure 3-1), and to promote the formation of sulphide which then reacts with chalcophile metals to form insoluble sulphide minerals. These insoluble sulphide minerals precipitate from the water column and settle to the bottom of the treatment system (i.e., barrel or pit lake).

Parameters such as dissolved iron and dissolved manganese can provide insight into the conditions in the pit lake trials, with increased concentrations of these parameters showing targeted reducing conditions have been achieved based on the theoretical redox ladder (Borch et al., 2010). TEA consumption can be influenced by numerous factors including the overall concentrations of reduced and oxidized TEA species, spatial distribution of organic electron donors and TEAs, and the abundance and diversity of TEA-metabolizing microbial populations. The specific mechanisms for treatment of the COPIs are described in Section 3.4.

3.4 TREATMENT MECHANISMS

3.4.1 DENITRIFYING BACTERIA

Nitrate is typically more desired as an electron acceptor by microbes over selenium and sulphate, so microbes therefore tend to preferentially reduce nitrate (Borch et al., 2010; Tan et al., 2016). Nitrate and nitrite can be removed from water through the denitrification activity of different types of microbes, including nitrate-reducing bacteria which can reduce nitrate (NO_3) to nitrite (NO_2), and other denitrifying organisms that are capable of fully reducing nitrate to nitric oxide (NO), nitrous oxide (N_2O), and subsequently to dinitrogen gas (N_2 , which is the most abundant gas in air).

3.4.2 SELENIUM-REDUCING BACTERIA

The targeted selenium treatment pathway is the reduction of selenate (Se(VI)) and selenite (Se(IV)) to insoluble elemental selenium (Se(0)). There are several different types of selenate- and selenite-reducing bacteria that can reduce these soluble forms of selenium to insoluble elemental selenium (e.g., Gonzalez-Gil et al., 2016; Nancharaiyah and Lens, 2015; Sharma et al., 2015).

3.4.3 URANIUM-REDUCING BACTERIA

Under uranium-reducing conditions, uranium is removed from solution through microbially mediated reduction of soluble uranyl (U(VI)) to uranium in its +4 oxidation state (U(IV)) by uranium-reducing bacteria (URB), followed by precipitation of U(IV) as uraninite (UO_2) (Lovley et al., 1991; Shelobolina et al., 2007). Uranyl is reduced under similar conditions as sulphate (anaerobic/reducing); there is overlap between the types of organisms that can produce sulphides and those that are able to remove uranium through reductive processes.

3.4.4 SULPHIDE-PRODUCING BACTERIA

Sulphate-reducing conditions are encountered when the above processes have advanced such that the TEAs higher than sulphate on the redox ladder have either been consumed or are less energetically favourable to reduce than sulphate (e.g., when the products of TEA reduction make further reduction of that TEA energetically unfavourable). Under such conditions, sulphate is reduced by bacteria to form sulphide, which may then react with chalcophile COPs to form insoluble sulphide minerals. The insoluble sulphide minerals then precipitate from the water column as authigenic precipitates prior to settling on the ABM Lake bottom. Sulphide production is carried out by sulphide-producing bacteria (SPB) through the reduction of sulphur-containing compounds.

3.4.5 ARSENIC REMOVAL

Arsenic mobility is linked to iron and sulphur cycling at redox boundaries, as well as associated co-precipitation reactions of iron (oxyhydr)oxides, iron monosulphides, and pyrite (Edenborn et al., 1986; Moore et al., 1988). Under reducing conditions, arsenic may be immobilized through formation of insoluble sulphide minerals including arsenic sulphides, and substitution within a variety of metal sulphides, and can exist as sorption complexes on these sulphides (Sun et al., 2016). Conversely, under oxidizing conditions, arsenic adsorbs on, and co-precipitates with iron (oxyhydr)oxides (O'Day, 2006). Stoichiometrically, there are chemical processes that suggest a one to one (1:1) molar ratio of iron to arsenic is needed to bind arsenic and render it insoluble. However, in application, an excess of iron is needed to facilitate arsenic treatment. The United States Environmental Protection Agency (USEPA) recommend an

iron to arsenic ratio of 20:1 (by mass) to facilitate arsenic treatment via adsorption on and co-precipitation with iron hydroxide (USEPA, 2005).

4. METHODS FOR *IN SITU* PILOT- AND BENCH-SCALE TRIALS

4.1 PILOT-SCALE TRIAL DESIGN

Pilot-scale testing was conducted at Ensero's laboratory in Saskatoon. The test systems consisted of eight 200 L plastic barrels each containing 10 kg of composite waste rock (Section 4.1.1) and filled with synthetic ABM Lake water (described in Section 4.2). Trials differed in the amount of soil amendment added (10 g versus 10 kg; described in Section 4.1.1), COPI concentrations (water quality model versus ten times the water quality model; described in Section 4.2), carbon dosing (regular versus high; described in Section 4.1.3), and temperature (room temperature versus 5°C; described in Section 4.1.4). A summary of the trials is detailed in Table 4-1. Trials 7 and 8 were held as controls, with no carbon or nutrients added to those trials as described in Section 4.1.3.

Additional arsenic (0.03 mg/L) was added to the trials with 10 kg of soil (Trials 3, 4 and 8) to compensate for the relatively low arsenic content of the soil compared to the overburden collected elsewhere in the ABM open pit footprint (AEG, 2019b; described in Section 5.5). Trial 6 had ten times the metals concentrations of the predicted water quality model to determine the maximum treatment possible (described in Section 4.2). These additions are detailed further below.

Table 4-1: Summary of Trial Setup

Trial #	Amount of Soil Added (kg)	Carbon Dosage	Temperature (°C)	COPI Concentration Reference ¹
1	0.01	Regular	22	Water Quality Model
2	0.01	High	22	Water Quality Model
3	10	Regular	22	Water Quality Model + Arsenic
4	10	High	22	Water Quality Model + Arsenic
5	0.01	High	5	Water Quality Model
6	0.01	Regular	22	10x Water Quality Model
7	0.01	None	22	Water Quality Model
8	10	None	22	Water Quality Model + Arsenic

¹ Water quality model reported in AEG, 2018. Arsenic addition and 10x water quality model as described in Sections 4.1.1 and 4.1.3, respectively.

4.1.1 PROJECT SITE MATERIAL ACQUISITION

Materials required to construct the pilot-scale trials include soil local to the proposed ABM open pit location (soil amendment), local waste rock extracted from the ABM open pit footprint, and 200 L plastic barrels with sealable lids. The soil amendment was collected by AEG on September 27, 2018 from the southern end of the ABM open pit area (Photo 4-1). Waste rock was selected by BMC geologists from their on site drill core collection and also from the existing inventory held at Global ARD Testing Services Inc. (Global ARD) in Burnaby, British Columbia (BC) to simulate the exposed ABM open pit walls. The drill core selection encompassed samples from the ore zone, alteration halo, other potentially acid-generating (PAG) material, and non-PAG material in the approximate proportions they are likely to be exposed in the final pit wall. Each of these rock categories were crushed to particles passing two inches at the University of British Columbia (UBC) and homogenized. Portions from each rock category were then mixed and homogenized by Global ARD into individual 10 kg composites reflective of the final pit wall rock composition (Photo 4-1) under the direction of BMC.



Photograph 4-1: Project Site Materials

Local Soil (Left) and Rock Composites (Right)

4.1.2 SOIL AMENDMENT

Trials 1, 2, and 5 to 7 (control) received 10 g of soil amendment to provide a source of local microbes. Trials 3, 4, and 8 (control) received a larger soil amendment (10 kg) to examine the option of supplementing the ABM Lake with local overburden during the early years of its formation. This larger soil addition is expected to provide a source of reducible iron to the system that may assist in metals removal and extend treatment longevity by creating a pool of labile iron sulphide that acts as a redox buffer to the ingress of Fault Creek water, which would be in an oxidizing condition. The soil material utilised in the trials was sourced from a waterlogged area of the Kudz Ze Kayah site, located close to where Fault Creek will discharge to the ABM pit at closure (GPS coordinates 61.459375N, 130.595483W). A shallow 1 m² pit was dug by hand and soil from the top 15 cm was collected in 20 L pails. The soil in each pail was stirred thoroughly prior to collecting a subsample for amendment in the trials.

During *in situ* treatment, transient iron-reducing conditions are expected to form. Under such conditions, poorly crystalline iron (oxyhydr)oxides can undergo reductive dissolution and release adsorbed constituents. Arsenic is commonly associated with iron (oxyhydr)oxides and can be mobilized under iron-reducing conditions. The arsenic content of the soil used to amend the *in situ* trials (4.3 mg/kg) was lower than the average arsenic content of overburden samples collected from the ABM open pit footprint (16.5 mg/kg; AEG, 2019b). Therefore, it was likely that any arsenic release under iron-reducing conditions from the soil added to the trials may be underestimated. To compensate for this, approximately 50% more arsenic (equivalent to an additional 0.03 mg/L) was added to those trials with 10 kg soil added (Trials 3, 4, and 8). This assumed that 20% of the bulk soil arsenic was associated with the iron (oxyhydr)oxide fraction of which only 25% was accessible. No additional arsenic was added to the other experiments, as the 10 g mass of soil would be a negligible contributor of arsenic.

4.1.3 CARBON AND NUTRIENT AMENDMENTS

An organic carbon amendment was added to Trials 1 through 6 in the form of 100% glycerol as the method of treatment. Glycerol was preferred to alcohol since it represents an electron-dense organic electron donor that does not have the flammability issues associated with other volatile alcohols, and therefore is more amenable to large scale industrial uses. Glycerol was dosed at the start of each trial at “regular” and “high” levels with dosages outlined in Table 4-2. The regular carbon dosage was calculated based on:

- Stoichiometric reduction of the main TEAs (Figure 3-1) in the water column measured in samples collected from each trial;
- Reduction of 10% of the soil reducible iron fraction (determined via Tessier et al. (1979) extraction) for Trials 3 and 4 that received a 10 kg soil amendment; and
- Reduction of enough sulphate to provide sulphide for precipitation of chalcophile COPs with some residual sulphide to provide buffering against the ingress of oxygen.

Calculation of the “high” carbon dose included the same considerations as the “regular” dose, but additional carbon was added to create additional sulphide. Trials 7 and 8 received no organic carbon addition to act as controls against the carbon amended experiments. Additional glycerol was added to Trials 1 through 6 at Week 11 (Table 4-2), due to an increase in oxidation-reduction potential (ORP), DO, and nitrate concentrations, indicative of oxidizing conditions (see Section 5.1.1 for details).

Molasses was also added to Trials 1 through 6 at the start of the trials at a dose of 10 mg/L carbon to simulate carbon that would be naturally occurring in the ABM Lake via fallen leaves and soil accumulation, for example, during the lake filling process. Nitrogen and phosphorus were also added to Trials 1 through 6 at the start of the trials as nutrients for growth in the form of ammonium sulphate and monopotassium phosphate (MKP), respectively, following a 50:14:3 (carbon: nitrogen: phosphorus (C:N:P)) molar ratio based on the molasses addition (Harrington, et. al., 2018).

Table 4-2: Initial and Top-up Glycerol Dosages in Trials 1 Through 8

Trial	Carbon Dosage	100% Glycerol Dosage (mL)	
		Initial	Top-up (Week 11)
Trial 1	Regular	2.10	2.03
Trial 2	High	5.94	9.74
Trial 3	Regular	3.02	4.06
Trial 4	High	7.32	12.17
Trial 5	High	6.50	9.74
Trial 6	Regular	3.28	4.46
Trial 7	—	0	0
Trial 8	—	0	0

— No carbon was added.

4.1.4 TEMPERATURE

Seven of the eight trials were conducted at room temperature (approximately 22°C). However, ABM Lake water will likely be lower temperature than this (approximately 5°C to 10°C) during the late summer/fall when carbon injection would likely be conducted. Therefore, one of the trials (Trial 5) was conducted at 5°C in a walk-in cooler. Trial 5 was also dosed at a “high” carbon dosage as cold temperatures are known to slow microbial activity (e.g., Marais et al., 2018), and therefore higher carbon doses may be required to compensate for the cold temperatures and to effectively facilitate *in situ* treatment.

4.2 SYNTHETIC WATER CHEMISTRY

A water chemistry recipe (Table 4-3) was developed to mimic the ABM Lake water quality that is anticipated upon filling of the ABM open pit based on the water quality model (AEG, 2018). To generate the synthetic water recipe, metal salts were added to the City of Saskatoon municipal tap water to achieve the targeted concentration of each parameter outlined in Table 4-3. Tap water was utilised since it is a cost-effective supply of the large volumes of water required (versus deionized water) and similar biological treatment studies conducted by Ensero using tap water have not observed any detrimental effect on microbial activity. Several parameters (e.g., aluminum, iron) were not predicted to be higher than the concentrations already present in the tap water, and hence were not added. Calcium concentrations in the influent trials were lower than targeted concentrations due to the solubility limit of the calcium sulphate compound. The amount of calcium added to the influent was therefore decreased to 85% of the target concentration. Sulphate concentrations in the synthetic influent were largely brought to target indirectly, through the addition of calcium sulphate. No pH amendment was required since the solution pH (7.0 to 7.4) was comparable to that expected in ABM Lake (pH 7.0 to 8.0).

Trial 6 had ten times the metals concentrations of the predicted water quality model (AEG, 2018) to determine the maximum treatment possible, with the targeted concentration outlined in Table 4-3. The 10 g soil and 10 kg soil trials had the same target parameter concentrations, with the exception of additional arsenic that was added to the 10 kg soil trials as described in Section 5.5.

Table 4-3: Target Total Concentrations for Synthetic ABM Lake Water When Fully Flooded (AEG, 2018)

Parameter	Compound added to water	Target synthetic water concentration (mg/L)		
		10 g soil trials	10 kg soil trials	10X metals salts trial
Aluminum ¹	-	0.01	0.01	0.01
Antimony	KSb(OH) ₆	0.019	0.019	0.190
Arsenic	Na ₂ HAsO ₄ •7H ₂ O	0.058	0.088	0.580
Cadmium	CdCl ₂	0.004	0.004	0.040
Calcium ²	CaSO ₄ •2H ₂ O	101.15	101.15	101.15
Cobalt	CoSO ₄ •7H ₂ O	0.0026	0.0026	0.0260
Copper	CuSO ₄ •5H ₂ O	0.019	0.019	0.190
Iron ¹	-	0.01	0.01	0.01
Lead	Pb(NO ₃) ₂	0.029	0.029	0.290
Manganese ¹	-	0.01	0.01	0.01
Nickel	NiCl ₂ •6H ₂ O	0.01	0.01	0.10
Selenium	Na ₂ SeO ₄	0.0096	0.0096	0.0960
Sulphate ³	-	231	231	231
Thallium	Tl ₂ SO ₄	0.00018	0.00018	0.00180
Uranium	Uranium Standard	0.034	0.034	0.340
Zinc	ZnSO ₄ •7H ₂ O	0.38	0.38	3.80

¹ Not added to the synthetic influent, as background concentrations in tap water were greater than target.

² Calcium target concentration is 85% of water quality model (AEG 2018) due to maximum solubility of the compound used.

³ A large percentage of the sulphate concentrations come from calcium sulphate addition, and in tap water.

4.3 TRIAL SETUP

Each of the trials received 10 kg of the crushed waste rock composite, followed by the soil amendment in quantities outlined in Table 4-1. Each barrel was then filled with tap water and left to equilibrate for 48 hours, after which a water sample was collected and sent to Bureau Veritas Laboratories (BVL, formerly known as Maxxam Analytics) for total and dissolved metals analysis (as described in Section 4.5.1, sampling methods). Initial metal concentrations provided a baseline for further metals addition (as salts) to each barrel to achieve the targeted water concentrations as outlined in Table 4-3. Following the metal salt addition, the trials were again allowed to equilibrate for 48 hours before sampling for total and dissolved metals and anions to confirm that the target concentrations were met in a range of plus or minus 20%.

Barrels remained sealed with a lid and metal ring for the duration of the trials. To keep the trials as free from oxygen as possible, sampling was performed through a bung cap in the lid. After the target constituent concentrations were achieved in each trial, 100% glycerol was added in the dosages as provided in Table 4-2. Additional molasses, nitrogen and phosphorus were added to Trials 1 through 6 at the start of the trials as described in Section 4.1.3. Dosing of glycerol in Stage 1 and 2, was performed by adding glycerol to a conical centrifuge tube and adding to the trials by slow stirring with a large spoon to ensure that minimal disturbance was created.

4.4 PILOT TRIALS TESTING PERIODS

Pilot-scale testing was initiated on March 25, 2019, based on the addition of carbon. *In situ* pilot-scale testing was conducted in two stages (Stage 1 and Stage 2), which was followed by a bench-scale trial (Stage 3) (Figure 4-1). Stage 1 of the *in situ* pilot-scale tests informed on the degree of constituent removal following organic carbon addition, and the effect of excess soil amendment (Section 5.1). Stage 2 of the *in situ* pilot-scale tests informed on the degree of arsenic removal through the addition of ferric iron either before or after glycerol addition (i.e., under oxidizing or reducing conditions, respectively) (Section 5.2). The Stage 3 bench-scale experiment was performed to validate arsenic removal in the presence of iron amendment when adequate mixing was attained (Section 5.2).

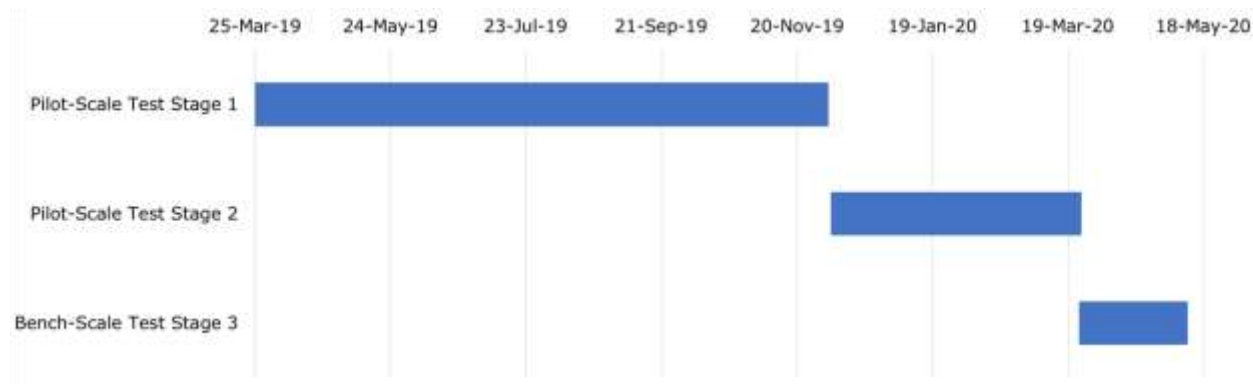


Figure 4-1: Testing Schedule Trials

4.4.1 SUMMARY OF KEY EVENTS DURING TRIALS

A summary of key events during Stage 1 and Stage 2 of the *in situ* pilot-scale treatment trials are detailed in Table 4-4 and Table 4-5, respectively. Details on sampling events can be found in Section 4.5.

Table 4-4: Summary of Key Events During Stage 1 of Pilot-scale Trial

Date	Week	Timeline
January 30, 2019	N/A	Initial microbiology sampling of soil amendment, waste rock, and water used in trials.
January 30, 2019	N/A	Trial set-up and synthetic water development.
March 25, 2019	0	Carbon, nitrogen and phosphorus added to trials. ¹ First routine water sampling and start of sampling frequency of every two weeks.
June 14, 2019	11	Carbon top-up in form of glycerol.
September 9, 2019	22	Microbiology monitoring of water from Trials 2-5. Routine water sampling frequency moved to monthly.
December 2, 2019	34	Final routine water sampling event for all trials.
December 4, 2019	34	Final microbiology and soil sampling during take down of Trials 3, 4, & 8.

¹ Carbon added in the form of glycerol and molasses. Nitrogen and phosphorus were also added as nutrients for microbial growth.

Table 4-5: Summary of Key Events During Stage 2 of Pilot-scale Trial

Date	Week	Timeline
January 2, 2020	0	Addition of iron to Trials 1 & 5. Addition of glycerol to Trial 2 (13.0 mL) & Trial 6 (12.9 mL).
January 8, 2020	1	First routine water sampling event for Trials 1 & 5.
January 15, 2020	2	Sampled all trials, first routine water sampling event for Trials 2 & 6.
January 23, 2020	3	Iron top-up for Trials 1 & 5.
January 28, 2020	4	Addition of glycerol to Trial 1 (13.1 mL) & Trial 5 (13.2 mL).
January 29, 2020	4	Addition of iron to Trials 2 & 6.
February 5, 2020	5	Water sampling event for Trials 2 & 6.
February 13, 2020	6	Water sampling event for Trials 1, 2, 5 & 6.
February 26, 2020	8	Water sampling event for Trials 1 & 5.
March 11, 2020	10	Water sampling event for Trials 2 & 6.
March 25, 2020	12	Final routine water sampling event for Trials 1, 2, 5 & 6. Final microbiology sampling during take down of Trials 1, 2, 5, 6 & 7.

4.4.2 STAGE 2 PILOT-SCALE TRIALS WITH IRON ADDITION

Trials 1, 2, 5, and 6 were used to investigate the addition of ferric iron to precipitate and remove arsenic under oxidizing or reducing conditions (i.e., before or after the addition of glycerol to establish of reducing conditions). Trials 1 and 2 targeted iron to arsenic mass ratios of 10:1, while Trials 5 and 6 targeted iron to arsenic ratios of 20:1 (Table 4-6). A 20:1 mass ratio of iron to arsenic was chosen based on recommendations by the USEPA (USEPA, 2005), with the lower 10:1 mass ration selected to examine the extent of arsenic treatment at a lower iron dosing ratio. Dissolved arsenic concentrations from Week 34 of Stage 1 of the trials (December 2, 2019) were used to calculate required ferric iron additions. The addition of ferric iron marked the beginning (Week 0) of Stage 2 of the pilot-scale trials. Iron (III) sulphate hydrate was dissolved into a stock solution, prior to being added to the barrels. A circulating pump was used to mix the iron (III) sulphate stock solution in the barrels for approximately five minutes. Glycerol dosing of 12.9 to 13.2 mL was performed, analogous to the “high” carbon dose employed for some trials in Stage 1 (Section 4.3). Stage 2 trials were performed for 12 weeks with details outlined in Table 4-5.

Table 4-6: Summary of Amendments and Dosing During Stage 2 of Pilot-scale Trial

Trial	Temperature (°C)	Fe:As Mass Ratio	Description	Week 34 Dissolved Arsenic Concentration (mg/L)	Ferric iron added (mg/L)
1	22	10:1	- Iron addition (Week 0) - Glycerol addition (Week 4) - Water Quality Model¹ COPI concentration	0.052	0.5
2	22	10:1	- Glycerol addition (Week 0) - Iron addition (Week 4) - Water Quality Model COPI concentration	0.049	0.5
5	5	20:1	- Iron addition (Week 0) - Glycerol addition (Week 4) - Water Quality Model COPI concentration	0.051	1
6	22	20:1	- Glycerol addition (Week 0) - Iron addition (Week 4) 10x Water Quality Model COPI concentration	0.295	6

¹ AEG, 2018

4.5 SAMPLING

4.5.1 ROUTINE WATER QUALITY SAMPLING

Water quality sampling was conducted at the start of the trials following the glycerol addition (time = 0), every two weeks for the first 16 weeks, and every four weeks thereafter through to Week 34 of Stage 1 of the *in situ* treatment trials (Table 4-4). Water quality sampling that was performed for the 12-week Stage 2 testing period is summarized in Table 4-5. The parameters analysed during Stage 1 and 2 are presented in Table 4-7 and Table 4-8, respectively. Laboratory results are reported in Appendix A, with raw data from *in situ* trials summarized in Appendix B.

Table 4-7: Water Sampling Parameters and Frequency for Stage 1 *in situ* Treatment Trials

Test Parameters	Frequency	Sample Location	Total Number of Samples	Number of Sampling Events
Temperature (°C)	At start of trial, Every two weeks for the first 16 weeks, and every four weeks for Week 17-34 (Table 4-4).	Trials 1-8; Three depths	336	14
pH				
Dissolved oxygen (DO) (mg/L)				
Conductivity (µS/cm)				
Oxidation reduction potential (ORP) (mV)				
Specific conductivity (SPC) (mV)				
Acidity (mg/L)	At start of trial, Every two weeks for the first 16 weeks, and every four weeks for Week 17-34 (Table 4-4).	Trials 1-8; one depth	112	14
Alkalinity (total CaCO ₃) (mg/L)				
Ammonia as N (mg/L)				
Dissolved Ferrous Iron (mg/L)				
Total Sulphide as S (mg/L)				
Dissolved organic carbon (mg/L)				
Anions (sulphate, fluoride, chloride, phosphate, nitrate, and nitrate) (mg/L)				
Total and dissolved metals by ICP-MS ¹ (Al, Sb, As, Ba, Be, Bi, B, Cd, Ca, Cs, Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, P, K, Rb, Se, Ag, Na, Sr, S, Te, Tl, Th, Sn, Ti, W, U, V, Zn, Zr) (mg/L)				

¹ICP-MS: Inductively coupled plasma mass spectrometry.

Table 4-8: Water Sampling Parameters and Frequency for Stage 2 in situ Treatment Trials

Test Parameters	Frequency	Sample Location	Total Number of Samples	Number of Sampling Events
Temperature (°C)	Refer to Table 4-5 for schedule.	Trials 1, 2, 5, 6; Three depths	84	7
pH				
Dissolved oxygen (DO) (mg/L)				
Conductivity (µS/cm)				
Oxidation reduction potential (ORP) (mV)				
Specific conductivity (SPC) (mV)				
Acidity (mg/L)	Refer to Table 4-5 for schedule.	Trials 1, 2, 5, 6; one depth	28	7
Alkalinity (total CaCO ₃) (mg/L)				
Ammonia as N (mg/L)				
Dissolved Ferrous Iron (mg/L)				
Total Sulphide as S (mg/L)				
Dissolved organic carbon (mg/L)				
Anions (sulphate, fluoride, chloride, phosphate, nitrate, and nitrate) (mg/L)				
Total and dissolved metals by ICP-MS ¹ (Al, Sb, As, Ba, Be, Bi, B, Cd, Ca, Cs, Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, P, K, Rb, Se, Ag, Na, Sr, S, Te, Tl, Th, Sn, Ti, W, U, V, Zn, Zr) (mg/L)				

¹ICP-MS: Inductively coupled plasma mass spectrometry.

Water sampling was conducted according to Ensero's sampling protocols, developed following the "*Standard methods for the examination of water and wastewater*" (Rice et al., 2012), which was co-produced by the American Public Health Association, the American Water Works Association, and the Water Environment Federations.

Routine water samples were prepared in sample bottles appropriate for each analysis parameter, as provided by BVL in Burnaby, BC. Sample collectors wore clean and new nitrile gloves when collecting samples. Bottles were capped immediately after filling. All samples were collected in labelled bottles that identified the sample location, date and time of collection, field filtering and/or preservation and analysis requested. Samples were filtered and/or preserved according to the analytical service provider's instructions (BVL).

Chain of Custody (COC) forms were completed at the time of sampling and contained all information from the sample bottles labels. COCs signed by the sampler were packed inside the coolers used to transport the samples to the laboratory. All samples were stored in coolers with freezer packs to remain cold (4°C), but not frozen, during sampling and during transport to BVL.

Water was sampled through a bung cap in the lid of the barrel in efforts to introduce the least amount of air as possible to the trials. Water was collected at approximately one-third to half-way down the water column into one

litre sampling containers using a peristaltic pump and tubing. Collected water was aliquoted into clean, laboratory prepared sample bottles appropriate for each analysis parameter. Each trial was designated its own tubing and following each sampling event the tubing was rinsed with reverse osmosis water using a clean syringe. To minimize interaction with the atmosphere the lids of the barrels were sealed using metal clamps between sampling events.

In situ water DO (mg/L), temperature (°C), pH, conductivity (micro Siemens per centimeter [$\mu\text{S}/\text{cm}$]), specific conductivity (SPC; $\mu\text{S}/\text{cm}$), and ORP (mV) were measured following the collection of routine water samples. Measurements were conducted with a YSI Professional Plus handheld unit calibrated according to the manufacturer's instructions. *In situ* parameters were measured at three different water depths (10 cm from the surface of the water, middle of the water column, and 10 cm from the top of the rock/soil layer at the bottom) through the bung cap of each barrel to examine if the water column became stratified over the course of the trials.

Water was not topped up during the trials, since a minimal volume of water was taken at each sampling event. Over the duration of the pilot-scale test work, approximately 8.75% to 12.5% (17.5 to 25 L) of the total water volume was removed for analysis.

4.5.2 SUBSTRATE SAMPLING

A sample of the site soil used to amend the trials was collected by filling and sealing glass jars while submerged under the water it was shipped in to limit oxidation. The samples were stored at 4°C for approximately 10 months during the experiments owing to the minimum sample number required by the laboratory for acid volatile sulphides (AVS) analysis; results of this storage are further described in Section 5.5.1. Samples of the soil amendment were taken anaerobically as described below from Trials 3, 4, and 8 upon take down on December 4, 2019 (Week 34 of Stage 1). The initial soil inoculum and Trials 3, 4, and 8 soil samples were submitted to BVL for acid volatile sulphides and simultaneously extracted metals (AVS: ΣSEM), and Tessier sequential extraction analysis for Trials 4 and 8 (Table 4-9). These trials were chosen for analysis based on the higher volume of soil substrate present in the trials. Soil samples from Trials 3, 4 and 8 at take-down were collected by using a pump to drain two-thirds of the water out of the barrel. AVS+SEM and Tessier samples were collected in 125 mL glass jars provided by BVL and capped under water with minimal headspace. Following United States Environmental Protection Agency method 821-R-91-100 (USEPA, 1991), the samples were then put into a glove bag under a nitrogen atmosphere to minimize oxidation of the sample. The surface of the sample was flushed to deoxygenate the overlying water and ensure any minimal headspace that remained was oxygen free (USEPA, 1991). All samples were stored in coolers with freezer packs to remain cold (4°C), but not frozen, during sampling and during transport to BVL.

Table 4-9: Soil Sampling Parameters and Frequency

Test Parameters	Frequency	Sample Location	Total Number of Samples	Number of Sampling Events
Sequential leach Tessier extraction (Al, Sb, As, Ba, Be, Bi, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mn, Mo, Ni, P, K, Se, Ag, Na, Sr, Tl, Sn, Ti, U, V, Zn) (mg/kg)	Prior to construction	Soil inoculum	1	1
	Week 34 of Stage 1 (4-Dec-2019)	Trial 4 & 8 substrate	2	1
AVS+ Σ SEM ¹ (μ mol/kg)	Week 34 of Stage 1 (4-Dec-2019)	Initial soil inoculum ² , Trial 3, 4 & 8 substrate	4	1

¹AVS + Σ SEM – Acid volatile sulphides and simultaneously extracted metals.

²The initial soil inoculum sample was collected from soil material during the trial set-up and had been stored for approximately 10 months during the experiments owing to the minimum sample number required by the laboratory for AVS analysis.

Mineral formation and stability of COPs were evaluated at the end of operations for Trials 4 and 8 via the Tessier sequential extraction method (Tessier et al., 1979) to aid in understanding the COP mineral formation as well as mineral association in the substrate (Table 4-10).

Table 4-10: Summary of Extractable Fractions from Tessier Sequential Extraction Procedure ¹

Fraction	Description	Stability of Metals Associated With Soil Fraction
1	Exchangeable fraction for adsorbed metals	Readily released (i.e., soluble and exchangeable)
2	Metal fraction bound to carbonates	Released under acidic pH
3	Metal fraction bound to Fe-Mn oxides	Released under reducing conditions
4	Metal fraction bound to organic matter and sulphides	Released under oxidizing conditions
5	Residual metal fraction (oxides and silicate minerals recalcitrant to dissolution at ambient conditions)	Not expected to be released in solution over time under conditions normally encountered in nature

¹ Method based on Tessier et al. (1979).

4.5.2.1 LABORATORY QUALITY CONTROL SAMPLE ANALYSIS

Laboratory analysis were performed by BVL. Overall quality control sample analysis from method blanks, laboratory duplicates, matrix spikes and blank spikes met the BVL laboratory acceptability criteria and consequently the data were issued.

4.5.3 MICROBIOLOGY SAMPLING

Microbes are the catalysts for the beneficial biogeochemical reactions occurring in the *in situ* trials (Section 3.3). Microbial testing can be used to compare microbial communities established in the water and associated with the substrate in different trial conditions, and over time. Microbial testing included genetic quantification of bacteria associated with specific sample types via quantitative polymerase chain reaction (qPCR), as well as genetic sequencing via the 16S ribosomal ribonucleic acid gene to identify the bacterial community and distribution of beneficial organisms. The microbial communities in the trials were tested with the initial materials used to construct the trials, as well as during the study to evaluate the distribution and establishment of beneficial microbes for the different trial designs (Table 4-11).

Microbiology samples were taken of water from Trials 2 to 6 on September 9, 2019 (Week 22 of Stage 1) based on the range of COPI removal observed over the first 22 weeks. Final microbiology water and substrate (i.e., mixed rock and soil) samples were collected during take down of trials (Week 34 of Stage 1) on December 4, 2019 for Trials 3, 4, and 8, and after the Iron Addition Trials (Week 12 of Stage 2) on March 25, 2020 for Trials 2, 5, 6, and 7.

Table 4-11: Microbial Sampling Parameters and Frequency

Test Parameters	Frequency	Sample Location	Total Number of Samples	Number of Sampling Events
Quantification analysis & genetic sequencing analysis for bacterial community composition and distribution of beneficial organisms	Initial sample	Initial soil amendment, waste rock composite, & tap water	3	1
	Week 22 (9-Sep-2019) of Stage 1	Water of Trials 2 - 6	5	1
	Week 34 (4-Dec-2019) Stage 1	Water and substrate of Trials 3 & 4	4	1
	Week 12 (25-Mar-2020) of Stage 2	Water and substrate Trials 5 & 6 Substrate for Trials 2 & 7	6	1

Samples were collected into sterile syringes and Sterivex™ filters (water), and sterile sample tubes provided by the Ensero microbiology laboratory. Sterivex™ filters of 0.2 µm pore size were used to collect the suspended bacteria in a known volume of water into the filter. Sample collectors wore clean and new nitrile gloves when collecting each sample. Sampling containers were capped immediately after filling. All samples were collected in labelled bottles that identified the sample location, date, and time of collection. COC forms were completed at the time of sampling and contained all information from the sample container labels. COCs signed by the sampler were packed inside the coolers used to immediately transport samples to the laboratory. All microbiology samples were stored in a -20°C freezer prior quantification and genetic sequencing analysis at the Ensero microbiology laboratory according to methods outlined in Appendix C.

All water samples collected from the trials were sampled at approximately the same depth as routine water sampling occurred (one-third to half-way down the water column; Section 4.5.1) using a sterile syringe and Sterivex™ filter. Substrate samples were collected at takedown of the trials by using a pump to drain two-thirds of the water out of the barrel and collecting the substrate into sterile containers.

4.5.4 SCANNING ELECTRON MICROSCOPY SAMPLING

Upon take down of Trials 3, 4, and 8 on December 4, 2019, the top layer of soil substrate was collected for scanning electron microscopy (SEM) analysis. These trials were selected since they each received 10 kg of soil, which presents a larger mass from which to sample and observe products of microbial reduction under the electron microscope. No significant biogenic precipitate formation was visually observed on the rock surfaces at the end of Trials 1, 2, 5, and 6. Given the relatively low COPI concentrations, the production of significant biogenic mineral was not expected. The material was collected underwater to keep the samples from being exposed to air until preparation for SEM analysis could occur at the Saskatchewan Research Council. Prior to being sent for analysis at the Saskatchewan Research Council, the samples were spread as thin layers on carbon tape secured to aluminum sample stubs. This work was performed in an anaerobic bag filled with nitrogen gas to minimize sample oxidation by ambient air. Once mounted, the samples were transferred to anaerobic containers that were flushed with nitrogen and submitted to the Saskatchewan Research Council for SEM analysis.

4.5.5 GEOCHEMICAL MODELLING

The calculated Eh and measured pH of all eight trials at Week 14 was plotted on an Eh-pH predominance plot for the COPI-sulphur-carbon-oxygen system to understand the mechanisms of COPI removal observed under the reducing conditions present at Week 14. All Eh-pH plots were prepared using PHREEPLOT (Kinniburgh and Cooper, 2011) calculated using PHREEQC and based on the Minteq (v4) thermodynamic database. The Minteq database was supplemented with hydrozincite $[\text{Zn}_5(\text{CO}_3)_2(\text{OH})_6]$ data sourced from the LLNL database and additional environmentally relevant uranium species from Guillaumont et al. (2003) and Dong and Brooks (2006). The arsenic Eh-pH plot was generated using the Wateq database owing to its updated and wider range of arsenic species thermodynamic data (Nordstrom and Archer, 2003). The Wateq database was also supplemented with thioarsenic thermodynamic data from Helz and Tossel (2008). Metal and sulphur concentrations were set based on the dissolved concentrations observed at the start of the experiment and the system was allowed to equilibrate with atmospheric carbon dioxide (i.e., the carbon dioxide partial pressure was set at $10^{-3.4}$).

4.6 STAGE 3 IRON ADDITION BENCH TRIALS

The ferric iron addition in the Stage 2 *in situ* pilot-scale barrel trials showed relatively limited arsenic removal compared to that expected. It was hypothesized that this may be due to insufficient mixing within the barrel and limited opportunity for interaction of the ferric iron with dissolved arsenic. Therefore, at the end of the *in situ* pilot-scale barrel trials, two bench trials were performed to evaluate the extent of arsenic treatment under conditions where better mixing could be attained. The bench trials were performed using synthetic influent (Section 4.2; Table 4-3) for the trials containing 10 grams of soil. A 4 L volume of reverse osmosis water was used to create the synthetic influent. The synthetic influent was monitored daily using a pH meter until the pH stabilized. Once the pH was stable, the synthetic influent was sent to BVL in Burnaby, BC for total and dissolved metals analysis to confirm its major and trace element content, and calculate the ferric iron dosage. The synthetic influent was stored sealed in a fridge at 4°C for 14 days during this time. Following receipt of initial water chemistry, the synthetic influent was equilibrated to room temperature while mixing on a stir plate. An initial sample of the synthetic influent was taken for total and dissolved metals to confirm the initial chemistry and the synthetic influent was separated into two 1.5 L aliquots for the trials. Iron to arsenic mass ratios of 20:1 and 10:1 were targeted for the two trials, respectively, by dosing iron (III) sulphate into each trial while stirring. Stirring was stopped after five minutes and a grab sample of each trial was taken for total and dissolved metals at 1, 24, and 144 hours after iron addition as described in Section 4.5.1.

5. RESULTS AND DISCUSSION

5.1 STAGE 1 IN SITU TREATMENT TRIALS

5.1.1 EXPLANATORY PARAMETERS

Explanatory parameters such as DO, ORP, dissolved organic carbon (DOC), pH, and alkalinity are characteristics of a specific environment that describe conditions in the context of how these parameters can affect the chemical reactions taking place. These parameters, when in specific ranges, can be used to predict and/or promote certain reactions in the aquatic environment.

In the ABM Lake pilot-scale trials, reducing conditions are targeted to promote the reduction of sulphate, selenium, and uranium and the subsequent precipitation of COPs as sulphide minerals. Reducing conditions are indicated by low DO concentrations (typically less than 1 mg/L) and depressed ORP values (Christensen et al., 2000). Measurements taken at different depths of the water column (Section 4.5.1) show that measurements were consistent through the water column (Appendix B, Table B1-1). Therefore, further discussion of DO and ORP are for measurements from the middle of the water column. At the start of the experiment, all trials were characterized as aerobic (oxidizing) environments (DO greater than 1 mg/L and ORP greater than +50 mV). Reducing conditions were achieved by the first sampling event (Week 2), with DO concentrations ranging from 0.04 to 0.08 mg/L (Figure 5-1) and ORP ranging from -164 to -42 mV (Figure 5-2), for all carbon dosed trials except for the cold-temperature Trial 5, which had an ORP that remained above +90 mV until Week 14. Cold temperature trials achieved reducing conditions by Week 14, with the longer time period expected based on slower microbially mediated reactions at cold temperatures.

Room temperature carbon-dosed trials experienced an increase in DO and ORP at Weeks 4 to 6 (Figure 5-1 and Figure 5-2), coincident with the consumption of dosed carbon (Figure 5-3), indicating that some re-oxygenation was occurring from the atmosphere. The DOC in the room temperature carbon amended trials had been mostly consumed by Weeks 4 to 6, while DOC in the cold temperature Trial 5 was consumed by Week 8 reflecting the slower microbially mediated reactions at cold temperatures (5°C). As such, a second glycerol dose was added to all carbon amended trials (Trial 1 to 6) in Week 11, and reducing conditions were re-achieved in Trials 2 to 6 from Week 14 to 16 (Figure 5-1 and Figure 5-2). The spike in DOC at Week 12 reflects the additional glycerol added in Week 11, which is mostly consumed by Week 14 to 16 in the room temperature trials and by Week 18 in Trial 5, coinciding with reducing conditions in the trials. Carbon was no longer added after Week 11 and the trials became carbon limited over time. Reducing conditions (i.e., DO less than 1 mg/L) generally persisted for 6 to 8 weeks following each carbon dose. This relatively short duration is a function of the size of the pilot-scale trials which had a water column depth of approximately 0.7 m. This relative short depth allows for more rapid infiltration of atmospheric oxygen throughout the water column. ABM Lake will be considerably deeper, allowing for greater protection of deeper treated water from the atmosphere and so extending the period over which the majority of lake water will be reducing. Furthermore, carbon injections would be timed to occur prior to ice formation on the lake. This will provide a barrier to oxygen ingress and allow for reducing conditions to persist over many months rather than the 6-8 weeks observed in the laboratory trials. Further discussion of the conceptual implementation of *in situ* treatment of ABM lake are provided in Section 7.

In the control trials (Trials 7 and 8) the DO had not changed substantively after 34 weeks of monitoring and the ORP was reflective of oxidizing conditions, consistent with the lack of carbon added to these control experiments. The baseline DOC in the tap water was approximately 3 mg/L, as noted in the controls Trials 7 and 8 (Figure 5-3).

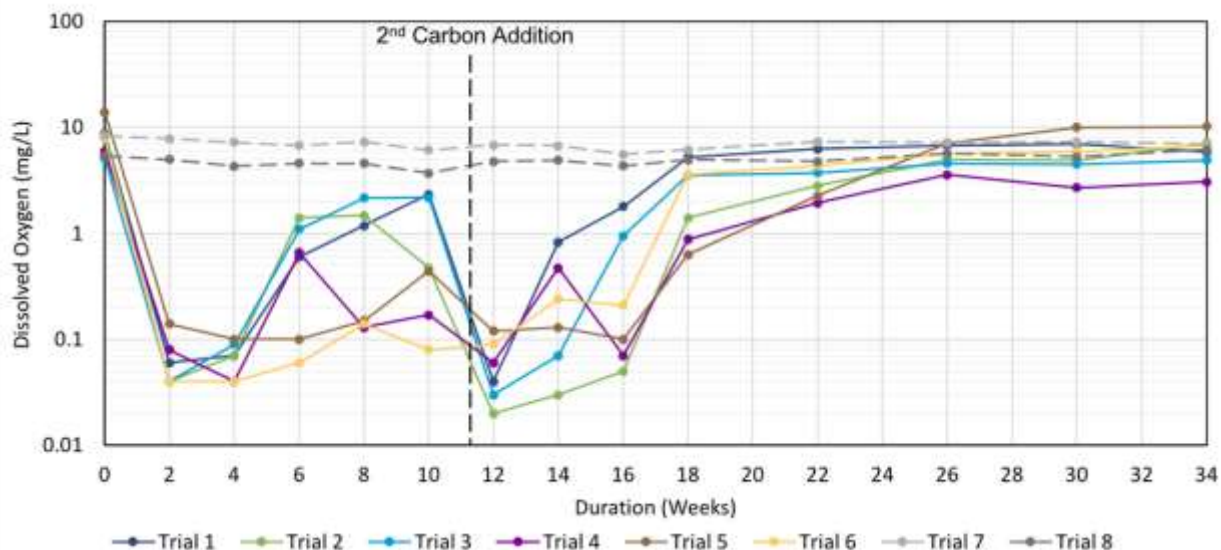


Figure 5-1: Dissolved Oxygen Values in the Pilot-scale Trials Stage 1 from Weeks 0 to 34

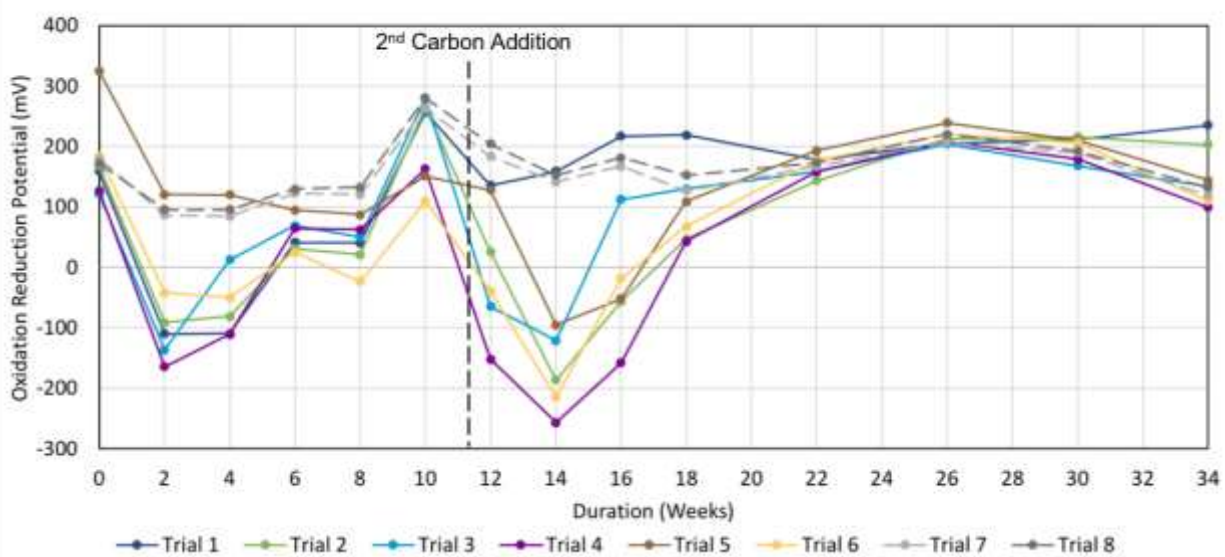


Figure 5-2: Oxidation Reduction Potential Values in the Pilot-scale Trials Stage 1 from Weeks 0 to 34

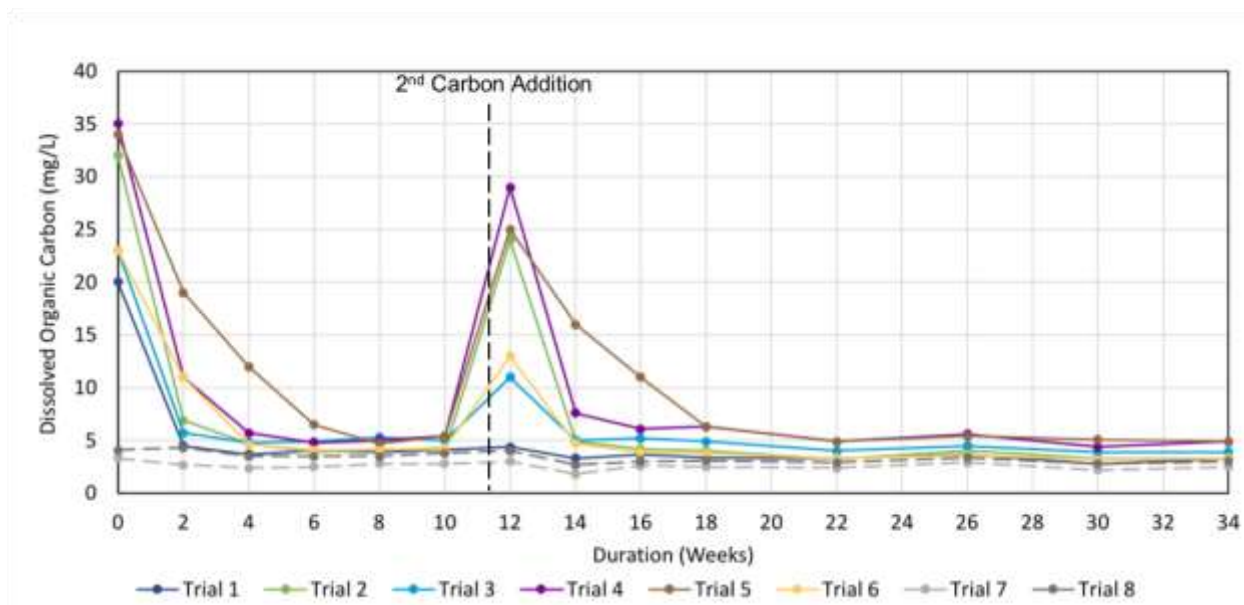


Figure 5-3: Dissolved Organic Carbon Concentrations in the Pilot-scale Trials Stage 1 from Weeks 0 to 34

The initial pH of the trials ranged between 6.9 and 7.4 (Figure 5-4). Once reducing conditions were established (Week 2), the pH of Trials 1 through 6 decreased to between 6.3 and 6.5 by Week 4. This is likely due to the production of organic acids (e.g., acetate) during the oxidation of glycerol. The pH in Trials 1 through 6 remained between 6.2 and 6.6 until Week 18, after which the pH increased slowly to between 6.6 and 7.2 by Week 34. The pH of the control Trials 7 and 8 showed limited variation and largely maintained their initial pH through the trials (pH 7.2 and 7.0, respectively). Higher pH is expected in the full-scale implementation of *in situ* treatment in ABM Lake. Fault Creek water is the largest single contributor to ABM Lake, suggesting the pH of ABM Lake will be similar to that of Fault Creek (7.2 to 8.2; median 7.8; AEG, 2019a) which is higher than the pH of the control Trials 7 and 8. Furthermore, minimal pH decrease is expected following glycerol addition to ABM Lake since it would take place over a number of weeks allowing the system to adequately buffer the effects of any intermediate organic acid production, versus the pulse addition used in the pilot-scale trials.

Acidity from the formation of these intermediate organic acids was adequately buffered by the alkalinity formed as a by-product of the mineralization of organic carbon by sulphate-reducing bacteria. The alkalinity concentrations in all trials except Trial 1 remained relatively stable until the second glycerol addition in Week 11, at which point alkalinity increased in Trials 2, 3, 4, 5, and 6 (Figure 5-5). Alkalinity in Trials 2, 3, 4, and 6 remained stable from Week 14 to 18 through to Week 34, while alkalinity in Trial 5 remained stable after Week 22. Trial 1, on the other hand, decreased by approximately 20 mg/L between Weeks 4 and 6, and then increased after the second glycerol addition and remained stable through to Week 34 (Figure 5-5). As expected, alkalinity levels increased more slowly in the cold temperature Trial 5, corresponding with slower organic carbon depletion. Alkalinity in Trials 7 and 8 also increased slightly over time, indicating an inherent microbial activity and subsequent organic carbon mineralization.

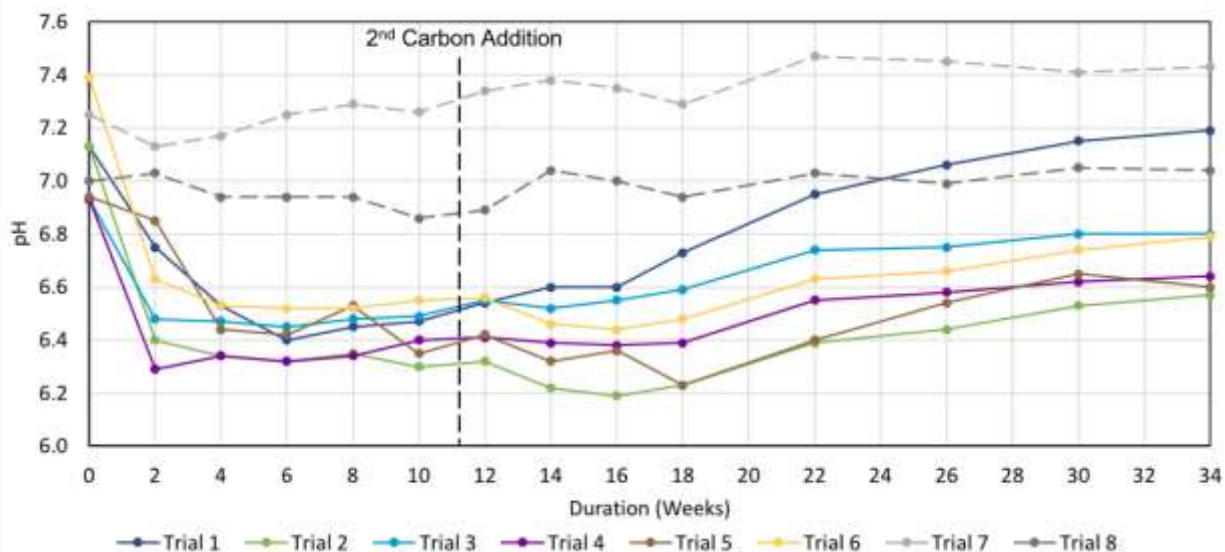


Figure 5-4: pH Values in the Pilot-scale Trials Stage 1 from Weeks 0 to 34

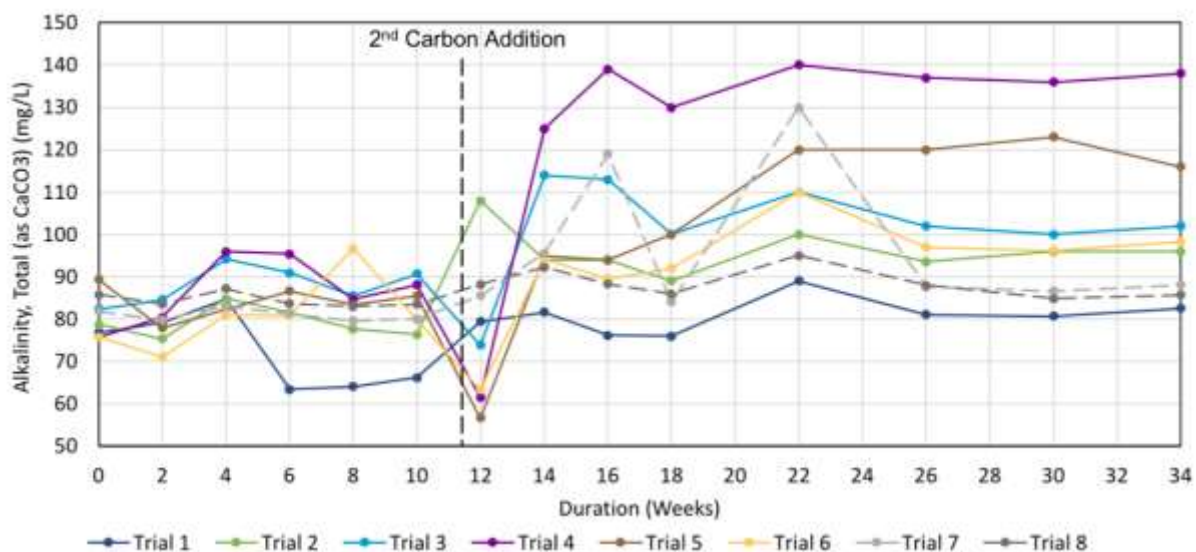


Figure 5-5: Alkalinity Concentrations in the Pilot-scale Trials Stage 1 from Weeks 0 to 34

5.1.2 MANGANESE AND IRON

Manganese and iron are important indicators of microbial activity and of the achievement of reducing conditions, shown by increases in dissolved manganese and ferrous iron concentrations (Londry, 2013). As manganese and iron are held in the substrate as (hydr)oxides, the development of more reducing conditions typically result in their transient release as the host phases are dissolved under manganese- and iron- reducing conditions.

In the pilot-scale test work completed up to Week 34 (Stage 1), dissolved and total manganese concentrations were comparable (Figure 5-6), indicating that the bulk of the manganese in the water is in the dissolved form. The trials containing 10 kg of soil (Trials 3, 4, and 8) had higher initial manganese content in the water due to some manganese release from the soil. Manganese concentrations gradually increased in the glycerol spiked trials (Trials 1 through 6) as manganese-reducing conditions were established, resulting in some dissolution of oxidized manganese minerals in the rock and/or soil substrate added to each trial. Following consumption of the added DOC (Week 16 to 18), dissolved manganese concentrations slowly decreased in all carbon amended trials, except Trial 6 in which dissolved manganese continued to rise slowly. Manganese concentrations slowly declined in the control Trial 7, as the dissolved manganese slowly oxidized, likely forming manganese (oxyhydr)oxide phases that settled out of the water column. Manganese concentrations declined in the control Trial 8 until Week 22 and slowly increased until Week 34. The mechanism for this increase is unclear; however, the 10 kg soil mass added to control Trial 8 likely included labile organic carbon which may foster reducing niches within the saturated soil, causing the release of a portion of the precipitated manganese back into solution.

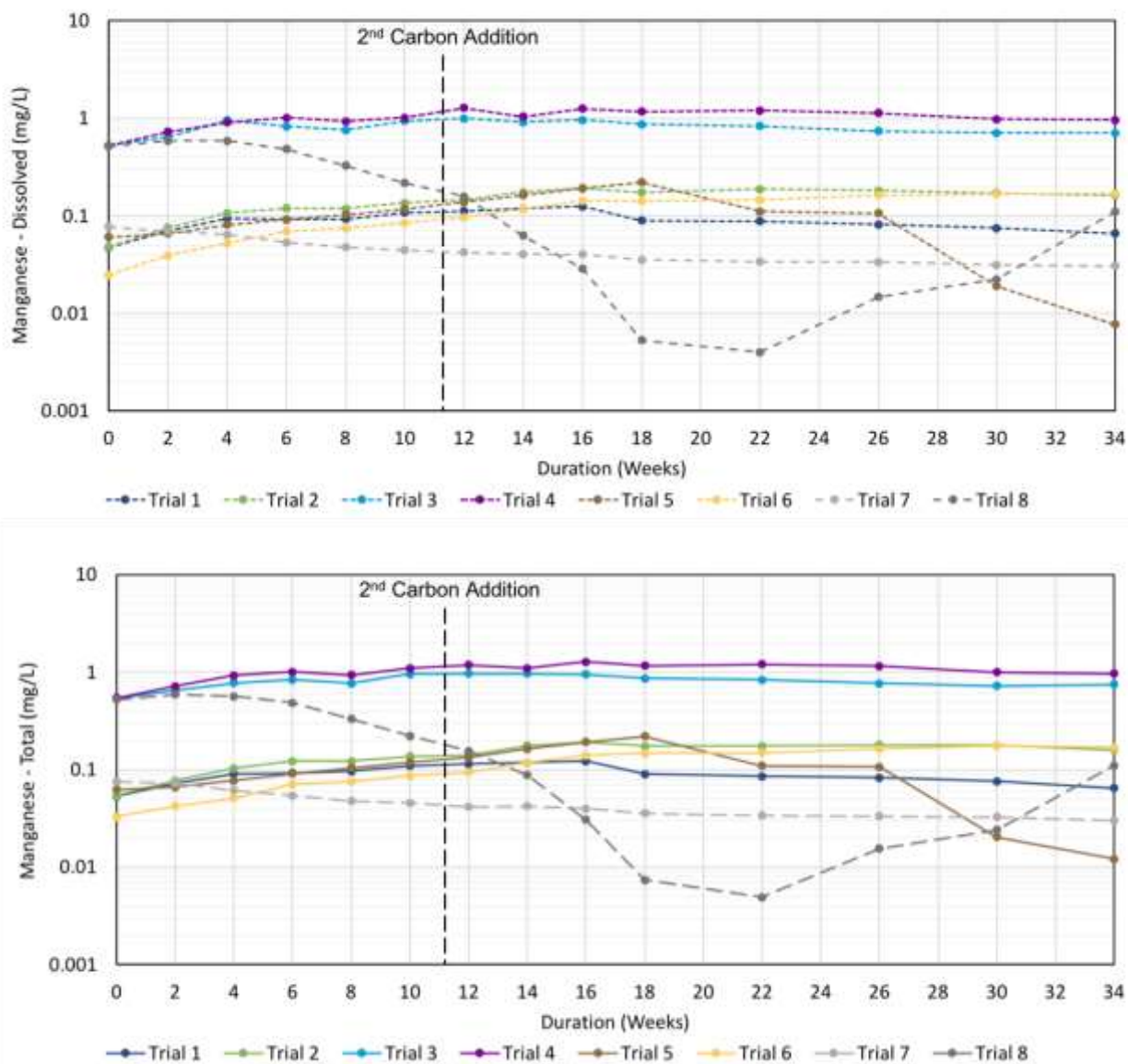


Figure 5-6: Dissolved and Total Manganese Concentrations in the Pilot-scale Trials Stage 1 from Weeks 0 to 34

The larger soil addition to Trials 3, 4, and 8 (control) is expected to provide a source of reducible iron to the system that may assist in metals removal and extend treatment longevity by creating a pool of labile iron sulphide that acts as a redox buffer to the ingress of oxidants. Dissolved iron concentrations comprised a small fraction of the total iron content at the start of the trials (Figure 5-7) as particulate oxidized iron (total) phases dominated the iron present in the water column. Once the trials were amended with glycerol, there was a marked increase in dissolved iron at Weeks 2 and 4 in all the room temperature trials (Trials 1 to 4 and 6). This was generally coincident with a peak in dissolved ferrous iron (Figure 5-8), indicative of the development of iron (III)-reducing conditions. Trials 3 and 4 had

the highest dissolved iron and ferrous iron concentrations during reducing conditions due to the increased leachable iron from the soil. However, by Weeks 14 to 16, Trial 5 dissolved iron and ferrous iron concentrations were more similar to Trials 3 and 4.

Dissolved iron and ferrous iron concentrations declined over Weeks 6 to 10 in the room temperature carbon amended Trials 1 through 4, consistent with re-oxygenation and the resulting oxidation of ferrous iron to ferric iron, which is highly insoluble at the circumneutral pH of the trials. Only a moderate decline in dissolved iron over the same period was noted for Trial 6 (the 10x water quality model concentration trial), which appeared to exhibit limited re-oxidation over this period based on its lower DO and ORP values (Figure 5-1 and Figure 5-2). Conversely, in Trial 5 (5°C) dissolved iron and ferrous iron increased between Weeks 6 and 10, as, due to the slowed consumption of organic carbon at the lower temperature, the trial was not as affected by the oxidizing conditions.

Dissolved iron and ferrous iron concentrations increased following the carbon top-up in Trials 2 to 6, which then declined again after DOC was consumed. Dissolved and ferrous iron concentrations were elevated between Weeks 12 to 16 for the room temperature Trials 2 to 4, and Weeks 14 to 18 for the cold temperature Trial 5. Dissolved iron concentrations were elevated between Weeks 14 to 16 for Trial 6, while low ferrous iron concentrations (approximately 0.07 mg/L), persisted until Week 22. Dissolved iron concentrations in Trial 1 increased to a lesser degree compared to the other trials following the carbon top-up. However, ferrous iron concentrations were not measured in Trial 1 following the carbon top-up, which coincides with no measurable DOC. Therefore, Trial 1 did not re-establish strong reducing conditions following the carbon top-up. As the dissolved iron concentrations slowly decreased after the consumption of DOC, the total iron concentrations in Trials 1 to 6 slowly decreased as oxidized iron forms precipitated and settled.

The control Trials 7 and 8 contained very little dissolved iron (less than 0.01 mg/L) and no detectable ferrous iron, consistent with their predominantly oxidizing conditions in the absence of carbon amendment. Total iron concentration in the control Trials 7 and 8 decreased slowly as the predominantly oxidized forms of iron settled.

The total iron concentrations in each carbon dosed trial showed relatively little overall net change while these trials were reducing, suggesting that little iron was removed from the water column under reducing conditions.

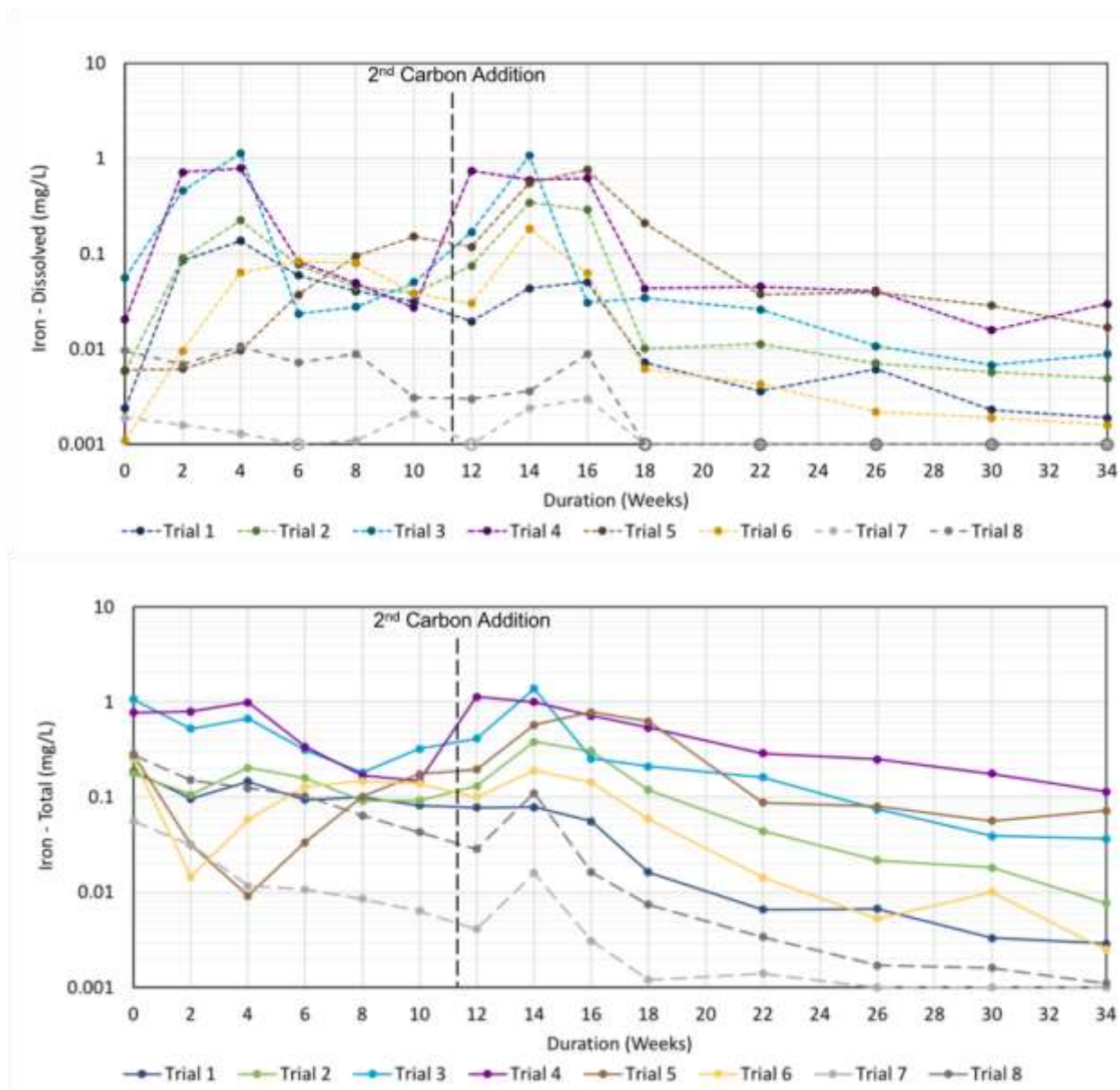


Figure 5-7: Dissolved and Total Iron Concentrations in the Pilot-scale Trials Stage 1 from Weeks 0 to 34

Measurements less than the detection limit of 0.001 mg/L are indicated by a hollow marker.

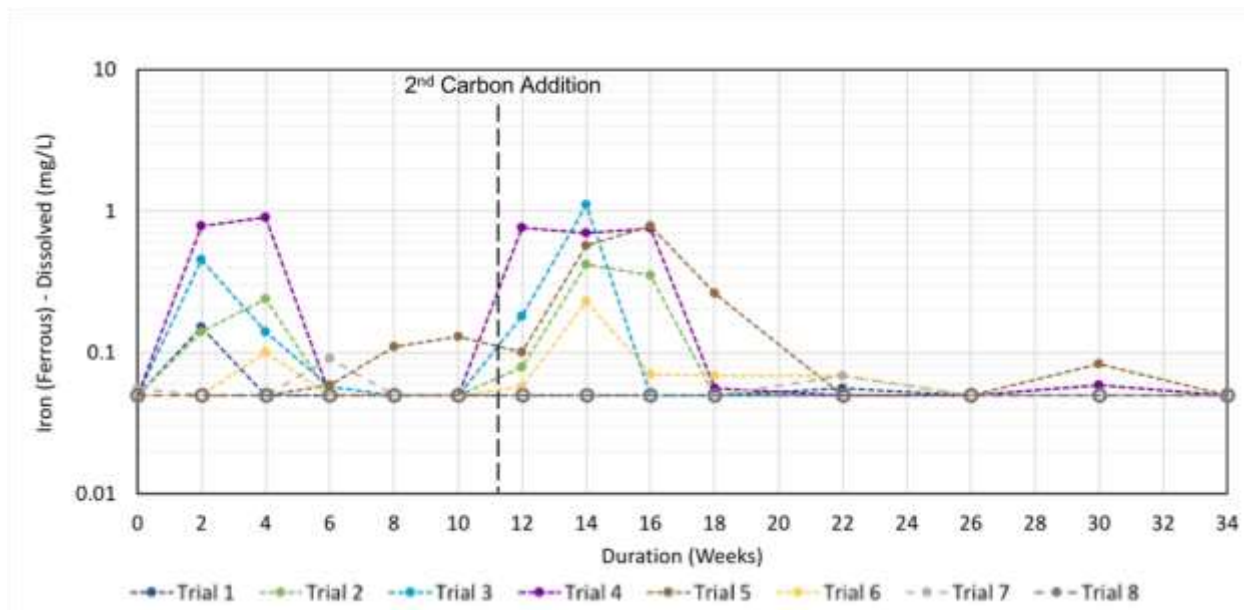


Figure 5-8: Dissolved Ferrous Iron Concentrations in the Pilot-scale Trials Stage 1 from Weeks 0 to 34

Measurements less than the detection limit of 0.05 mg/L are indicated by a hollow marker.

5.1.3 SULPHUR SPECIES

The sulphate and sulphide concentrations in the water are an important marker to identify COPI removal, which is driven by sulphide mineral precipitation. Generally, sulphate concentrations remained relatively stable in all trials for the first 12 Weeks of operation (Figure 5-9), but declined by ~15% in Trials 3 and 4 by Week 34, coincident with a marked increase in sulphide concentration (Figure 5-10). The appearance of detectable sulphide concentrations in the four to six weeks following each carbon injection (i.e., Weeks 2, 4, 12, 14, and 16) is indicative of the development of sulphate-reducing conditions in the carbon amended trials. However, Trial 5 produced appreciable amounts of sulphide only after the carbon top-up. Sulphide production in Trial 6 was generally delayed and resided longer after the first carbon addition compared to the other trials, which coincides with the elevated dissolved iron concentrations in its water. Relatively low (typically less than 5.6 mg/L) sulphide concentrations and low percent removal of sulphate have been observed to date and are expected since extensive sulphate reduction was not targeted as part of the carbon dose calculations. Sulphide is not anticipated to persist due to its precipitation with dissolved chalcophile elements (e.g., cadmium, copper, zinc), reaction with solid phase iron in the soil and/or rock in each trial to form iron sulphide phases, and oxidation by the slow ingress of oxidized constituents (e.g., DO) over time. As expected, no sulphide was detected in the control Trials 7 and 8.

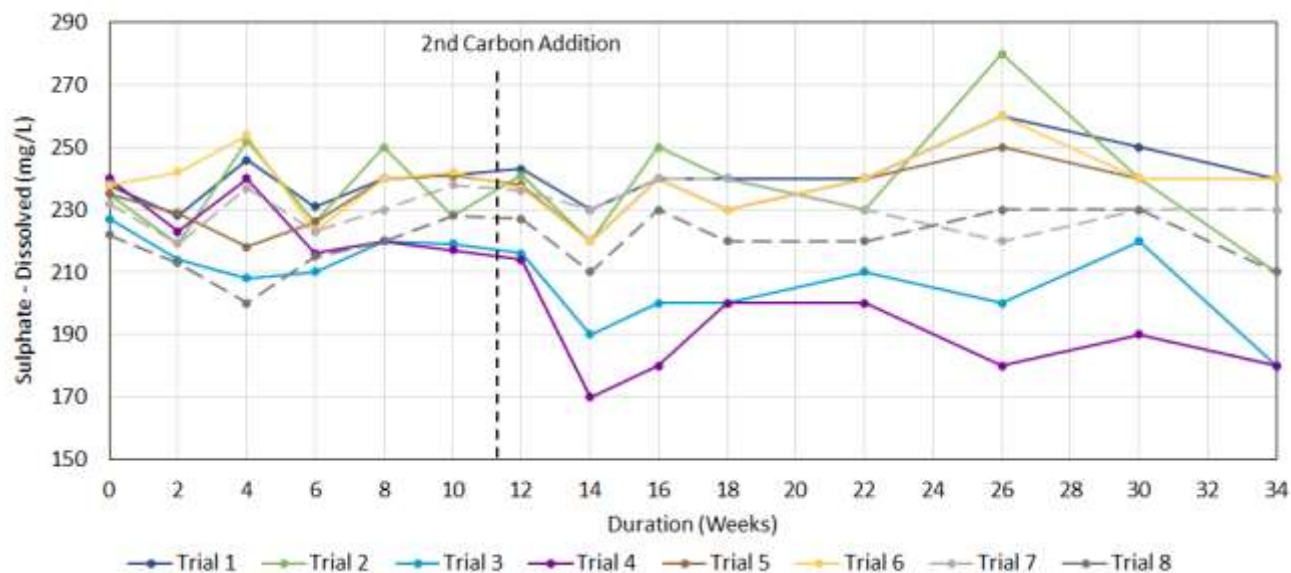


Figure 5-9: Sulphate Concentrations in the Pilot-scale Trials from Weeks 0 to 34

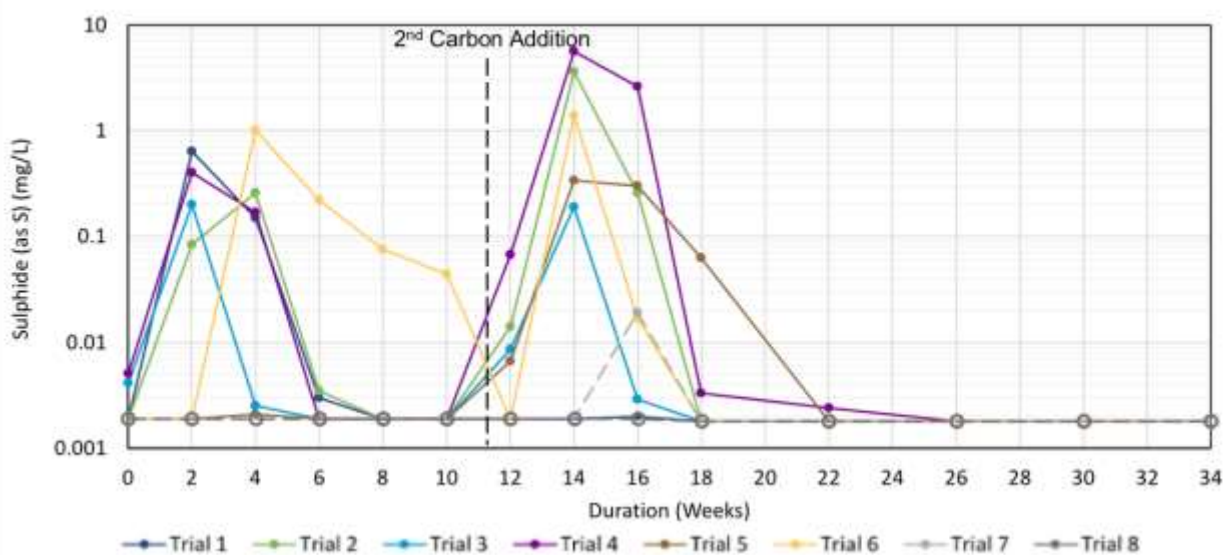


Figure 5-10: Sulphide Concentrations in the Pilot-scale Trials from Weeks 0 to 34

Measurements less than the detection limit of 0.0019 mg/L are indicated by a hollow marker.

5.1.4 CONSTITUENTS OF POTENTIAL INTEREST

Figures showing the change in COPI concentrations also display the “treatment target” for reference (Table 3-3). These concentrations correspond to the concentrations used in the water quality model following the implementation of *in situ* treatment in ABM Lake (i.e., these are the post-*in situ* treatment concentrations; AEG, 2018).

5.1.4.1 Antimony, Cadmium, Copper, Lead, and Zinc

Reducing conditions also triggered concurrent decreases in chalcophile and sulphide-forming COPIs, namely cadmium, zinc, copper, lead, and antimony (Figure 5-11 to Figure 5-15, respectively; Appendix B, Table B2-1). Treatment for COPIs cadmium, copper, and zinc are discussed in this report in terms of treatment of dissolved concentrations to be comparable against the dissolved concentration treatment targets (consistent with the dissolved form of these elements used for water quality objectives in the receiving environment; AEG and Minnow Environmental, 2020). Following the second carbon addition in Week 11, concentrations of COPIs were generally at their lowest by Week 14 (Figure 5-11 to Figure 5-15). These initial results indicate the formation of poorly soluble mineral phases, such as sulphide minerals greenockite (CdS), covellite (CuS), galena (PbS), and sphalerite (ZnS), for cadmium, copper, lead, and zinc, respectively.

Dissolved concentrations for cadmium, zinc, and copper increased as conditions became more oxidizing; however, concentrations remained below starting concentrations by Week 34 (Table 5-1; Figure 5-11 to Figure 5-13, respectively). Furthermore, percent removal compared to the control at Week 34 (Table 5-1) showed some residual treatment for cadmium, copper (except Trial 1), and zinc (except Trial 1 and 5) despite conditions becoming more oxidizing. Conversely, lead removal was different than the other chalcophiles. By Week 34, the 10 kg soil amended Trials 3 and 4 performed better compared to the respective 0.01 kg soil Trials 1 and 2 due to sorption of lead to the much larger soil mass (Table 5-1; Figure 5-14). However, during reducing conditions, removal of cadmium, copper, and zinc was comparable between the 10 kg and 0.01 kg soil trials as they are removed through the same treatment mechanisms (Table 5-1; Section 5.2).

Discrete antimony sulphide minerals are not expected to form under the conditions observed in the carbon amended trials, and as such, the decreases in antimony experienced in the carbon amended trials (Figure 5-15), and in control Trial 8, suggests co-precipitation with, or sorption on, other sulphide minerals (Section 5.2). The treatment target was achieved for Trials 2, 3, and 4 and maintained up to Week 34 (Figure 5-15). Trials 1, 5, and 6 treated antimony below the treatment target in reducing conditions at Week 14, which were not maintained to Week 34 as Trials 1 and 6 were carbon limited and Trial 5 was at lower temperatures (Figure 5-15).

Overall, the maximum percent removal assumed in the water quality model for cadmium, zinc, copper, lead, and antimony was met or exceeded during reducing conditions in all trials (Figure 5-11 to Figure 5-15, respectively).

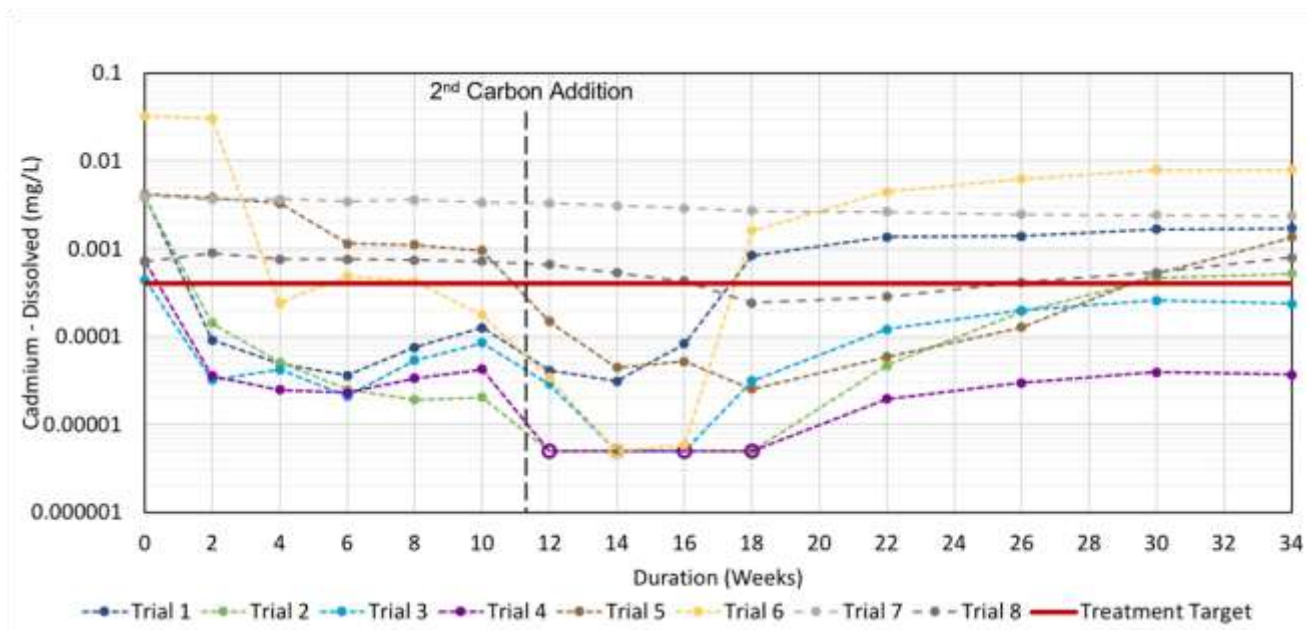


Figure 5-11: Dissolved Cadmium Concentrations in the Pilot-scale Trials from Weeks 0 to 34

Measurements less than the detection limit of 0.000005 mg/L are indicated by a hollow marker.

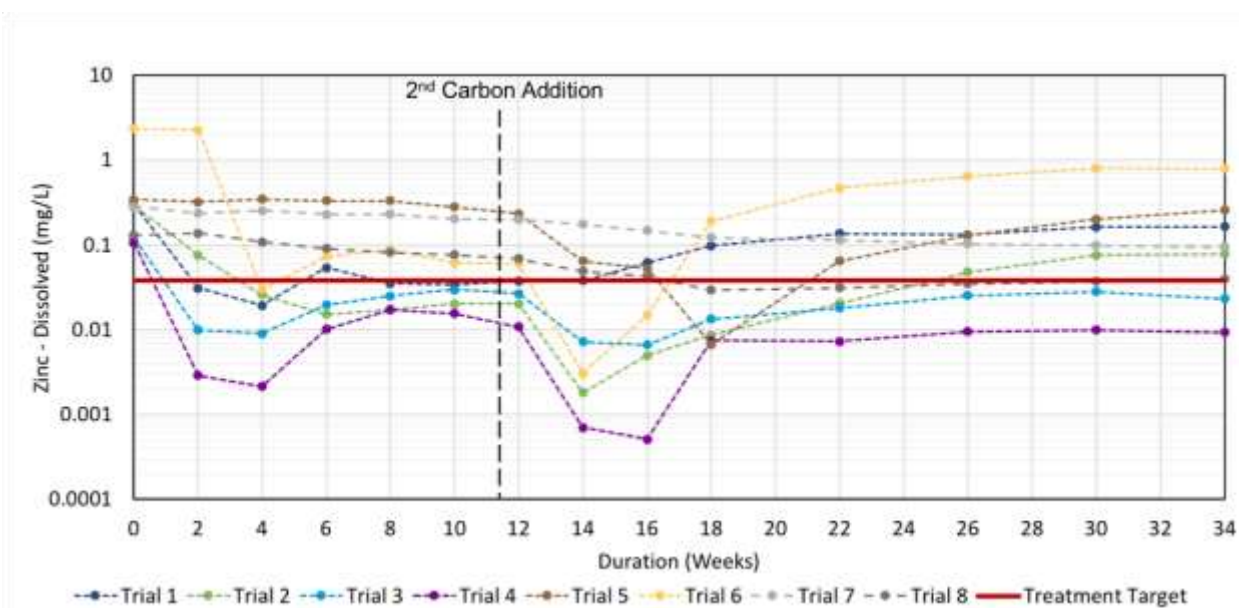


Figure 5-12: Dissolved Zinc Concentrations in the Pilot-scale Trials from Weeks 0 to 34

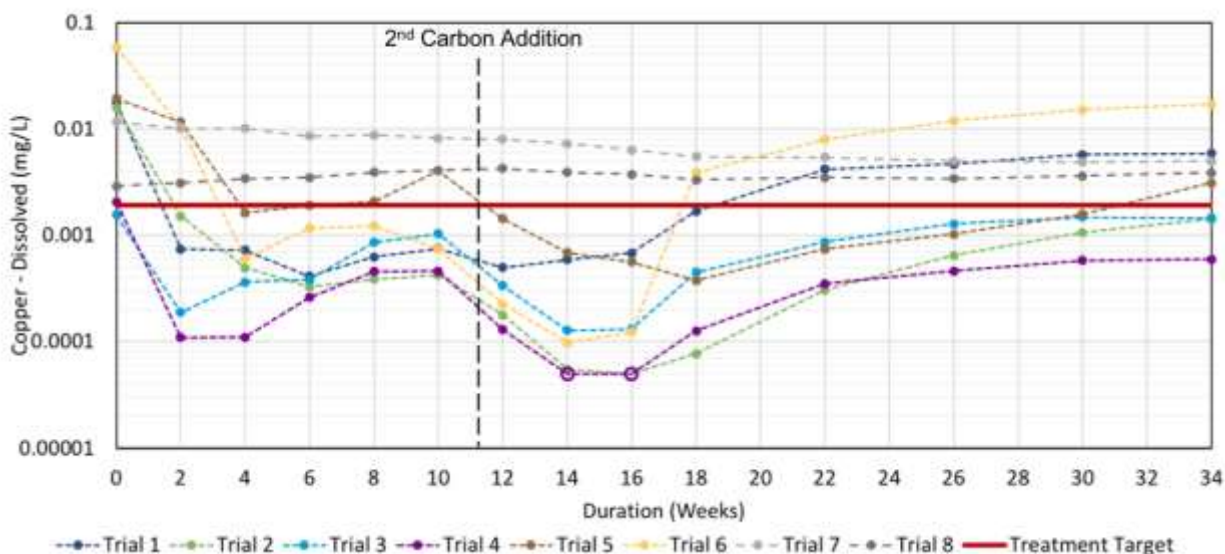


Figure 5-13: Dissolved Copper Concentrations in the Pilot-scale Trials from Weeks 1 to 34

Measurements less than the detection limit of 0.00005 mg/L are indicated by a hollow marker.

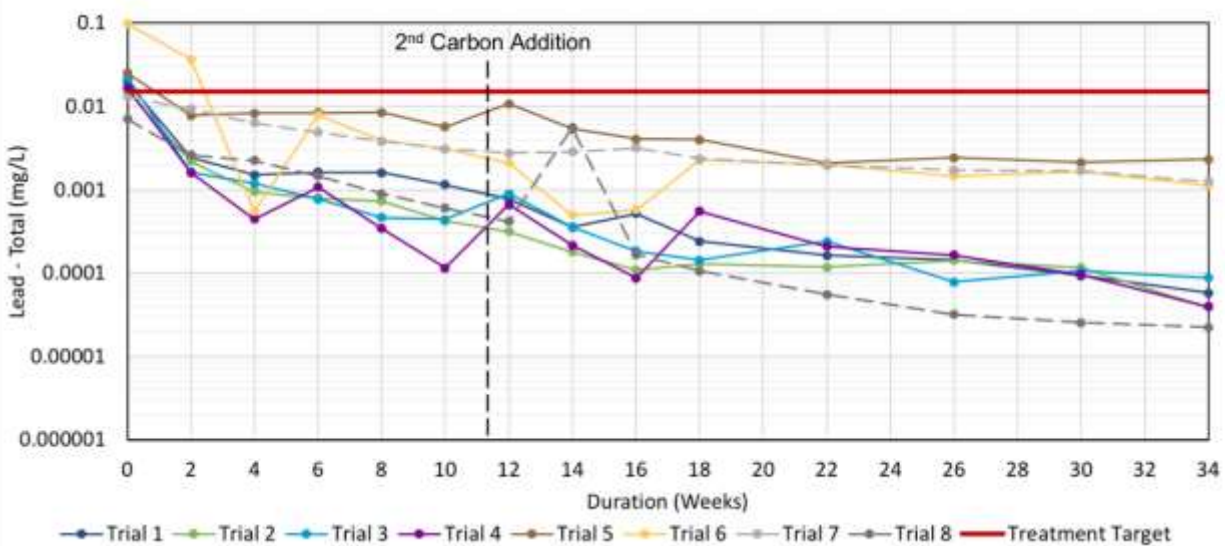


Figure 5-14: Total Lead Concentrations in the Pilot-scale Trials from Weeks 0 to 34

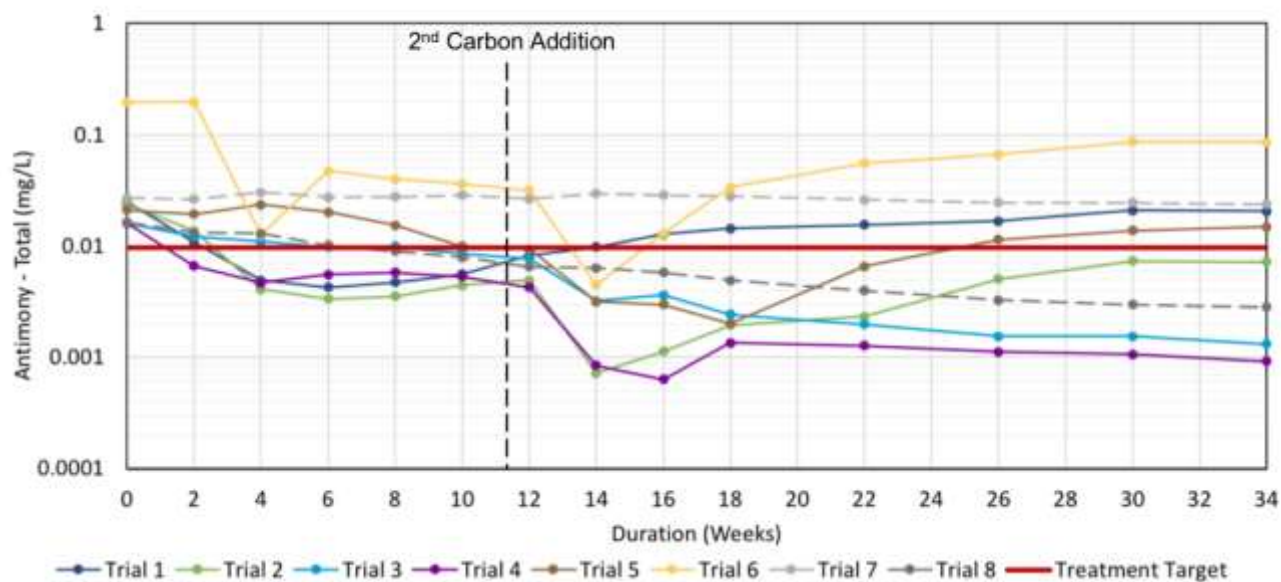


Figure 5-15: Total Antimony Concentrations in the Pilot-scale Trials from Weeks 0 to 34

Table 5-1: Percent Removal of Constituents of Potential Interest Compared to the Control Experiment for Trials 1 to 5

COPI	Units	Percent Removal ¹										
		Removal Assumed in Water Quality Model (AEG, 2018)	Trial 1		Trial 2		Trial 3		Trial 4		Trial 5	
			Max ²	Week 34 ³	Max	Week 34	Max	Week 34	Max	Week 34	Max	Week 34
Total Antimony	mg/L	50%	84%	13%	98%	70%	53%	53%	89%	67%	93%	37%
Total Arsenic	mg/L	0%	-14%	-214%	-4%	-199%	-89%	-89%	-129%	-287%	-2%	-201%
Dissolved Cadmium	mg/L	90%	99%	27%	>99%	78%	99%	70%	99%	95%	99%	43%
Dissolved Copper	mg/L	90%	95%	-18%	99%	72%	97%	62%	99%	85%	93%	38%
Total Lead	mg/L	50%	95%	95%	97%	97%	94%	-295%	96%	-78%	16%	-86%
Total Selenium	mg/L	50%	86%	49%	89%	76%	74%	46%	81%	60%	74%	44%
Total Uranium	mg/L	50%	42%	20%	79%	62%	41%	38%	86%	68%	55%	26%
Dissolved Zinc	mg/L	90%	92%	-73%	99%	18%	93%	41%	99%	76%	95%	-170%

¹ Percent removal for Trials 1, 2, and 5 calculated against control Trial 7 at same time points. Percent removal for Trials 3 and 4 calculated against control Trial 8 at same time points. Negative percent removals indicate the concentration was greater than the respective control Trial 7 or 8. Consistent negative percent removal for arsenic is discussed further in Section 5.1.4.3. Negative percent removal observed at Week 34 in some trials for lead and zinc may partly be due to the slightly lower initial starting concentrations in the control trials. Trial 6 does not have a directly comparable control trial for the percent removal calculation as it was designed to contain ten times the metals concentrations of the predicted water quality model and was therefore omitted from this table.

² Maximum observed COPI removal throughout trial.

³ COPI removal at end of experiment (Week 34).

5.1.4.2 Selenium and Uranium

Selenium, which is less soluble as elemental selenium in the reduced state (i.e., low DO and ORP), remained generally stable in the control Trial 7, but decreased in control Trial 8, likely due to some sorption on the 10 kg of soil present in this trial (Figure 5-16; Appendix B, Table B2-1). In trials that were amended with organic carbon and operated at room temperature (Trials 1 through 4 and 6), selenium concentrations decreased in Week 2 (approximately 90% removal), increased slightly over Weeks 4 and 6, were stable until Week 12 and then increased slightly at Week 14 (Figure 5-16). In the cold temperature carbon amended trial (Trial 5), a decrease in selenium concentrations was not observed until Week 8 (Figure 5-16). Trials 1 to 5 met the treatment target during the experiment and Trials 2 to 4 were able to maintain treatment below the target concentration up to Week 34 (Figure 5-16). Trials 1 and 5 likely did not maintain treatment targets based on being carbon limited and at lower temperatures, respectively. Trials 3 and 4 likely maintained treatment targets under oxidizing conditions due to sorption onto soil, consistent with the decrease in selenium levels observed in the control Trial 8. In Trial 6, where the starting concentrations were 10 times that of the water quality model, selenium concentrations were lower than the control Trial 7 in Week 4, 12, and 16 to 18, but above for the other monitoring weeks (Figure 5-16). The lower concentrations of selenium observed in the carbon amended trials is likely due to precipitation of elemental selenium under reducing conditions (Section 5.2).

Uranium, which is less soluble as uraninite in a reduced state, remained generally stable in the control Trial 7, but decreased in control Trial 8 due to sorption on the 10 kg soil (Figure 5-17; Appendix B, Table B2-1). In trials that were amended with organic carbon (Trials 1 through 6), uranium concentrations declined over Weeks 2 and 4, stabilized until Week 10, then declined again following the second carbon addition (Figure 5-17). In the cold temperature carbon amended trial (Trial 5), a decrease in uranium concentrations following the second carbon addition occurred at Week 14, due to slower microbial activity at lower temperatures (Figure 5-17). Trials 2 to 4 met the treatment target during the experiment and were able to maintain treatment below the target concentration up to Week 34 (Figure 5-17). However, at Week 34, Trial 2 uranium concentrations approached the treatment target as it became carbon limited (Figure 5-17). Trials 3 and 4 likely maintained treatment targets under oxidizing conditions due to sorption onto soil, consistent with the decrease in uranium levels observed in the control Trial 8 (Figure 5-17). In Trial 6, where the starting concentrations were 10 times that of the water quality model, uranium concentrations remained above control Trial 7 concentrations to Week 34 (Figure 5-17). The lower concentrations of uranium observed in the carbon amended trials is likely due to precipitation of uraninite under reducing conditions (Section 5.2).

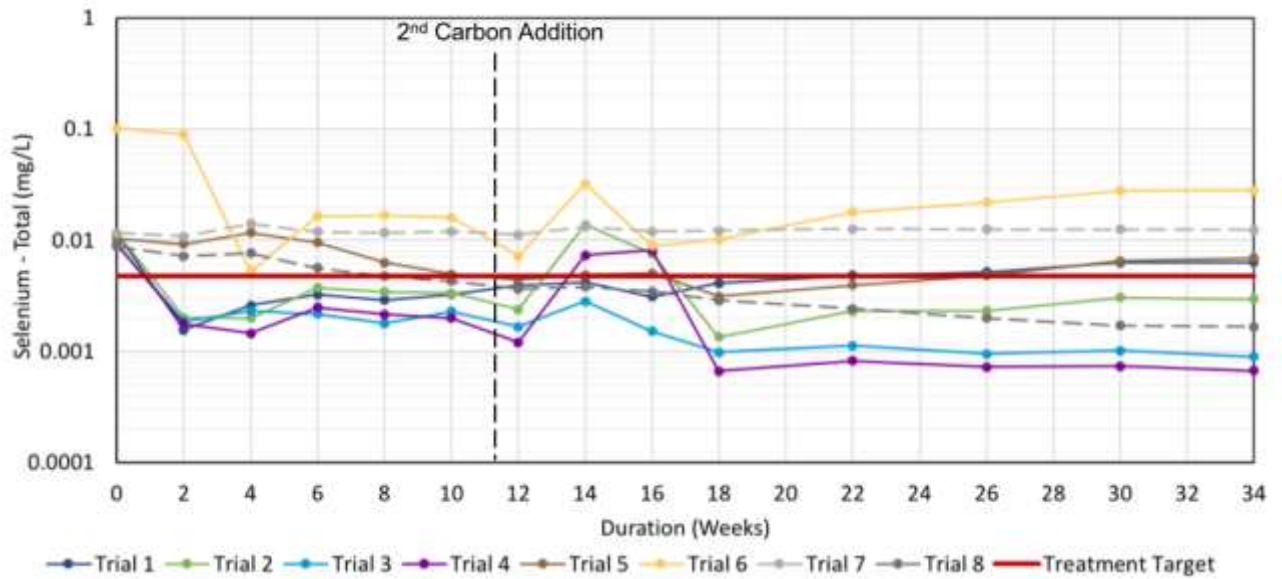


Figure 5-16: Total Selenium Concentrations in the Pilot-scale Trials from Weeks 0 to 34

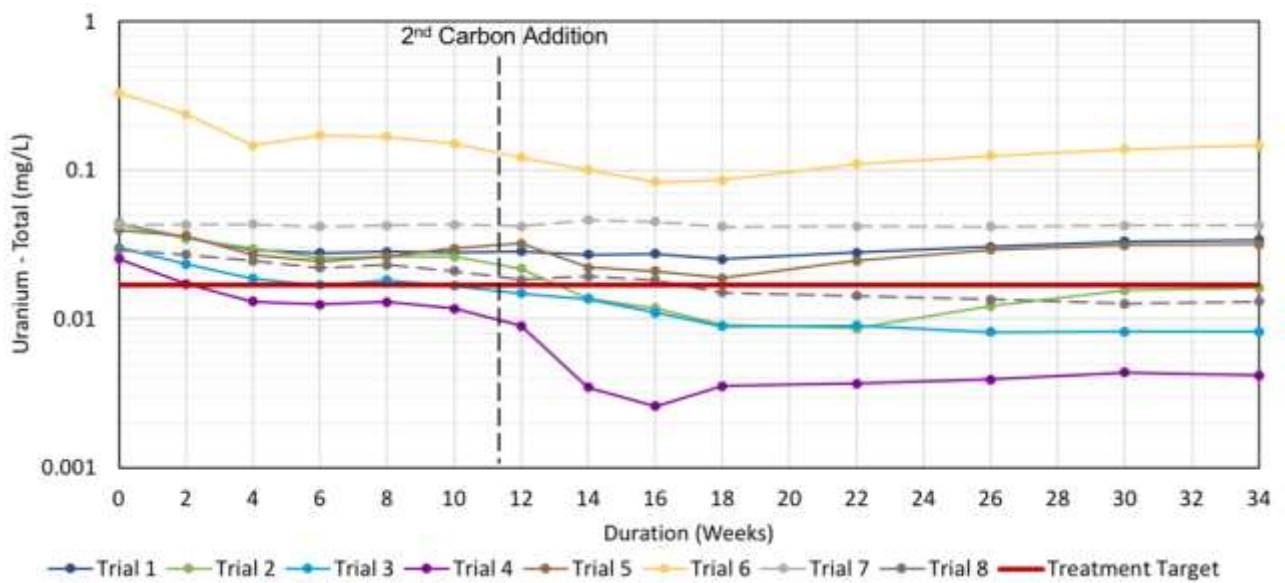


Figure 5-17: Total Uranium Concentrations in the Pilot-scale Trials from Weeks 0 to 34

5.1.4.3 Arsenic

Up to Week 34, arsenic did not experience significant removal compared to the control trials (Figure 5-18), which is consistent with predictions for these trials (Section 5.2). In fact, greater arsenic removal was observed in the control Trials 7 and 8 than in the carbon amended trials (Figure 5-18). This may be due to the formation of soluble thioarsenic species under the reducing conditions formed in the carbon amended trials, resulting in less sorption to the rock and soil surfaces within the barrels than that which occurred in the control trials.

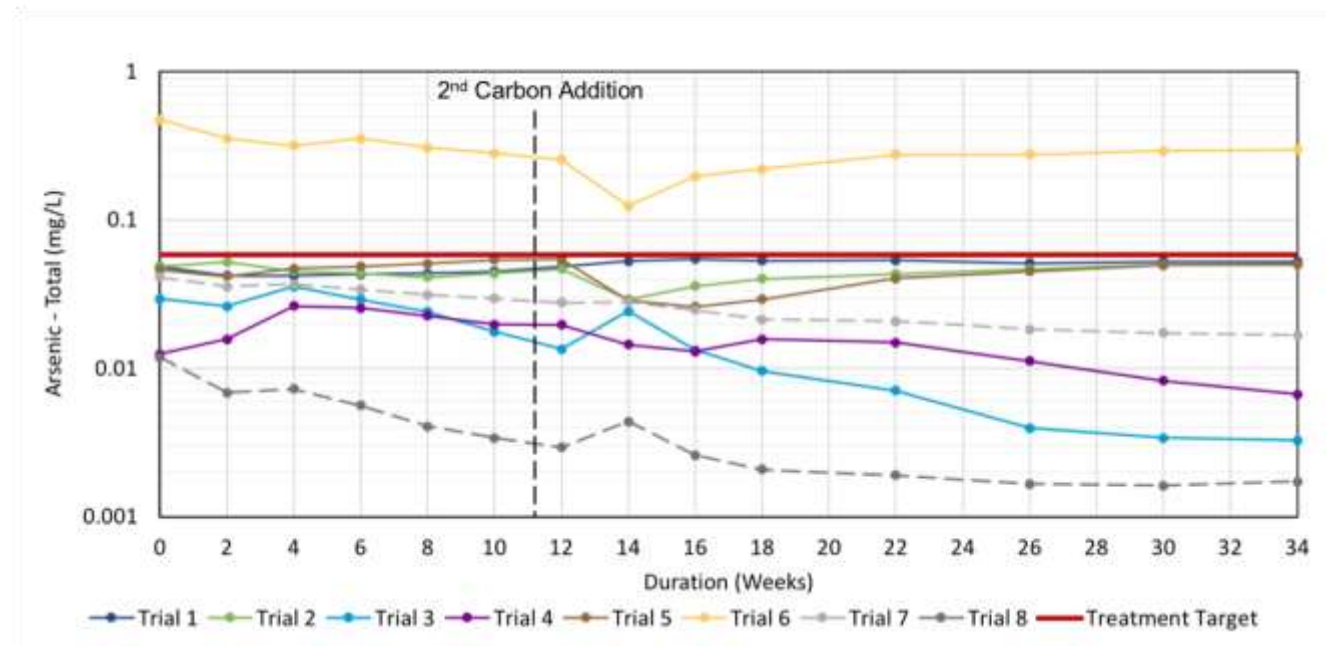


Figure 5-18: Arsenic Concentrations in the Pilot-scale Trials from Weeks 0 to 34

5.2 STAGE 2 *IN SITU* TREATMENT TRIALS

5.2.1 ARSENIC TREATMENT

Trials 1, 2, and 5 to 7 were repurposed after the initial 34-week test period for additional Stage 2 iron amendment barrel trials. The purpose of these tests was to determine arsenic removal in the presence of ferric iron supplemented to the trials under reducing or oxidizing conditions. Trials were either amended with soluble ferric iron prior to (Trials 1 and 5) or after carbon dosing (Trials 2 and 6) in a 10:1 (Trials 1 and 2) or 20:1 (Trials 5 and 6) Fe:As mass ratio to assess if the order influenced the extent of arsenic removal (Section 4.4.2).

5.2.1.1 *Ferric Addition Followed by Carbon Amendment*

Trials 1 and 5 were amended with ferric iron to observe arsenic removal under initial oxidizing conditions through sorption and co-precipitation of arsenic to iron (oxyhydr)oxide precipitates that will form following the addition of soluble ferric iron (O'Day, 2006). Carbon was added to these systems at Week 4 to assess whether the development of reducing conditions resulted arsenic re-mobilization due to dissolution of the host ferric (oxyhydr)oxide phase. Continued monitoring over the weeks following carbon addition were used to evaluate if any such arsenic release was a transient event and/or if further arsenic sequestration occurred due to removal with iron sulphides that will likely form under the sulphidic conditions stimulated by the carbon addition.

Trials 1 and 5 showed a 18% and 26% decrease in total arsenic (19% and 40% decrease in dissolved arsenic, respectively) through sorption to iron (oxyhydr)oxides over a four-week period (Table 5-2). Removal of dissolved arsenic in Trial 5 was greater than or similar to Trial 1, thus abiotic arsenic treatment processes were less affected by temperature and may have shown better removal due to the higher ratio of iron added to Trial 5. After Week 4, glycerol was dosed into Trials 1 and 5 and reducing conditions (DO less than 1 mg/L and ORP less than +50 mV) were achieved by Week 6 (Figure 5-19 and Figure 5-20). Arsenic and iron concentrations were observed to increase in Trials 1 and 5 as iron (oxyhydr)oxides were reduced (Figure 5-21 and Figure 5-22) and dissolved, releasing sorbed arsenic. Further removal of total arsenic was observed in Trials 1 and 5 following the initial release after carbon reduction, resulting in 42-45% decrease in total arsenic concentrations by the end of the Iron Addition Trial. Trial 1 continued to exhibit strongly reducing conditions at the end of the Stage 2 (Week 12) as evidenced by its negligible DO, low ORP and elevated concentrations of dissolved iron and sulphide at Week 12 (Figure 5-19, Figure 5-20, Figure 5-22, Figure 5-22, and Figure 5-23, respectively). This suggests that additional arsenic sequestration via sulphide precipitation (likely incorporated into iron sulphides) may be responsible. While not as strongly reducing as Trial 1, the polishing of arsenic concentrations in the latter weeks of Trial 5 may also be due to removal by precipitating sulphide phases, perhaps supplemented with sorption on iron (oxyhydr)oxides that start to re-precipitate as the system begins to re-oxidize.

Table 5-2: Percent Removal of Dissolved and Total Arsenic For Trials 1, 2, 5 and 6 during the Stage 2 *in situ* Treatment Trials

COPI	Percent Removal ¹ (Fe:As Mass Ratio)											
	Ferric addition at Week 0 under oxidizing conditions; Carbon addition after Week 4						Carbon addition at Week 0 to stimulate reducing conditions; Ferric addition after Week 4					
	Trial 1 (10:1)			Trial 5 (20:1)			Trial 2 (10:1)			Trial 6 (20:1)		
	Max ²	Week 4 ³	Week 12 ⁴	Max	Week 4 ³	Week 12 ⁴	Max ²	Week 4 ⁵	Week 12 ⁶	Max ²	Week 4 ⁵	Week 12 ⁶
Arsenic - Dissolved	44%	19%	44%	72%	40%	72%	56%	34%	3%	62%	40%	62%
Arsenic - Total	45%	18%	45%	42%	26%	42%	39%	36%	5%	66%	39%	63%

¹ Percent removal for Trials 1, 2, 5 and 6 calculated against the Week 0 concentration for each trial.

² Maximum observed arsenic removal throughout trial.

³ Arsenic removal during oxidizing conditions, pre-carbon addition (Week 4).

⁴ Arsenic removal during reducing conditions, post-carbon addition (Week 12).

⁵ Arsenic removal during reducing conditions, pre-ferric addition (Week 4).

⁶ Arsenic removal during reducing conditions, post-ferric addition (Week 12).

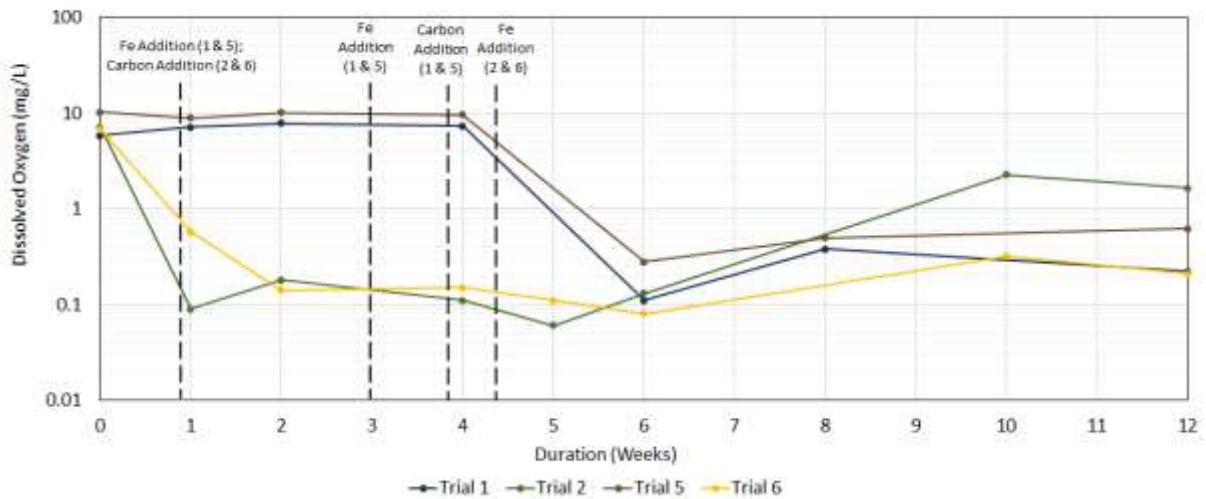


Figure 5-19: Dissolved Oxygen Concentrations in the Iron Addition Trials from Weeks 0 to 12

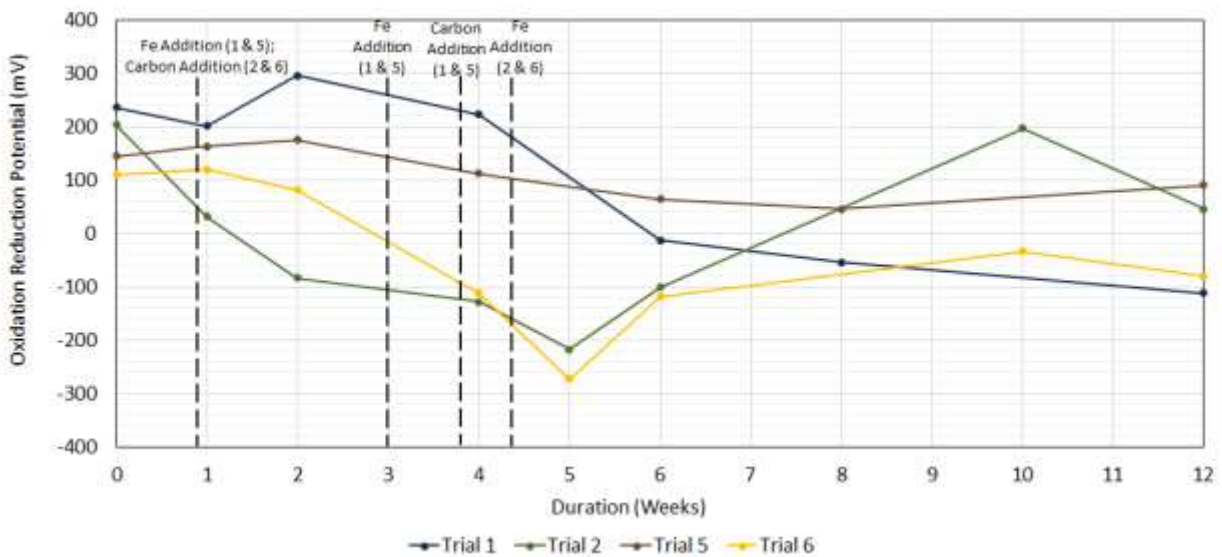


Figure 5-20: Oxidation-reduction Potential in the Iron Addition Trials from Weeks 0 to 12

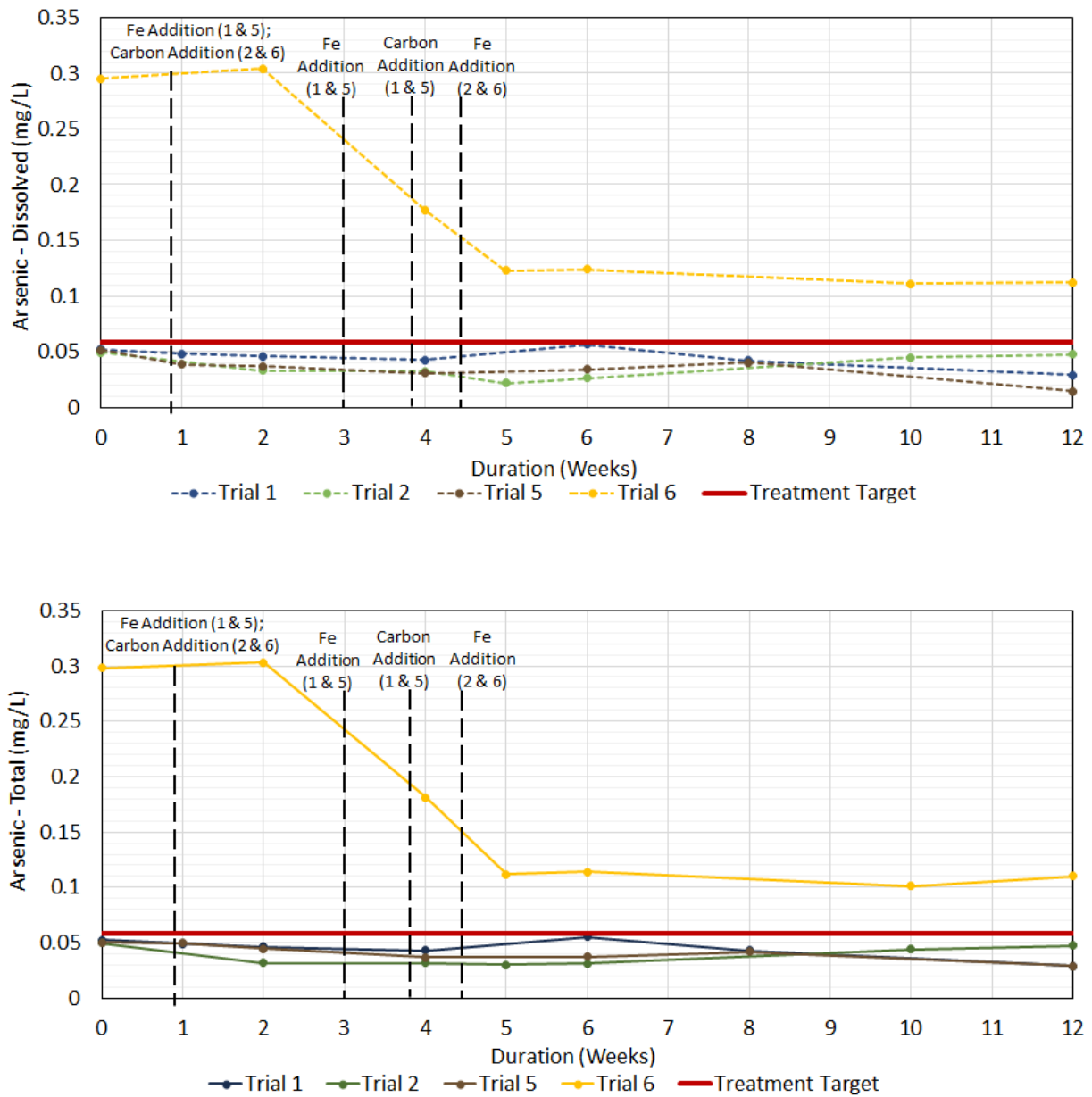


Figure 5-21: Dissolved (top) and Total (Bottom) Arsenic Concentrations in the Iron Addition Trials from Weeks 0 to 12

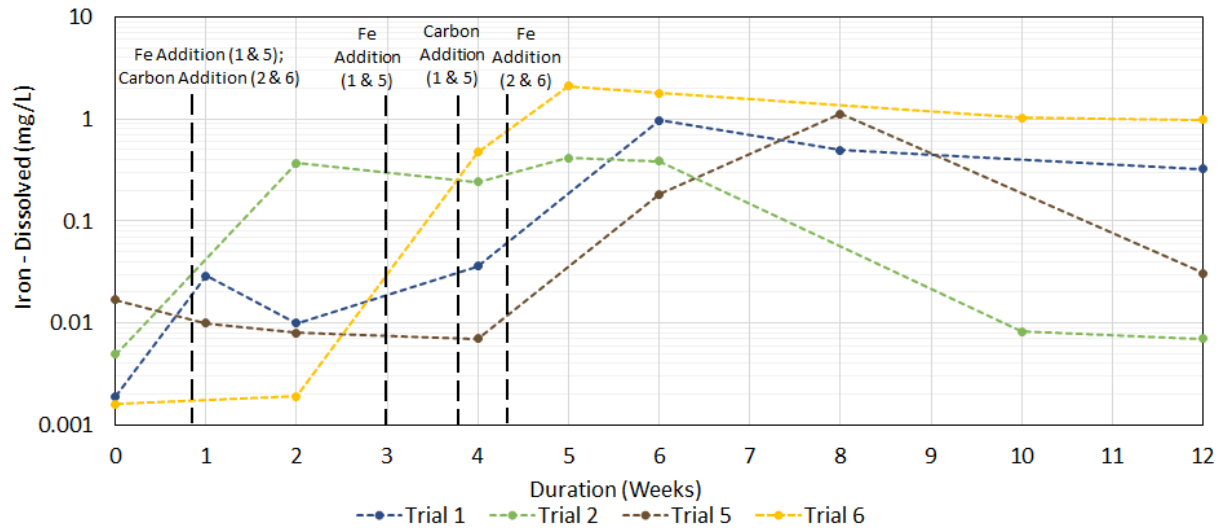


Figure 5-22: Dissolved Iron Concentrations in the Iron Addition Trials from Weeks 0 to 12

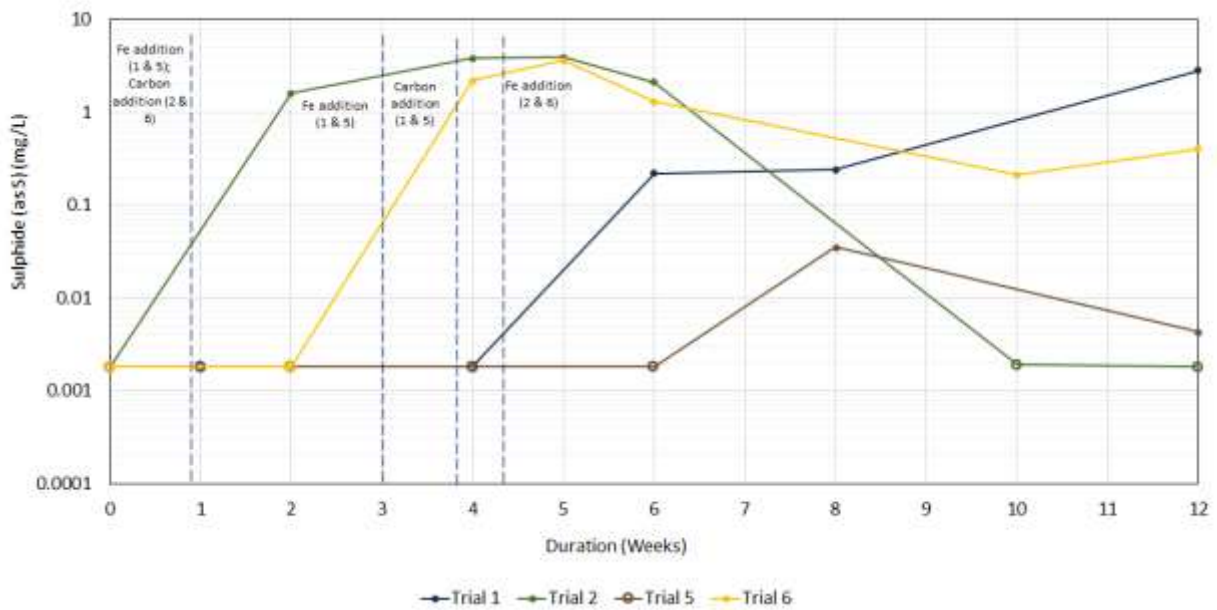


Figure 5-23: Sulphide Concentrations in the Iron Addition Trials from Weeks 0 to 12

Measurements less than the detection limit of 0.0018 mg/L are indicated by a hollow marker.

5.2.1.2 Carbon Amendment Followed by Ferric Addition

Trials 2 and 6 were amended first with carbon to induce reducing conditions before ferric iron was added. Arsenic removal under these conditions would be expected through sorption to iron monosulphides (e.g., mackinawite) and formation of arsenic sulphides (Edenborn et al., 1986; Moore et al., 1988; Sun et al., 2016). Trials 2 and 6 had become reducing by Week 2 and 4, respectively, as seen through low DO, ORP, increased dissolved iron and sulphide (Figure 5-19, Figure 5-20, Figure 5-22, and Figure 5-23, respectively). Trials 2 and 6 both showed a 36% and 39% decrease in total arsenic (34% and 40% decrease in dissolved arsenic) at Week 4 (Table 5-2). After ferric iron addition on Week 4, Trials 2 and 6 both showed increased removal to 39% and 62% decrease in total arsenic (56% to 58% decrease dissolved arsenic) by Week 5, respectively. Reducing conditions were observed for Trial 6 throughout the rest of the Iron Addition Trial, and removal was maintained to a 62% to 66% decrease in total arsenic (58% to 62% decrease in dissolved arsenic) to the end of the Iron Addition Trial. Conversely, Trial 2 had become oxidizing again by Week 10, and showed an associated increase in total and dissolved arsenic concentration, due to the solubilization of sulphide minerals. By the end of the Iron Addition Trials, Trial 2 showed only a 5% decrease in total arsenic and showed much lower removal than Trial 6 possibly due to the higher iron ratio in Trial 6. However, as dissolved iron oxidized and re-precipitated to iron (oxyhydr)oxides, dissolved arsenic removal through sorption was not observed in Trial 2.

Overall, comparable total arsenic removal maxima were obtained using the 10:1 and 20:1 iron to arsenic ratios, although greater removal of dissolved arsenic was observed at the 20:1 dosing ratio (Table 5-2). This suggests extended settling over time may result in lower total arsenic concentrations for the 20:1 iron to arsenic dosing ratio. While the order of ferric and carbon dosing did not appear to influence the maximum arsenic removal observed, greater removal was observed at the end of Trial 5 for dissolved arsenic (Table 5-2), which received ferric iron first under oxidizing conditions before transitioning to reducing conditions following carbon amendment. Also, the addition of ferric iron to the already reducing Trial 2 resulted in no marked improvement in arsenic removal while the bulk of arsenic removal in Trial 6 was achieved prior to ferric dosing (Figure 5-21).

5.2.2 TREATMENT OF OTHER COPIs

Chalcophile COPIs (total antimony, dissolved cadmium, dissolved copper, total lead) showed no marked removal with ferric iron dosing alone (Figure 5-24 to

Figure 5-27), whereas dissolved zinc exhibited limited removal following ferric iron addition (up to 30% and 0% decrease for Trial 1 and Trial 5, respectively; Figure 5-28). Total selenium and uranium were also not treated with ferric iron dosing alone (Figure 5-29 and Figure 5-30). The transition to strongly reducing conditions subsequent to the iron dosing for Trials 1 and 5 resulted in a strong decline in dissolved antimony, cadmium, copper, lead, and zinc concentrations by between one and two orders of magnitude, to levels that were similar to, or lower than those observed during Stage 1. The decline was quicker for the room temperature Trial 1 than the cold temperature Trial 5, but the overall chalcophile element removal for the cold Trial 5 was similar to (antimony, lead, zinc) or greater than (cadmium, copper) that of Trial 1 by Week 12. This was despite the higher ORP observed for Trial 5, and lower dissolved iron and sulphide concentrations, suggesting it was not as strongly reducing as Trial 1. Trial 5 received a higher iron dose (20:1 iron to arsenic ratio), suggesting that the additional iron assisted in the enhanced cadmium and copper removal observed. No selenium removal was observed in Trial 1 following carbon amendment. Total selenium concentrations were lowered in Trial 5 but rebounded by Week 12 (Figure 5-29). Interestingly, the dissolved selenium concentration for Trial 5 at

Week 12 (0.0014 mg/L) showed removal and was an order of magnitude lower than total selenium (0.013 mg/L), suggesting settling of selenium particulates (likely elemental selenium) over time would result in lower selenium in the water column. Conversely, total uranium removal was observed by Week 12 in Trial 1 (60% lower than Week 0) but was minimal in Trial 5 (8% lower; Figure 5-30).

Trials 2 and 6 received carbon amendment before iron dosing. The carbon addition resulted in marked removal of the chalcophile COPIs total antimony, dissolved cadmium, dissolved copper, and dissolved zinc (Figure 5-24, Figure 5-25, Figure 5-26, and Figure 5-28, respectively). By Week 5, these COPIs were treated below their respective treatment targets to levels that were comparable to or lower than those observed in Stage 1, likely resulting from the strong reducing conditions produced from the higher carbon dose used in Stage 2 compared to Stage 1. Therefore, continued improvement of treatment after ferric iron addition was difficult to observe for these COPIs. While dissolved lead showed some variable removal in Trial 6 prior to iron addition, removal of total lead did not occur until after iron was added (

Figure 5-27). There was no removal of dissolved or total lead in Trial 2 with a Fe:As mass ratio of 10:1, suggesting a 20:1 Fe:As ratio was beneficial to lead removal. Total uranium was treated up to 52% and 16% in Trials 2 and 6, respectively, by Week 4 (Figure 5-30). Further removal of total uranium after ferric addition was observed mainly in Trial 6 (decrease up to 80% of total uranium concentrations by Week 12). Total uranium concentrations in Trial 2 slowly declined to 33% removal by the end of Stage 2. Total selenium was not treated in Trials 2 and 6 by Week 4 (Figure 5-29). Further removal after ferric addition fluctuated, however by the end of Stage 2, Trial 6 had a decrease of 56% of the total selenium while Trial 2 had no removal. Despite its order of magnitude higher initial COPI concentrations, Trial 6 exhibited removal to similar or lower concentrations as those observed for Trial 2 for all COPIs except uranium, indicating that treatment of higher starting concentrations is clearly feasible.

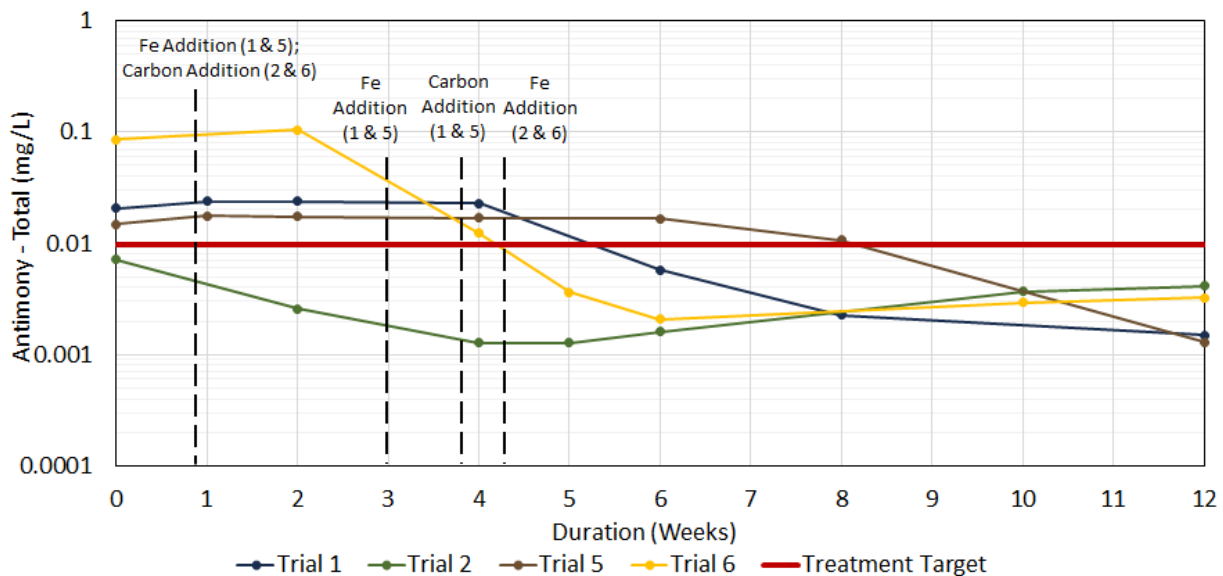


Figure 5-24: Total Antimony Concentrations in the Stage 2 Pilot-scale Trials from Weeks 0 to 12

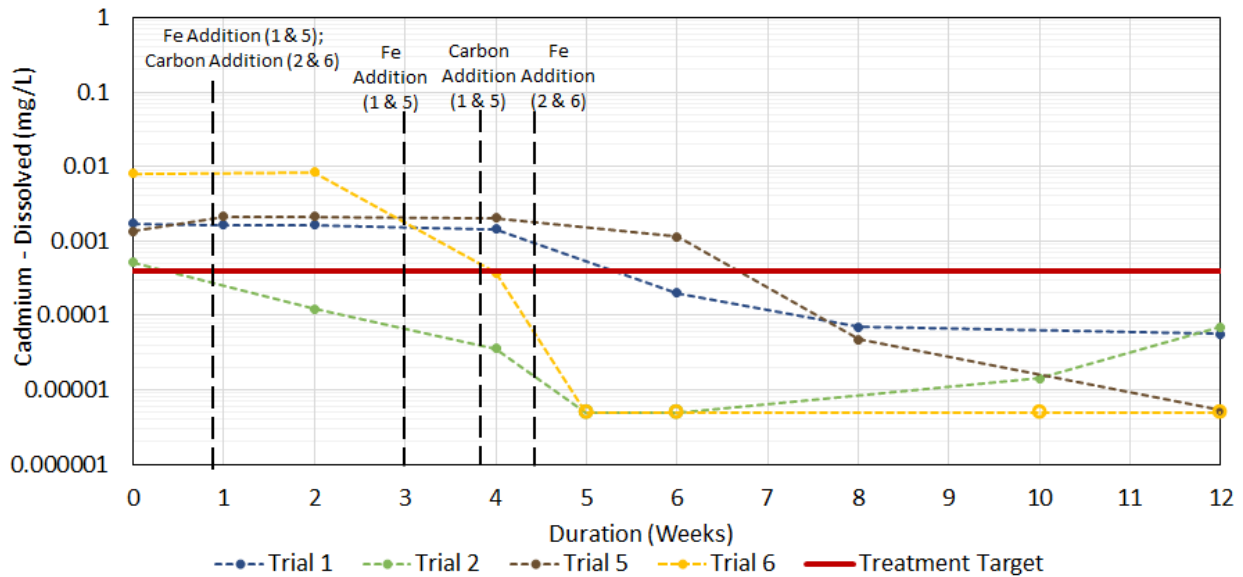


Figure 5-25: Dissolved Cadmium Concentrations in the Stage 2 Pilot-scale Trials from Weeks 0 to 12

Measurements less than the detection limit of 0.000005 mg/L are indicated by a hollow marker.

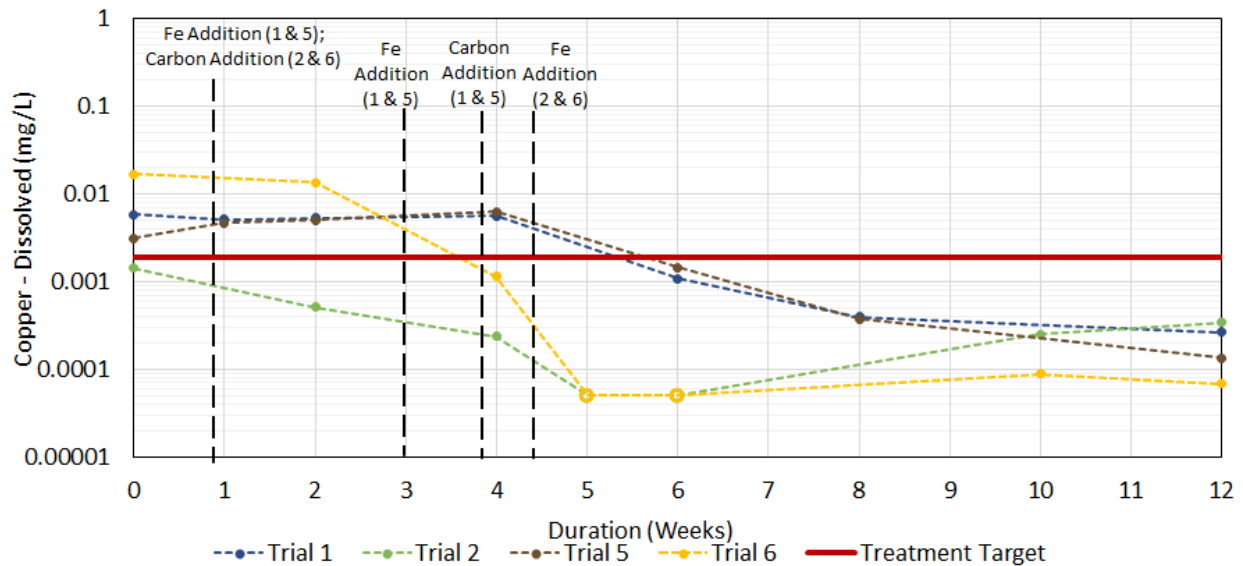


Figure 5-26: Dissolved Copper Concentrations in the Stage 2 Pilot-scale Trials from Weeks 0 to 12

Measurements less than the detection limit of 0.00005 mg/L are indicated by a hollow marker.

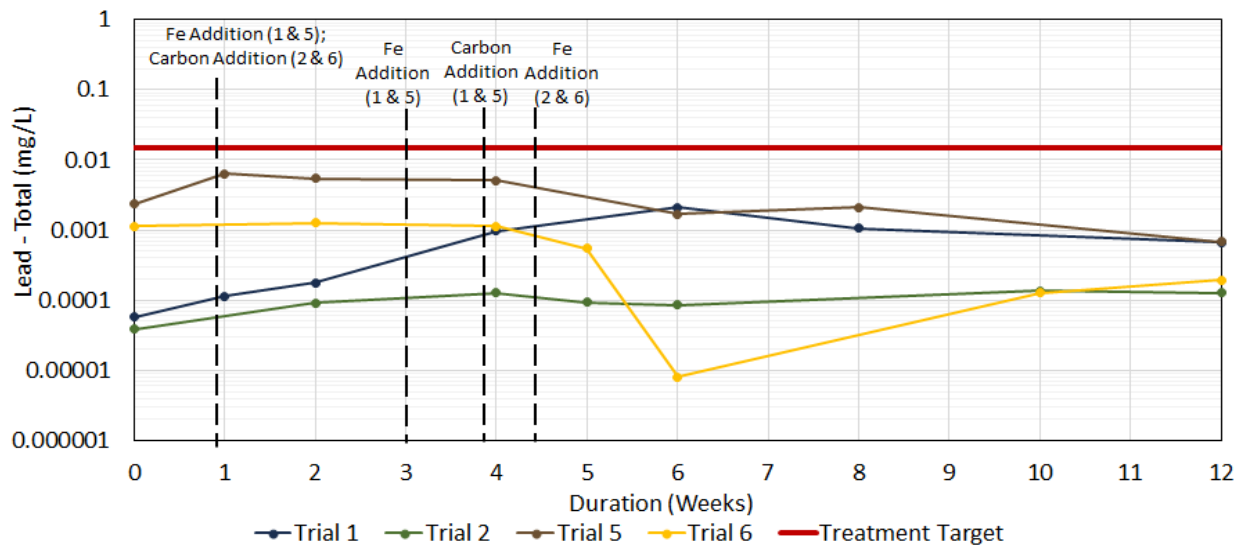


Figure 5-27: Total Lead Concentrations in the Stage 2 Pilot-scale Trials from Weeks 0 to 12

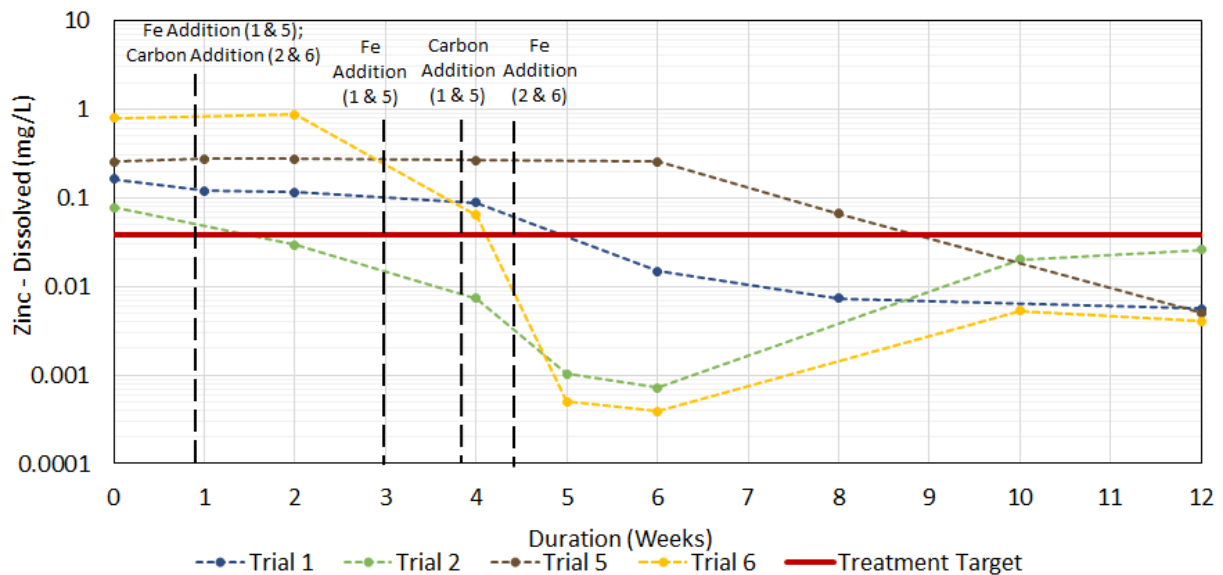


Figure 5-28: Dissolved Zinc Concentrations in the Stage 2 Pilot-scale Trials from Weeks 0 to 12

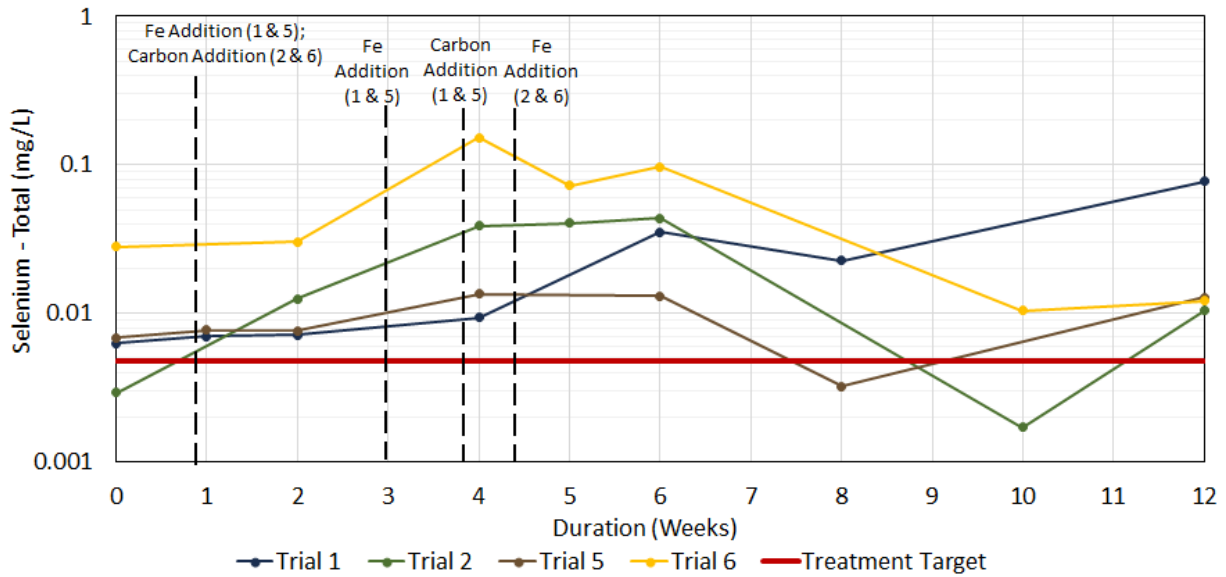


Figure 5-29: Total Selenium Concentrations in the Stage 2 Pilot-scale Trials from Weeks 0 to 12

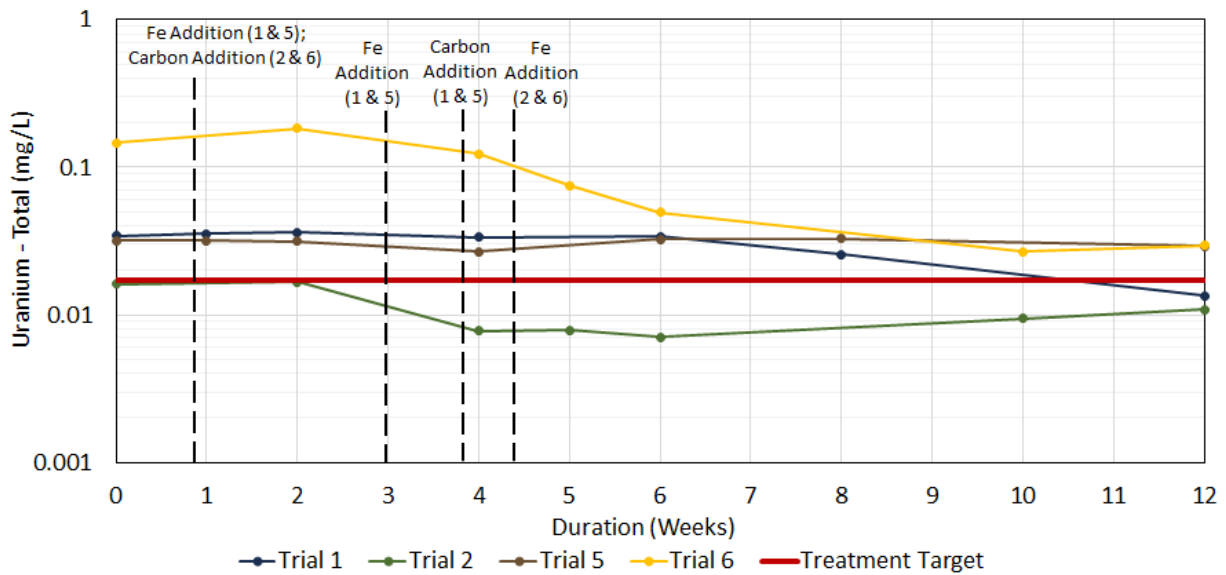


Figure 5-30: Total Uranium Concentrations in the Stage 2 Pilot-scale Trials from Weeks 0 to 12

5.3 STAGE 3 IRON ADDITION BENCH TRIALS

Although marked arsenic removal was observed in the pilot-scale trials (Stage 2), higher removal was expected given the affinity of arsenic for iron minerals (O'Day, 2006). The less than expected removal was ascribed to poor mixing and restricted contact to the iron (oxyhydr)oxides in the 200 L barrels. Therefore, the ferric dosing experiment was repeated using smaller scale bench-scale tests to assure intimate mixing between the ferric reagent and the arsenic in solution.

The extent of arsenic removal through ferric iron addition is related to the ratio of iron to arsenic and the initial arsenic concentration (Barabash and Nicholson, 2019). Bench-scale trials of 1.5 L and adequate mixing were further investigated for arsenic removal extent with iron amendment in a mass ratio of 20:1 and 10:1 Fe:As. As expected, dissolved arsenic removal in the presence of iron (oxyhydr)oxide mostly occurred within the first hour for both Fe:As mass ratios (Table 5-3, Figure 5-31). Total arsenic concentrations decreased more slowly, broadly in line with the fall in total iron concentrations (Figure 5-32) requiring about 6 days (144 hours) for total arsenic concentrations to reach dissolved concentrations as the arsenic-bearing ferric iron precipitates settled out. After 6 days, a 20:1 Fe:As ratio decreased total arsenic concentrations by 90%, while a 10:1 Fe:As ratio decreased total arsenic concentrations by 53% due to the lower mass of ferric (oxyhydr)oxide produced. Thus, a 20:1 iron to arsenic ratio is recommended for any full-scale implementation of iron amendment combined with adequate mixing (Barabash and Nicholson, 2019).

Table 5-3: Percent Removal of Dissolved and Total Arsenic for 20:1 and 10:1 Fe:As Mass Ratio Stage 3 Bench-scale Trials

COPI	Percent Removal					
	20:1			10:1		
	1 hr	24 hrs	144 hrs	1 hr	24 hrs	144 hrs
Dissolved Arsenic	91%	94%	94%	54%	41%	56%
Total Arsenic	1%	48%	90%	-3%	11%	53%

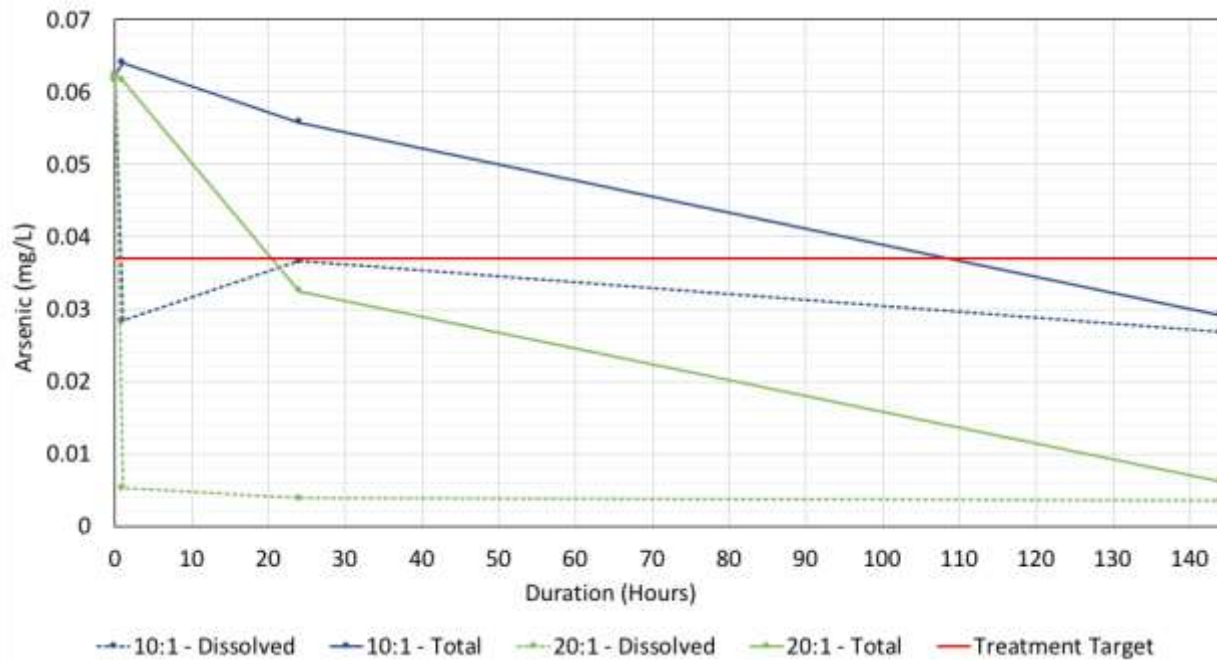


Figure 5-31: Total and Dissolved Arsenic Concentrations in the Iron Addition Bench Trials from Time Zero to Day 6 (144 Hours)

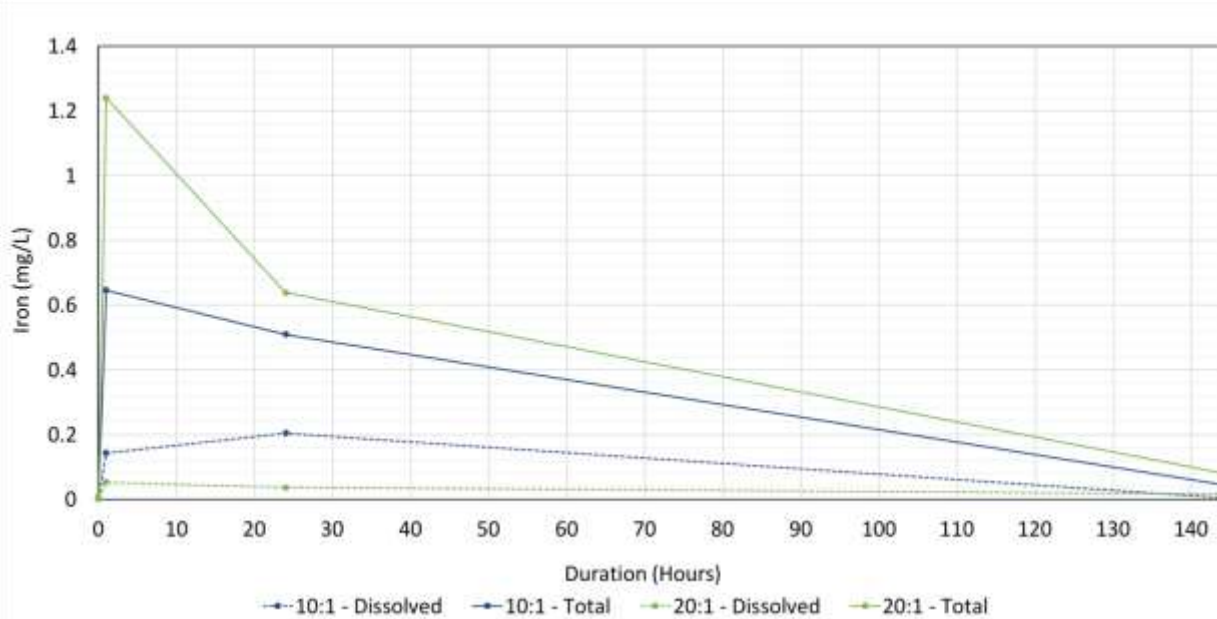


Figure 5-32: Iron Concentrations in the Iron Addition Bench Trials from Time Zero to Day 6 (144 Hours)

5.4 COPI TREATMENT MECHANISMS

Eh (i.e., redox potential) and pH are master variables that exert a strong influence on the mobility of trace elements including the COPIs. The mechanisms of COPI removal can be visually understood when the samples are plotted in Eh-pH space. Although ORP is a useful qualitative indicator of changes in redox conditions over time, it is known to be unreliable when determining the actual redox state due to uncertainties in the redox couple to which it is responding and the relative insensitivity of the platinum electrode in the ORP device to some redox couples (e.g., sulphate/sulphide; Lindberg and Runnells, 1984). As such, the Nernst equation was used to calculate the *in situ* Eh for samples collected at Week 14 when COPI removal was most prominent in the carbon amended trials. Sulphide concentrations over two orders of magnitude higher than the detection limit were present in Trials 2 through 6 at Week 14 (Figure 5-10), suggesting sulphate reduction was a significant process in these trials. Therefore, the Eh for Week 14 of these trials was calculated using the sulphate/sulphide redox couple, since the presence of detectable sulphide is indicative of sulphate-reduction and use of the redox couple with the lowest potential has been shown to yield more accurate Eh measurements in past work examining groundwater redox geochemistry (Jackson and Patterson, 1982). No detectable sulphide or ferrous iron was present at Week 14 of Trial 1 or the control Trials 7 and 8. These three trials had detectable nitrate and dissolved oxygen and shared similar ORP at Week 14 (Figure 5-1, Figure 5-2). As such, they are more oxidizing than the other trials, which is expected for the carbon-free control Trials 7 and 8 and three months removed from the initial carbon addition to Trial 1 and lack of response to the second carbon addition to Trial 1. Given the oxidized conditions present, the measured ORP was used to calculate the Eh in these three trials.

The calculated Eh and measured pH of all eight trials at Week 14 was plotted on an Eh-pH predominance plot for the COPI-S-C-O system (Figure 5-33 and Figure 5-34). The Eh-pH plots indicate the dissolved species or solid phases that the source thermodynamic data dictate to be predominant at a given Eh and pH. The plots are based on thermodynamic data; they do not consider reaction kinetics, however, kinetically-inhibited phases were not included. Figure 5-33 and Figure 5-34 display the Eh-pH plots for COPIs and iron.

The control Trials 7 and 8 all plotted in soluble species stability fields in the COPI Eh-pH plots, indicating that under the prevailing pH and Eh conditions at Week 14 (and generally throughout these control trials) the COPIs remained soluble. Only iron plotted in a stable mineral stability field [ferrihydrite – nominally $\text{Fe}(\text{OH})_3$], which was reflected in the low dissolved iron concentrations present in Trials 7 and 8 that were one to two orders of magnitude lower than in the glycerol-amended trials (Figure 5-7). The Week 14 Trial 1 Eh and pH also plotted in the soluble COPI species fields owing to the lack of development of reducing conditions following its carbon top up; however, the lower Eh recorded during the early weeks of this trial from the initial carbon dose resulted in COPI precipitation. As such, the COPI concentrations were lower in Trial 1 at Week 14 than those in the control Trials 7 and 8 due to the lasting effects of COPI precipitation earlier in this trial.

The lower Eh calculated for Trials 2 through 6 resulted in the formation of poorly soluble mineral phases. For example, at the Eh and pH conditions of Week 14 the chalcophile (i.e., elements that tend to form sulphide minerals) COPIs cadmium, copper, lead, and zinc plotted in the stability field of their sulphide minerals greenockite (CdS), covellite (CuS), galena (PbS), and sphalerite (ZnS), respectively (Figure 5-33). As such, it is likely that the diminution in dissolved concentrations of these elements observed for Trials 1 through 6 is due to precipitation of these sulphide minerals. Similarly, following reduction to their lower valence states, selenium and uranium form poorly soluble elemental selenium [$\text{Se}(0)$] and uraninite (UO_2), respectively

(Figure 5-33). The lower concentrations of these two elements observed in the carbon amended trials is likely due to precipitation of these phases.

Interestingly, the antimony Eh-pH plots suggest that discrete antimony sulphide minerals are not expected to form under the conditions observed in the carbon-amended trials (Figure 5-34). That antimony removal was observed suggests that these chalcophile elements likely co-precipitated with, or sorbed on, other sulphide minerals. Arsenic did not experience significant removal. Under the reducing, sulphidic conditions at Week 14 in Trials 2 through 6, soluble arsenite [H_3AsO_3] and tetrathioarsenate (AsS_4^{3-}) are the predominant forms (Figure 5-34). No insoluble arsenic minerals were predicted at the Eh and pH conditions of these trials, and iron sulphide formation, into which arsenic may be sequestered, was also not predicted to be widespread (Figure 5-34). This was anticipated and no arsenic removal was predicted for *in situ* treatment (Figure 5-34). Indeed, the data suggest iron sulphide formation (as mackinawite; FeS) was not favoured; Trials 2 through 6 plotted in the ferrous iron stability field (Figure 5-34), consistent with the elevated dissolved iron present in Trials 2 through 6 for Week 14 (Figure 5-7), which exclusively comprised ferrous iron (Figure 5-8). This is due to the relatively low iron levels in the water column, resulting in minimal oversaturation with respect to iron sulphide phases, although FeS formation likely occurred within the soil mass for Trials 3 and 4 that were charged with 10 kg of soil (further described in Section 5.5.3).

Arsenic removal was observed under oxidizing conditions in Stage 2 and Stage 3 due to sorption on (and probably some co-precipitation with) ferric (oxyhydr)oxides that form under oxidizing conditions (i.e., ferrihydrite). The additional arsenic sequestration observed under reducing conditions in Stage 2 is likely due to sorption on and incorporation within iron sulphides that formed from the additional iron added to these experiments.

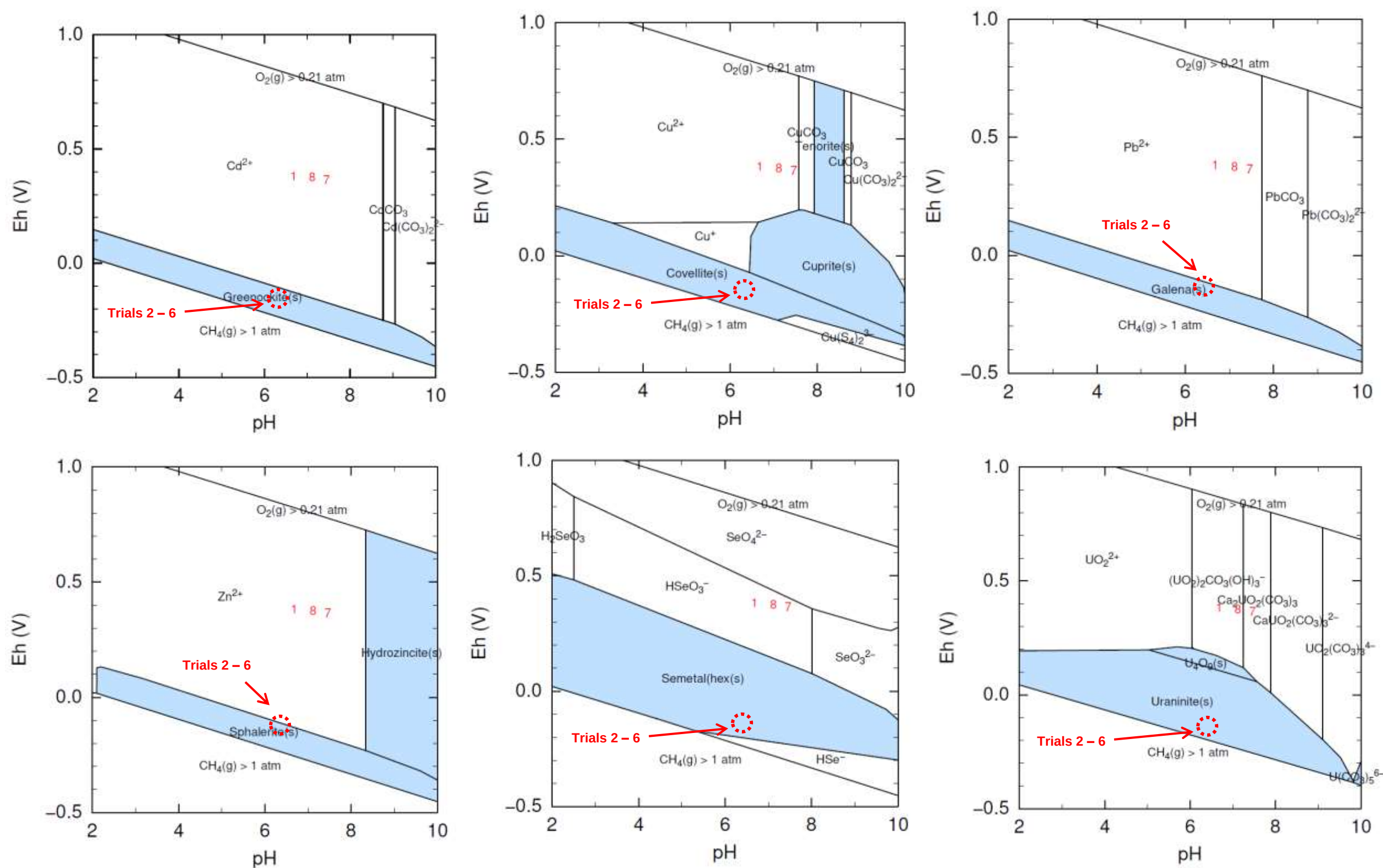


Figure 5-33: Eh-pH Predominance Plots Showing the Domains of Major Dissolved and Mineral Forms of Cadmium, Copper, Lead, Zinc, Selenium, and Uranium as a Function of Eh and pH

Blue shaded areas indicate solid mineral phases. Red numbers denote location of Trials 1 through 8 at Week 14 sampling event in Eh-pH space.

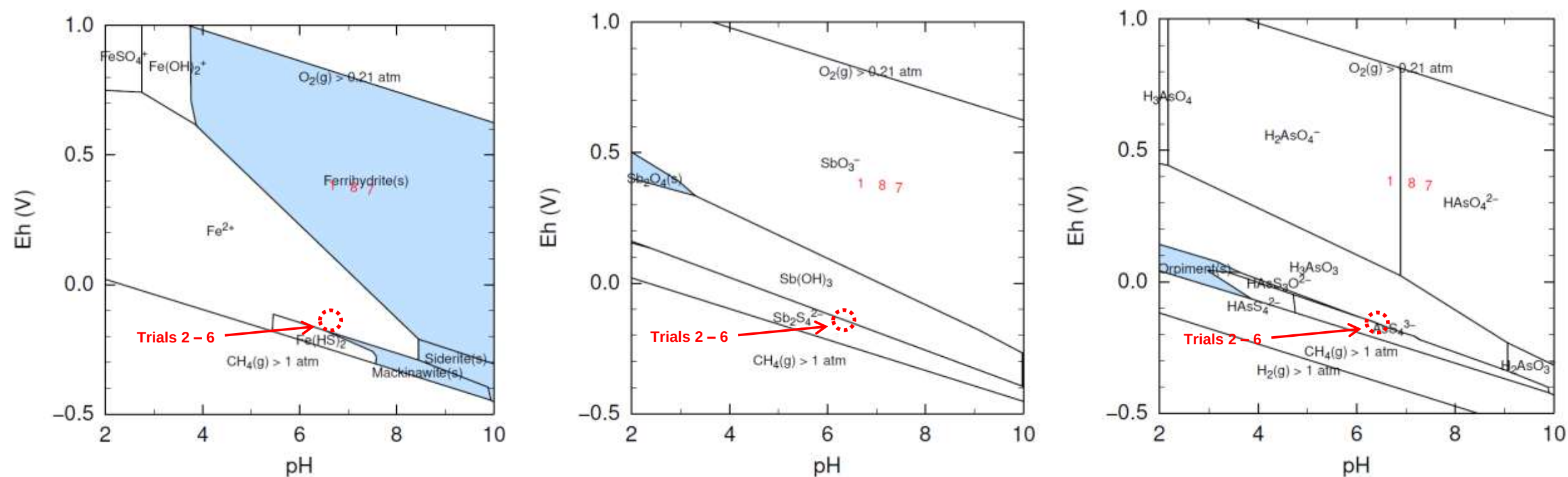


Figure 5-34: Eh-pH Predominance Plots Showing the Domains of Major Dissolved and Mineral Forms of Iron, Antimony, Arsenic as a Function of Eh and pH

Blue shaded areas indicate solid mineral phases. Red numbers denote location of Trials 1 through 8 at Week 14 sampling event in Eh-pH space.

5.5 SOILS

5.5.1 ACID VOLATILE SULPHIDES AND SIMULTANEOUSLY EXTRACTED METALS

The formation of sulphide minerals with chalcophile metals in reducing conditions can be measured through tests for acid volatile sulphides (AVS) and the sum of simultaneously extracted metals (Σ SEM; cadmium, copper, lead, mercury, nickel, zinc). When excess sulphides are generated in the presence of excess iron, the iron bound AVS formed is stored in soils as excess AVS for future use in metals removal in an on-demand manner. The excess AVS are biogenically formed amorphous iron sulphides. The amorphous structure and solubility constant of the iron bound AVS results in the sulphide preferentially exchanging iron for heavy metals with a greater affinity for the sulphide (e.g., copper, zinc) which are then stably bound.

AVS in the sample of the starting soil inoculum was below detection (i.e., less than 0.2 $\mu\text{mol/g}$; Figure 5-35; Appendix B, Table B3-1); however, this sample was collected from soil material that had been stored for approximately 10 months during the experiments owing to the minimum sample number required by the laboratory for AVS analysis. Although the soil material was refrigerated during storage and the sample was collected from approximately 15 cm depth from the soil column within the storage pail, the AVS present may have oxidized during storage. The highest amount of AVS was measured in Trial 3 (24.6 $\mu\text{mol/g}$), which was more than double that present in the control Trial 8 soil (10.9 $\mu\text{mol/g}$) at the end of the experiment (Figure 5-35), indicating that carbon amendment to this trial resulted in the accumulation of AVS under the sulphate reducing conditions that were stimulated. Although Trial 4 received a higher carbon dose, the AVS measured in its soil at the end of the experiment (9.0 $\mu\text{mol/g}$) was comparable to that of the control (Figure 5-35). This suggests that either AVS formation was not significant in the experiment or that the AVS was oxidized in the last few weeks of the experiment when re-oxidation of the overlying waters was observed. These explanations are counterintuitive given the Trial 3 AVS results, which exhibited comparable water chemistry to Trial 4; instead, sample heterogeneity is likely responsible for this result. The measurable AVS present in the control Trial 8 probably reflects the presence of AVS in the initial soil material since it was sourced from a waterlogged area of the Kudz Ze Kayah site which likely contained AVS. The maintenance of such saturated conditions under the water cover in the experiment would have preserved much of the AVS while the likely presence of labile organic carbon in the soil may also have allowed for some additional AVS to be produced during the trial, but at levels that did not change the redox status of the overlying water.

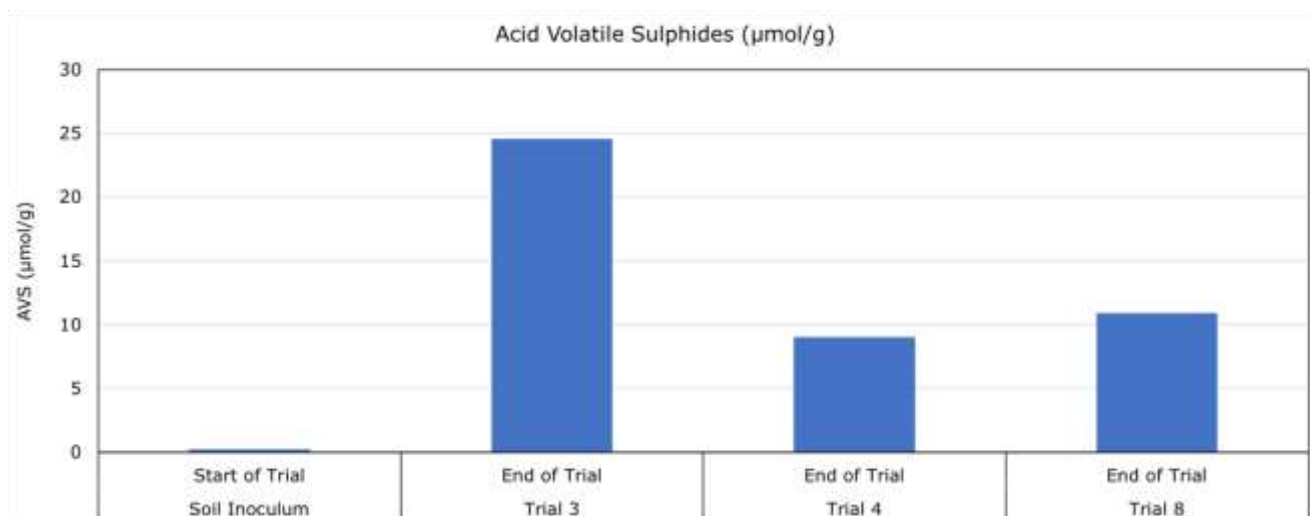


Figure 5-35: Acid Volatile Sulphides Measured in the Soils of Trials 3, 4, and 8 at the end of Week 34

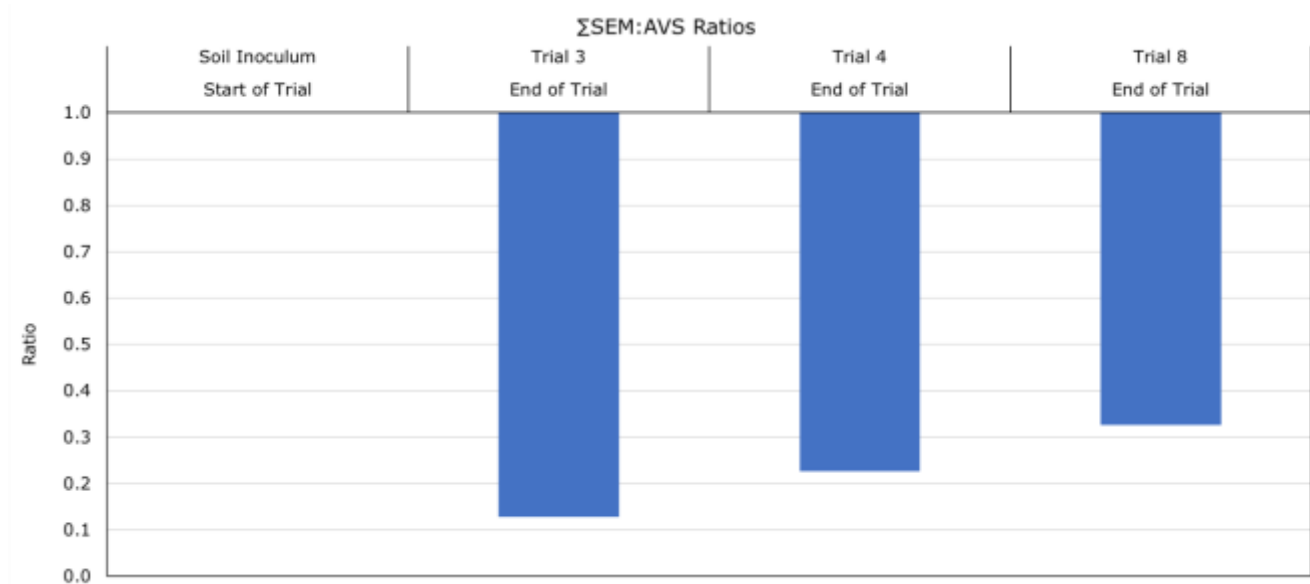


Figure 5-36: Sum of Simultaneously Extracted Metals to Acid Volatile Sulphide Ratio Measured in the Soils of Trials 3, 4, and 8 at the end of Week 34

If a soil has a molar ratio of $\Sigma\text{SEM}:\text{AVS}$ less than 1, then there is excess AVS and it is theoretically capable of exchanging iron for COPIs that are simultaneously extracted. In this way the AVS can serve as a buffer to oxidation should the sediments of a reducing (sulphide-producing) lake system be exposed to oxygen or become carbon limited, thereby making sequestered metals less likely to re-solubilize. Excess AVS in Trials 3, 4, and 8, suggests that excess iron bound AVS was present in all samples (Figure 5-36). Trials 3 and 4 had excess AVS ($\Sigma\text{SEM}:\text{AVS}$ less than 1) after 34 weeks and exhibited the lowest $\Sigma\text{SEM}:\text{AVS}$ ratios (0.13 and 0.23, respectively), indicating there was iron sulphide buffering potential against COPI sulphide oxidation in these trials (Figure 5-36). Excess AVS was also measured in the control Trial 8 at the end of 34 weeks ($\Sigma\text{SEM}:\text{AVS}$ of 0.33; Figure 5-35) and likely resulted from initial AVS in the soil that was preserved under water.

5.5.2 TESSIER SEQUENTIAL EXTRACTION

Under the sulphate-reducing conditions of the experiments, chalcophile metals will precipitate as sulphide minerals, which are extracted in Fraction 4 of the Tessier sequential extraction scheme (Table 4-10). Additionally, metals within Fraction 3 can transition into Fraction 4 as iron and manganese (oxyhydr)oxides linked with Fraction 3 are reductively dissolved and chalcophile COPIs associated with these phases are released before being re-sequestered as sulphide minerals under sulphate-reducing conditions.

The distribution of COPIs between the Tessier sequential extraction fractions is displayed in Figure 5-37 to Figure 5-39 (Appendix B, Table B3-2). Despite the development of sulphate reducing conditions in the water column of Trial 4, there was minimal to no change in the distribution of COPIs between the soil fractions extracted by the Tessier procedure in Trial 4 compared to control Trial 8 (Figure 5-37 to Figure 5-39). This may be related to the relatively short duration (approximately 9 weeks for Trial 4) that the trials maintained reducing conditions. Reducing conditions are likely to be maintained longer in the full-scale system, thus treated chalcophiles and co-precipitated metals are likely to be sequestered into Fraction 4.

Chalcophile COPI metals expected to be treated into Tessier Fraction 4 (Cd, Cu, Pb, Sb, Zn) generally showed no increase in distribution into Fraction 4 or other fractions in Trial 4 compared to the control and starting soil inoculum sample (for cadmium, copper, lead, and zinc) (Figure 5-37). The bulk of cadmium and zinc in the soils of both trials was associated with Fraction 3 (55% to 75%), reflecting the affinity of these metals for iron (oxyhydr)oxide surfaces (Figure 5-37). A sizeable proportion of the lead in the trials was also associated with Fraction 3 (30%), while 40% was found in Fraction 2, likely present as a carbonate phase (Figure 5-37). Copper was primarily found in Fraction 4 in both trials (40% to 55%), with smaller amounts in Fraction 3 (15% to 20%; Figure 5-37). Although this may indicate that copper is present as a sulphide phase in these soils, Fraction 4 also co-extracts organic material with which copper is commonly complexed. Therefore, this likely reflects copper-organic matter association rather than a sulphide predominance.

Antimony was mostly in the residual Fraction 5 in both trials (approximately 70% Figure 5-38), which is resistant to mobilization. Although antimony apportionment amongst the Tessier extraction pools was similar for Trials 4 and 8 (i.e., primarily bound in Fraction 5), antimony in the initial soil inoculum sample was relatively evenly distributed amongst the five Tessier fractions (Figure 5-38). It is unlikely that antimony was redistributed to Fraction 5 during the trials since this fraction comprises silicate and oxide minerals that are only released under strongly acidic conditions and which are unlikely to form under the low temperature conditions and short period of time over which the trials were conducted. Therefore, the difference in antimony allocation between the Tessier fractions is likely due to sample heterogeneity.

Selenium and uranium COPs were expected to be treated in reducing conditions through microbially mediated reduction to less soluble forms. Selenium generally showed no difference in distribution in Fraction 4 in Trial 4 compared to the control, however showed an increase compared to the starting soil inoculum, suggesting co-precipitation or sorption to iron mineral and organic forms (Figure 5-39). Selenium minerals in the trials were mostly distributed in Fraction 5 (40%) and lower amounts in Fraction 4 (20% to 35%; Figure 5-39). Uranium generally showed no difference in distribution in Fraction 2 and 3 in Trial 4 compared to the control Trial 8 (Figure 5-39), however showed an increase in Fraction 2 and decrease in Fraction 3 compared to the starting soil inoculum. Overall, uranium was mostly distributed in the residual Fraction 5 (50-70%) and smaller amounts in Fraction 2 (15% to 30%; Figure 5-39).

Arsenic was not expected to be removed under the tested reducing conditions. Thus, similar distribution of arsenic in Trial 4 compared to the control and initial soil inoculum is consistent with no treatment at Week 34 (Figure 5-38). Arsenic minerals were mostly distributed in Fraction 5 for both trials (60% to 70%; Figure 5-38).

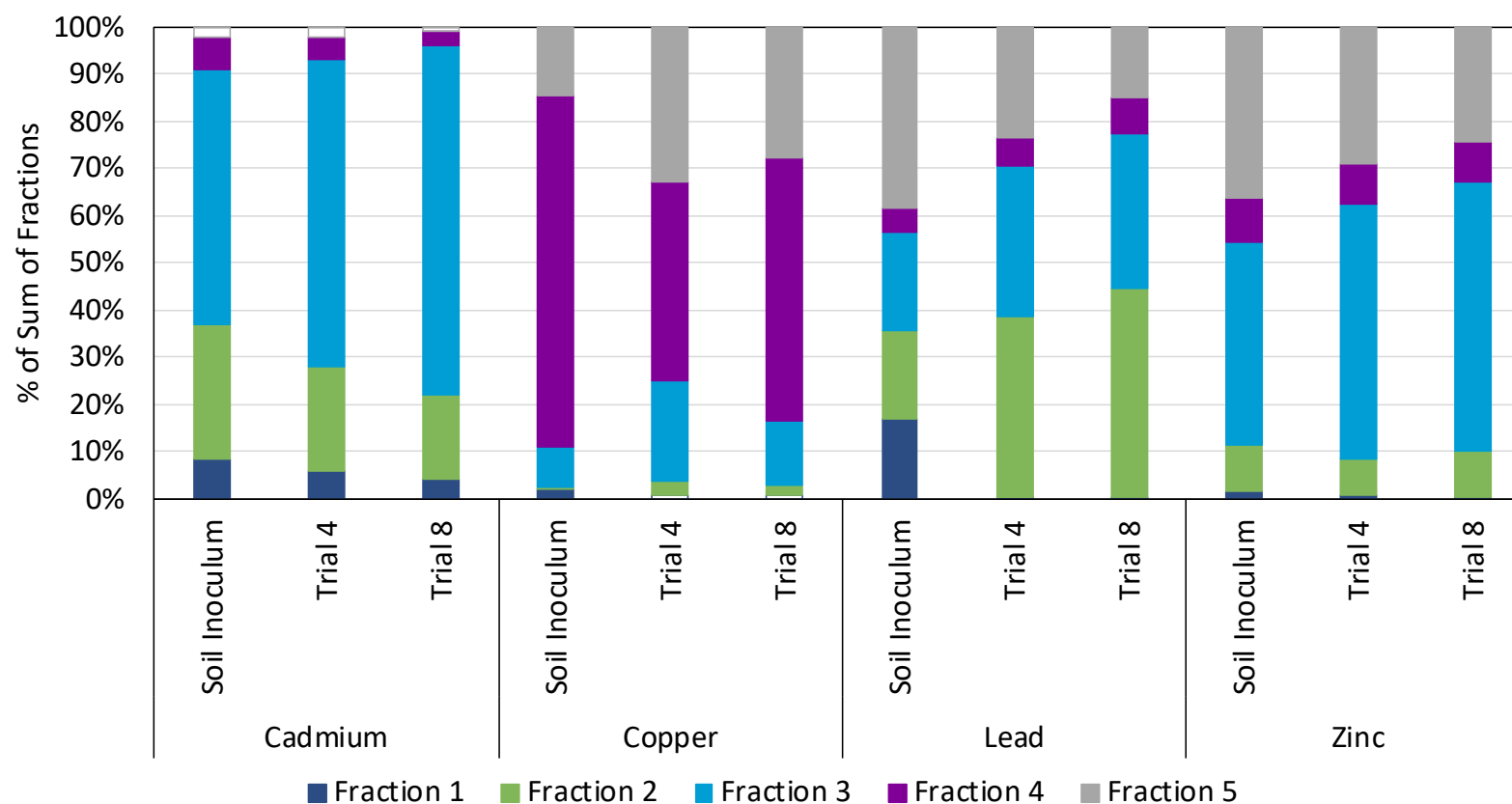


Figure 5-37: Distribution of Cadmium, Copper, Lead, and Zinc between Tessier Sequential Extraction Fractions in Soils from Trials 4 and 8 at the end of Week 34

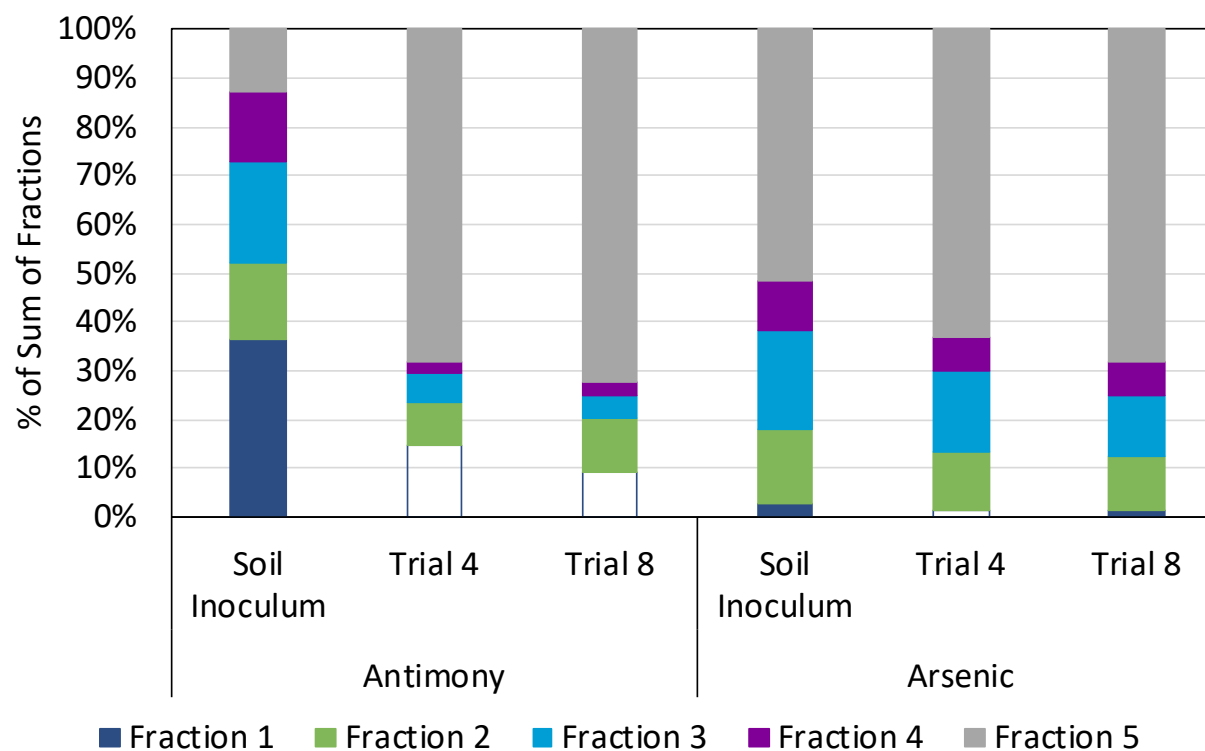


Figure 5-38: Distribution of Antimony, Arsenic, between Tessier Sequential Extraction Fractions in Soils From Trials 4 and 8 at the end of Week 34

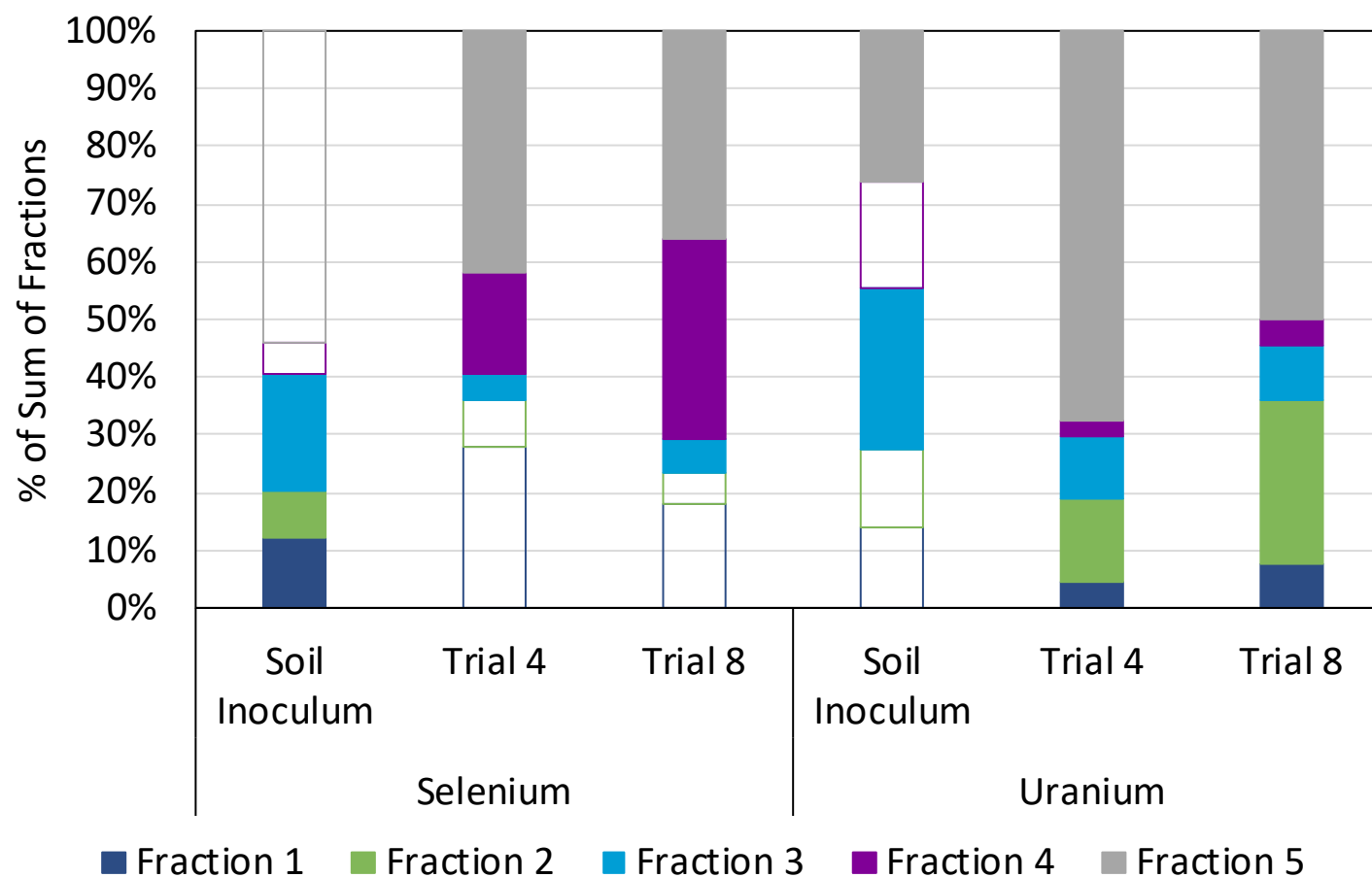


Figure 5-39: Distribution of Selenium and Uranium between Tessier Sequential Extraction Fractions in Soils From Trials 4 and 8 at the end of Week

5.5.3 SCANNING ELECTRON MICROSCOPY

Scanning Electron Microscopy (SEM) images, with associated energy dispersive X-ray (EDX) spot analyses, for samples collected from Trials 8, 3, and 4 are shown in Figure 5-40 to Figure 5-42, respectively. Consistent with the sulphate-reducing conditions observed temporarily in Trial 4, the formation of biogenic iron sulphide mineral phases was observed under the electron microscope in the form of micron to sub-micron sized iron sulphide with trace zinc sulphide phases. No other COPI mineral phases were observed due to their relatively low concentration compared with the SEM-EDX detection limits (typically 1 wt.%).

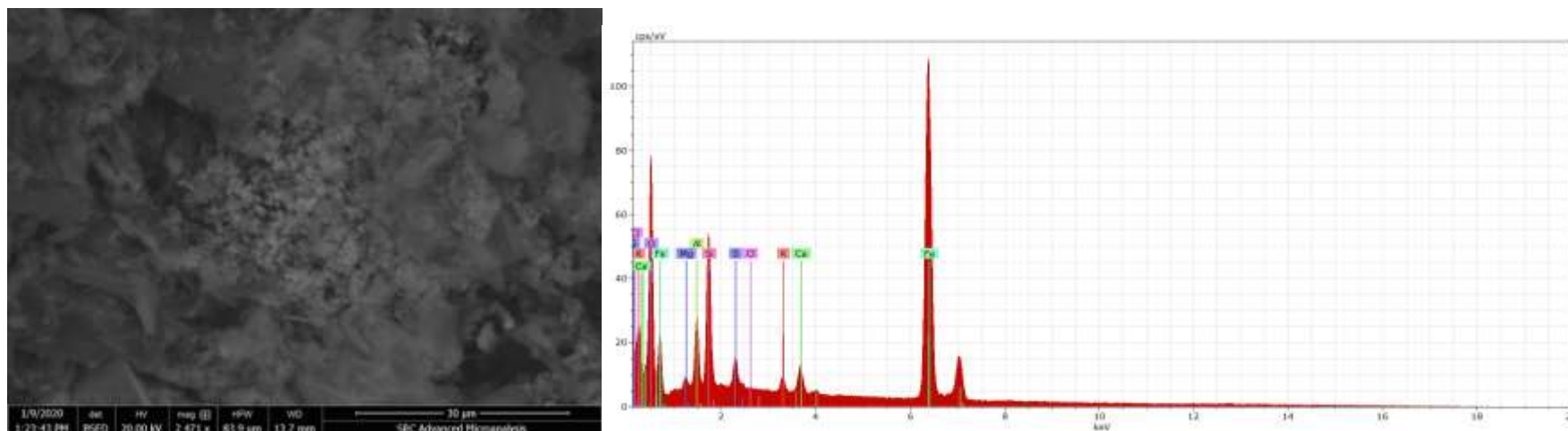
SEM-EDX analysis of the original soil inoculum that was refrigerated following collection in the field showed micron to sub-micron sized ferric (oxyhydr)oxide particles with detrital aluminosilicate grains (Figure 5-40). Similar results were obtained for the soil material collected from the control Trial 8 (Figure 5-40). No freshly formed metal sulphide minerals were observed in either sample. These observations are consistent with the oxidation experienced by the soil during storage and the oxic nature of the control Trial 8.

Metal sulphide minerals were also not observed in Trial 3. Aggregates of nanoparticulates were observed under the SEM (Figure 5-41), which returned a strong iron (and oxygen) signature in the EDX spectrum. The morphology and X-ray spectrum is suggestive of freshly formed iron (oxyhydr)oxide, likely precipitated as the system gradually re-oxidized. Although traces of sulphur were detected in the EDX spectrum, this may be due to gypsum (CaSO_4) formation rather than iron sulphide precipitates.

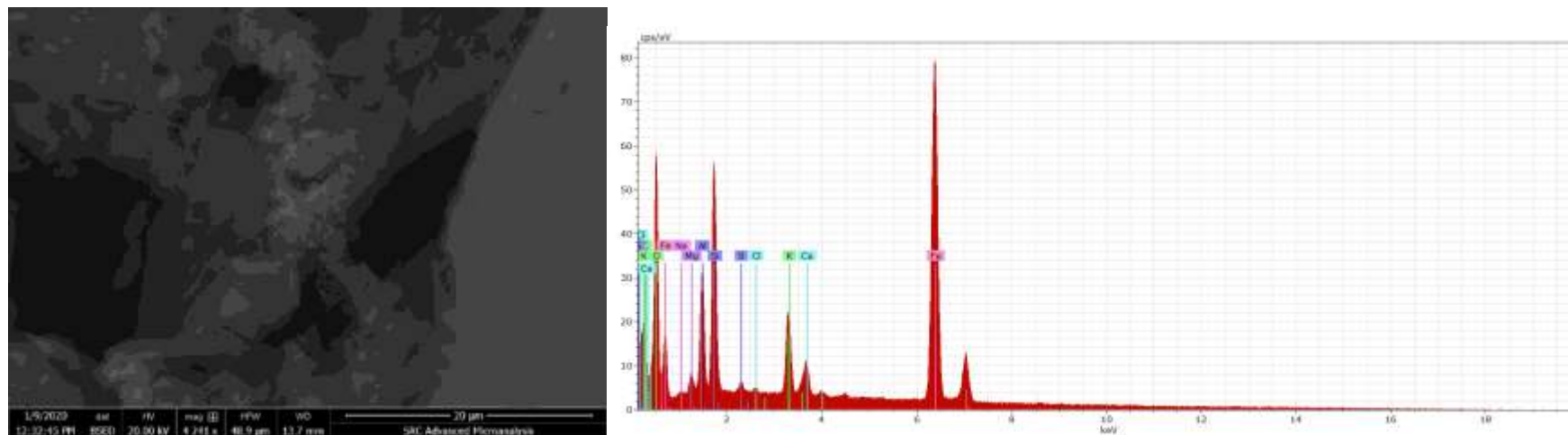
Evidence for biogenic iron sulphide formation was observed in the EDX spectra of samples collected from Trial 4. These displayed strong iron and sulphur peaks in their X-ray spectra with much lower oxygen levels (Figure 5-42), suggestive of an iron sulphide phase. The SEM images show micron and sub-micron structures whose poorly defined structure points towards a recently precipitated phase, likely of biogenic origin. There is also evidence of trace zinc content in the EDX data (Figure 5-42), consistent with zinc removal via sulphide precipitation. Of all the COPIs, zinc was present at the highest concentration in the overlying water and despite its sequestration during the trial, it was not expected to be strongly detected in the soil given the qualitative detection limits of the SEM-EDX (typically 1 wt.%). The bright contrast of these phases indicates they are electron dense (i.e., contain heavier elements such as iron) relative to the duller grains in the images, which are likely composed of detrital aluminosilicate mineral assemblages responsible for the silicon, aluminum, oxygen, and other light element peaks in the EDX spectra.

A few spot analyses of the Trial 4 material also returned SEM images of sub-micron particle assemblages with an EDX spectrum indicative of iron (oxyhydr)oxide (Figure 5-42). The nanoparticulate morphology and agglomeration is suggestive of freshly deposited mineral which likely formed during re-oxidation of the trial with associated oxidation of ferrous iron and precipitation of ferric (oxyhydr)oxides.

The presence of iron sulphide material in Trial 4 is consistent with the AVS results for this material and the strongly reducing conditions observed for this trial as evidenced by the high sulphide concentrations in the water column (Figure 5-10). However, the lack of iron sulphide identifiable by SEM-EDX in Trial 3 is at odds with the AVS data which found the highest AVS content in material collected from Trial 3 (Section 5.5.1). This discrepancy is likely due to the nature of SEM-EDX analysis, which is conducted on a spot by spot basis within a small sample (less than 0.1 g). Therefore, more weight is ascribed to the AVS results, which were obtained from a larger sample mass (approximately 10 g).

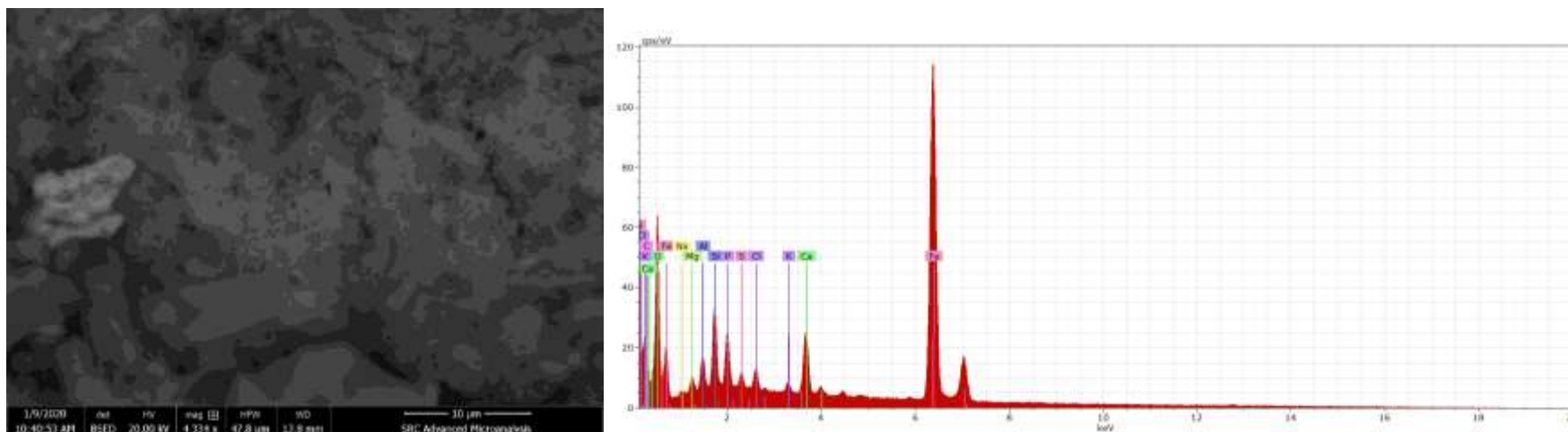


Agglomeration of sub-micron sized iron (oxy)hydroxides (brightest spherules) in the starting soil inoculum

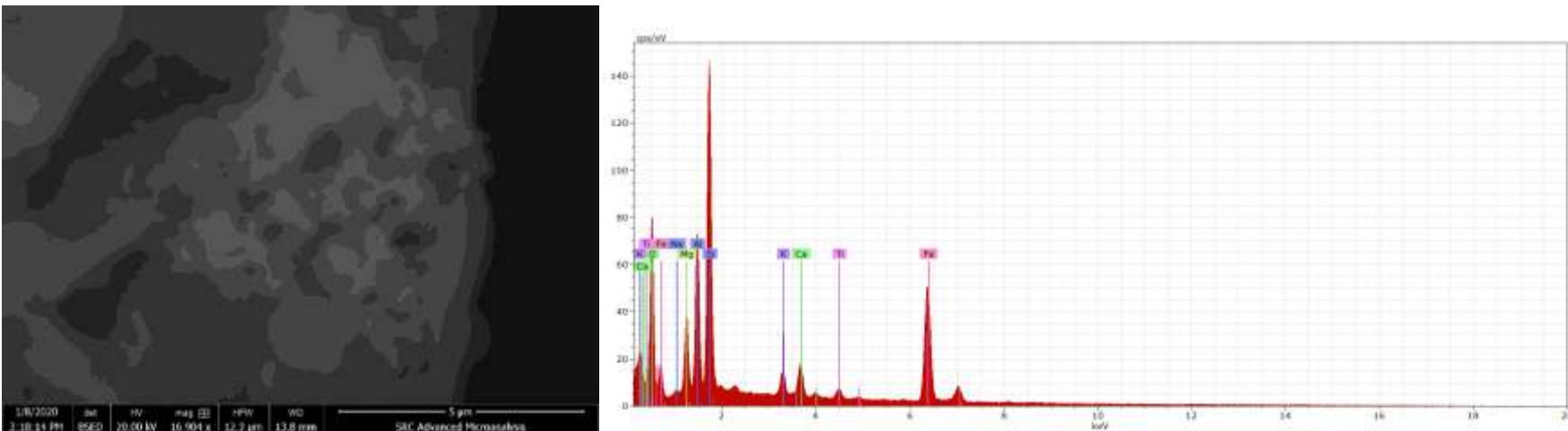


Aggregates of nanoparticulate iron (oxy)hydroxides in soil inoculum collected from Trial 8

Figure 5-40: Scanning Electron Microscopy Images and associated Energy Dispersive X-ray Analyses of the Starting Inoculum Soil (top) and Material Collected from Trial 8 (Bottom)

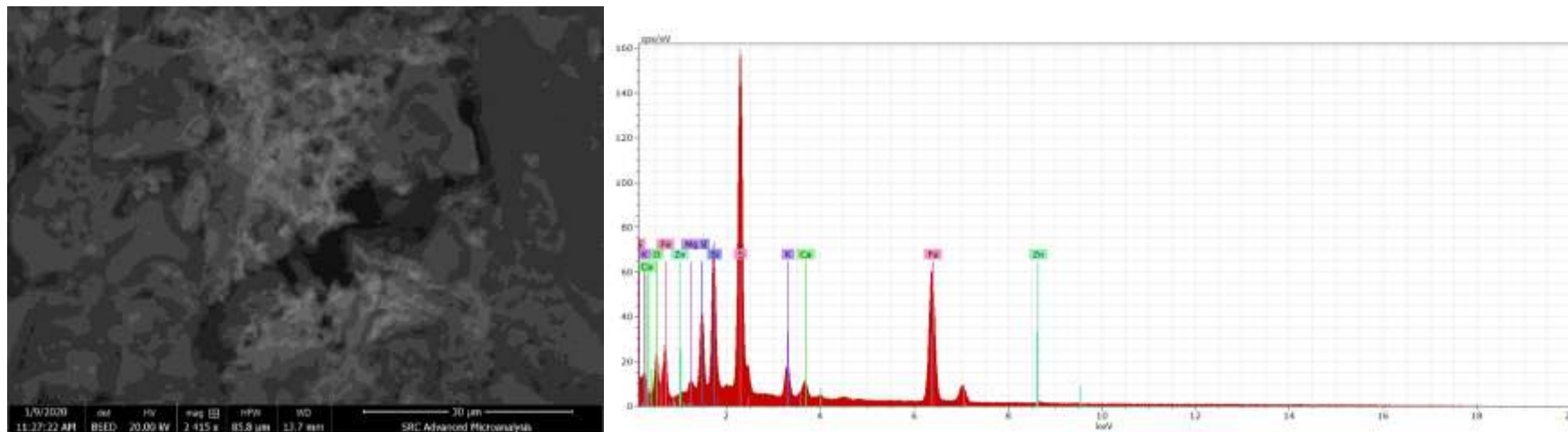


Agglomerated nanoparticulate iron (oxy)hydroxides.

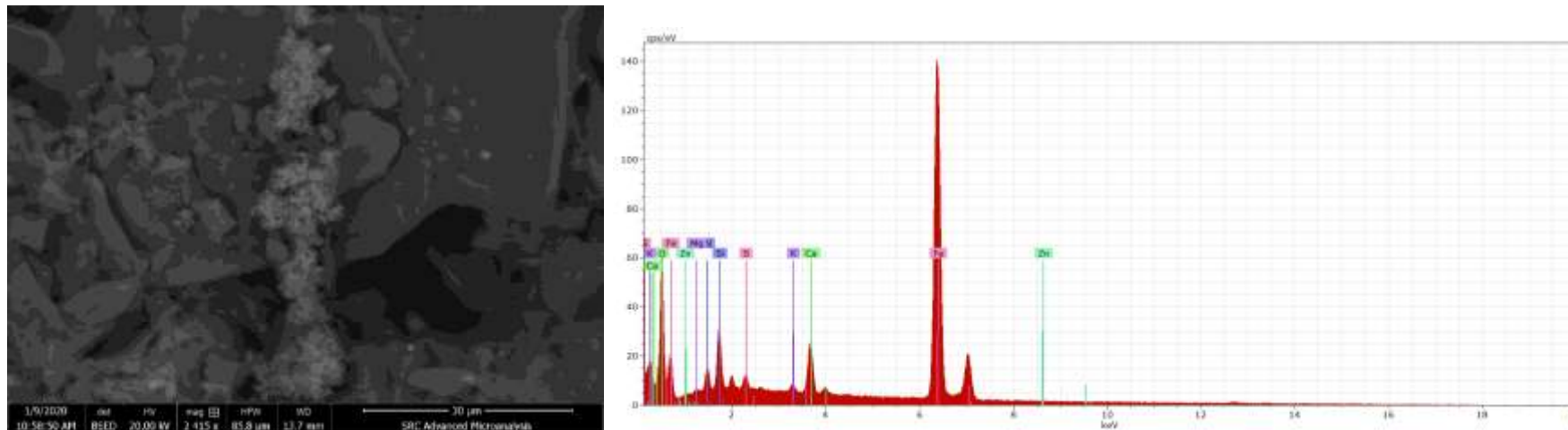


High magnification image of sub-micron iron (oxy)hydroxide particles. Larger, darker grey particles are likely aluminosilicate grains.

Figure 5-41: Scanning Electron Microscopy Images and associated Energy Dispersive X-ray Analyses of Material Collected from Trial 3



Poorly defined iron sulphide assemblage (brightest shade) with trace zinc embedded in detrital aluminosilicate matrix (darker shaded grains).



Collection of micron-sized poorly crystalline iron (oxyhydr)oxide spherules (bright material at centre of image)

Figure 5-42: Scanning Electron Microscopy Images and associated Energy Dispersive X-ray Analyses of Material Collected from Trial 4

5.6 MICROBIOLOGY

Specific types of bacteria have been evaluated in the substrate and water of the *in situ* treatment trials to inform removal mechanisms that are occurring. Background information on the targeted removal mechanisms and bacteria involved in these biogeochemical reactions is provided in Section 3.4. DNA testing can be used to quantify and identify all bacteria in a sample, along with their relative abundance as a percentage of the community (Section 4.5.3). This reveals whether the desired types of bacteria are present in the community, and if there is biodiversity for the community to adapt to environmental change while maintaining the desired treatment pathways. In other words, diversity in beneficial microbes is favourable and can be regarded as a measure of robustness to conduct a given biogeochemical function, as multiple different bacteria will be able to carry out the beneficial reaction under a wider range of conditions than a small diversity of bacteria could. Key findings of microbial analyses for the *in situ* treatment trials are provided in the following sections. Specific trials were selected for microbiology evaluation based on results through the trials, specifically Trials 2 to 7 (Section 4.5.3).

5.6.1 SULPHIDE-PRODUCING BACTERIA

Sulphide-producing bacteria (SPB) were present in the substrate of Trials 2 to 5 at the end of their testing periods, as well as in the water during the trials (Figure 5-43). The abundance and diversity of SPB were higher in substrate samples in the carbon-dosed Trials compared to the control Trial 7 substrate (Figure 5-43). The addition of carbon therefore promoted the development of SPB and supports removal of COPIs through sulphide production.

SPB were present in all initial samples, with the soil inoculum from site having a high inferred abundance and diversity of SPB which was a source for SPB that established in the Trials (Figure 5-43). The amount of soil inoculum added to the trials impacted the inferred abundance in the substrate samples at take-down, with higher abundance measured in Trials 3 and 4 which had the higher (10 kg) soil inoculum. However, this did not have a notable impact on the treatment of chalcophile elements as removal in both low and high inoculum trials was comparable under reducing conditions (Section 5.1.4.1).

SPB growth was not inhibited at colder temperatures, although a few differences in abundance and types of SPB was observed (Figure 5-43). While the cold temperature Trial 5 was generally lower in percentages, the inferred abundance in the water at Week 22 was similar to both 10 g of soil room temperature Trials 2 and 6. Trial 5 substrate had lower SPB abundance at take down than Trial 6 and Trial 2 substrate, however, the abundance was substantially higher than that in control Trial 7.

Additionally, there was no impact to SPB with the high 10X metals salts concentrations of COPIs in Trial 6, as evidenced by the similarity in the SPB population between Trial 2 and Trial 6. The SPB population and consequently sulphide-production and removal of chalcophile metals is therefore not expected to be impacted by COPI concentrations within this range in the pit lake.

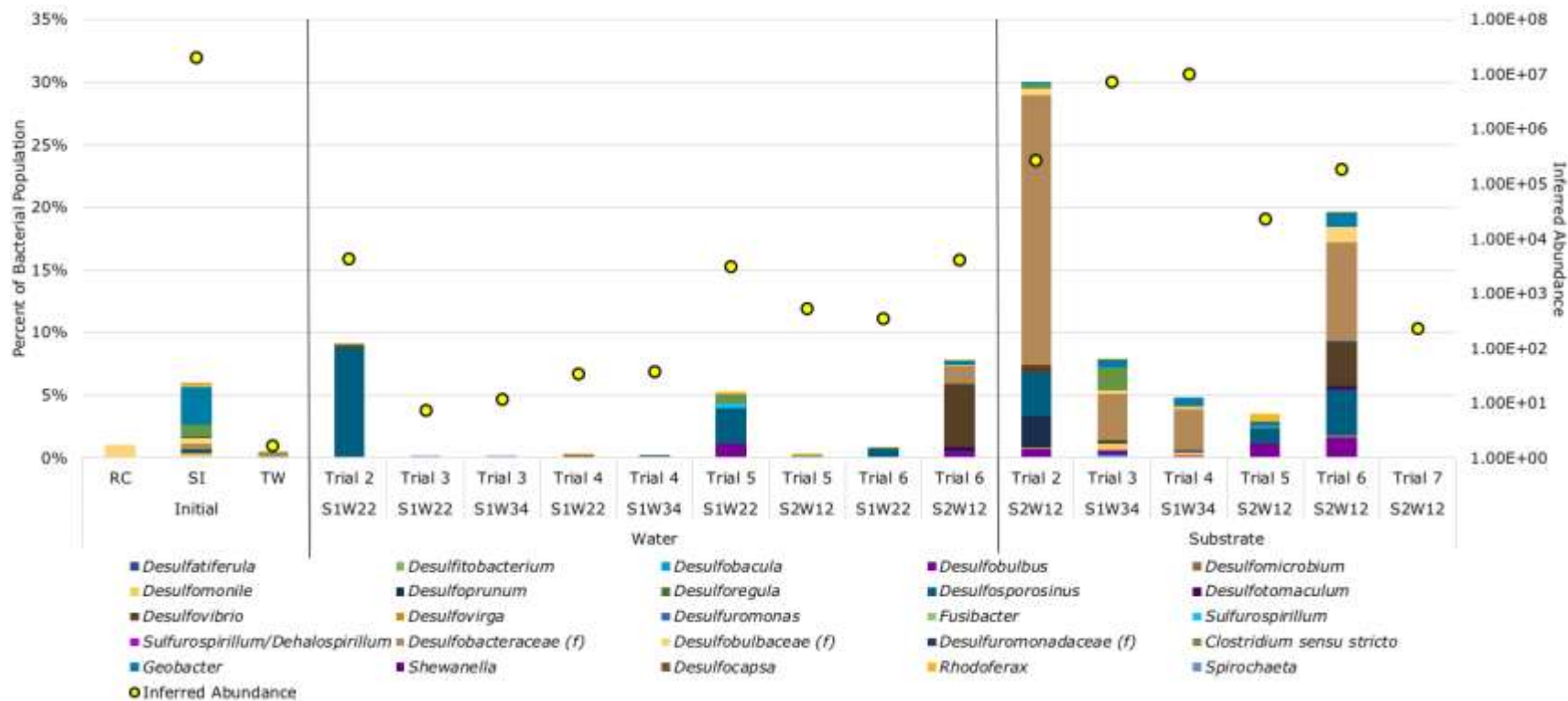


Figure 5-43: Sulphide-producing Bacteria associated with Substrate and Water in the Trials

The primary y-axis provides the percentage of the bacterial population (relative abundance) that corresponds to sulphide-producing bacteria through the reduction of sulphate, sulphite, thiosulphate, and sulphur. Organisms are classified to the genus or family level (f). The secondary y-axis provides the inferred abundance of SPB in the substrate (per cm³) and water (per mL) samples. Quantities of bacteria in the initial RC (rock composite) sample were below the limit of analysis. Vertical lines are used to separate sample types. Samples are labelled according to the Trial number that the sample was collected for substrate and water as well as the stage and week of sample collection. Sample labels are: S1W22 (Stage 1 Week 22 [mid point]), S1W34 (Stage 1 Week 34[end point Stage 1], and S2W12 (Stage 2 Week 12 [end point Stage 2]). Initial samples are: RC (rock composite), SI (soil inoculum), and TW (tap water room temperature trial).

5.6.2 SELENIUM-REDUCING AND URANIUM-REDUCING BACTERIA

Selenium-reducing bacteria (SeRB) were present in all sample types (i.e., water and substrate) tested during and at the end of the trials (Appendix C). Substrate samples from trials with carbon dosing (Trials 2 to 6) had higher diversity than the control Trial 7 with no carbon dosing, suggesting the lack of carbon prevented the development of a diverse SeRB population. There was a higher abundance and percentage of SeRB in the cold temperature Trial 5 (both water and substrate), compared to the other trials with a similar soil inoculum (Trial 2 and 6). Similarly, there was no impact to SeRB with the high 10X metals salts concentrations of COPIs in Trial 6. The microbiology results therefore support that microbially mediated selenium reduction can occur at the range of temperatures tested herein, and a diverse SeRB population can be promoted to establish through the addition of carbon.

Uranium-reducing bacteria (URB) were also present in all sample types (i.e., water and substrate) tested during and at the end of the trials (Appendix C). Similar to other beneficial bacterial populations, the addition of carbon promoted a higher diversity of URB (trials with carbon compared to control Trial 7), and the establishment was not inhibited by colder temperatures or higher concentrations of COPIs. The microbiology results therefore support the observation of microbially catalyzed uranium reduction in the trials through the addition of carbon.

6. SUMMARY OF KEY FINDINGS

Stage 1 of the *in situ* treatment trials examined COPI removal under reducing conditions stimulated by the addition of organic carbon. The primary observations of these experiments are summarized as:

- A second carbon dose during week 11 resulted in reducing conditions and generally the lowest concentrations of antimony, cadmium, copper, lead, selenium, uranium, and zinc concentrations by the end of Week 14;
- The addition of 10 kg of soil (Trials 3 and 4) resulted in comparable removal to 10 g of soil (Trials 1 and 2) for most COPIs during reducing conditions, however, following re-oxidation, sustained removal via sorption on the larger soil mass was observed for these experiments;
- At lower temperatures (5°C), reducing conditions were slower to be established, due to slower microbial metabolism at the colder temperatures, which was reflected in the slower decrease of COPIs compared to those trials operating at room temperature;
- COPI removal was lower if trials became carbon limited, which resulted in lowered treatment performance in Trial 1 and 6;
- Percent removal of COPIs assumed in the ABM Lake water quality model (AEG, 2018) was supported by the *in situ* treatment trials, particularly for Trial 2 which did not contain the 10 kg of soil; and
- The *in situ* trials demonstrated establishment of a diverse population of sulphide-producing, selenium-reducing, and uranium-reducing bacteria with the addition of carbon, supporting the observation of microbially catalyzed COPI removal in the trials. Establishment was not inhibited by colder temperature or by higher COPI concentrations that were tested.

Stage 2 of the *in situ* treatment trials examined COPI (particularly arsenic) removal following ferric iron addition under both oxidizing and reducing conditions. These experiments indicated:

- Addition of ferric iron resulted in a maximum removal of approximately 40% to 65% of arsenic;
- The higher iron to arsenic ratio (20:1) improved removal of dissolved arsenic, suggesting that overall removal of total arsenic may be further improved upon extended settling time;
- At lower temperatures (5°C), abiotic processes were less affected by temperature as shown by comparable arsenic removal through sorption to iron (oxyhydr)oxides in Trials 1 and 5;
- Although the order of ferric and carbon dosing did not appear to influence the maximum total arsenic removal observed, greater removal was observed at the end of Trial 5 for dissolved arsenic, which received ferric iron first under oxidizing conditions before transitioning to reducing conditions following carbon amendment;
- Additional arsenic sequestration in reducing systems likely occurs via incorporation into iron sulphides in the presence of iron, which can also polish arsenic concentrations as the system begins to re-oxidize, perhaps by sorption on iron (oxyhydr)oxides that start to re-precipitate; and
- Ferric addition under oxidizing conditions resulted in no to minor removal of other COPIs; however, subsequent transition to reducing conditions resulted in improved removal of cadmium and copper at the highest iron dose.

Bench-scale iron addition trials were conducted to evaluate arsenic removal with ferric addition under conditions of complete mixing, to assess the maximum arsenic removal that may be realized. These experiments showed that:

- The addition of ferric iron to a well mixed bench-scale experiment achieved greater arsenic removal on a shorter time scale compared to the *in situ* treatment trials; and
- After 144 hours, up to 90% of total arsenic removal was achieved with a Fe:As mass ratio of 20:1 compared to approximately 50% removal with a Fe:As mass ratio of 10:1.

7. CONCEPTUAL IMPLEMENTATION OF *IN SITU* TREATMENT IN ABM LAKE

ABM Lake is expected to take approximately 15 years to form before it begins to discharge to Geona Creek. Water quality monitoring of the ABM Lake will occur as it fills to monitor its chemistry, help direct the optimal location and timing of *in situ* treatment, and determine whether additional treatment events are required to maintain low COPI concentrations. COPI concentrations will peak in the first year of flooding as the more reactive, metal-leaching rock facies are located in the lower portion of the ABM pit which release their accumulated soluble load to the small volume of water in the pit (AEG, 2018). COPI concentrations then decline over the following year due to dilution before stabilizing or rising slowly as the pit fills (AEG, 2018).

7.1 FERRIC IRON AMENDMENT

The Stage 2 and Stage 3 *in situ* experiments suggest that ferric iron dosing is effective at removing arsenic from the water column while mixing is important to ensure optimal arsenic removal (i.e., contact with the precipitating ferric hydroxide). Based on the Stage 3 data, an iron to arsenic ratio of 20:1 is recommended to optimize arsenic removal. If required, ferric iron addition in the early stages (e.g., Year 5 or earlier) of the ABM Lake formation is recommended given that:

- Arsenic concentrations are predicted to peak in the first few years of filling;
- The nascent ABM Lake will be better mixed during this early stage in its formation; and
- The smaller water volume present in the pit will result in lower reagent requirements and lower cost.

Based on the ABM Lake volume at Year 5 (11.408 million m³) and an arsenic concentration of 0.058 mg/L, approximately 18.9 tonnes of ferric iron are required to achieve a 20:1 iron to arsenic ratio in the lake. Commercially available liquid ferric sulphate has a ferric iron content of approximately 13% and specific gravity of 1.6. Therefore, 18.9 tonnes of ferric sulphate equates to approximately 91 m³ of commercial ferric sulphate solution. This material can be shipped to site in 275 gallon (1 m³) totes (i.e., 91 totes) and added to the ABM pit by direct addition to the inflowing Fault Creek water. This would facilitate treatment of the Krakatoa zone portion of ABM Lake. Addition to the remainder of ABM Lake may be performed using water cannons situated around the pit. A water distribution system comprising cannons, pumps, and piping would pump water from ABM Lake, and spray it back with ferric amendment, dependent on safe access to locations close enough to pump water from the pit to feed the water cannons. The iron (oxyhydr)oxide precipitates that form will scavenge dissolved arsenic and settle out of the water column following the cessation of pumping.

Water quality monitoring before and after the iron addition will assess the efficacy of the treatment and subsequent regular monitoring will determine whether any additional arsenic removal may be required prior to discharge of the lake to Geona Creek. Addition of ferric reagent in the later stages of filling will need to be balanced against the potential exceedance of WQO for the counter-anion in the ferric reagent (e.g., sulphate, chloride, nitrate), although the sulphate added is likely to be negligible relative to that already present in the lake. If alternative ferric iron sources are required to minimize sulphate addition, use of ferric nitrate may be preferred for any ferric addition required in the later stages of pit filling since the nitrate can be subsequently removed by a follow-up carbon injection.

7.2 ORGANIC CARBON AMENDMENT

Glycerol was used in the *in situ* trials as an electron dense source of carbon that is readily utilized by the microorganisms which facilitate COPI removal. Glycerol also has safety and logistical advantages over other potential sources of organic

carbon. For example, glycerol does not have flammability issues associated with more volatile alcohols (e.g., methanol, ethanol) and is less viscous than molasses, allowing for safer and easier application at the Kudz Ze Kayah Site.

Glycerol will be added later in the lake filling period in order to (i) allow a larger volume of water to form, which provides a greater barrier to oxygen ingress at depth once reducing conditions are established; (ii) harness the ice cover that will form on the larger water body over winter, which will also act as a barrier to oxidation by atmospheric oxygen; and (iii) utilize the iron added from the ferric treatment to assist in COPI removal and longer term sequestration associated with iron sulphide formation. Carbon addition maybe be considered around Years 8 to 10 after the start of ABM Lake formation, which would allow for significant time to monitor COPI removal and allow for any contingency measures (e.g., additional carbon addition) to be enacted if needed.

Based on the ABM Lake volume at Year 8 (18.147 million m³), approximately 1,500 m³ of 100% glycerol is required to match the glycerol dose used in the Stage 2 Trials that resulted in marked COPI removal (13 mL in approximately 160 L water). This would require 24 B-train tankers, assuming a volume of 64 m³ for a standard B-train. Glycerol may be deposited at site in a large storage vessel at one or two storage facilities depending on the selected injection location(s) to the nascent ABM Lake. Glycerol can be added by both direct addition to the discharging Fault Creek water and via a water distribution system similar constructed of water cannons, pumps, and piping to stimulate the development of reducing conditions. Enough organic carbon will be added to consume dissolved oxygen, nitrate and nitrite, and cause the partial conversion of some dissolved sulphate to sulphide. Under such reducing conditions, elements such as selenium and uranium are largely transformed to less soluble forms (e.g., elemental selenium and uraninite phases). Chalcophile elements such as cadmium, zinc, copper, antimony, and lead will precipitate as poorly soluble sulphide minerals. The insoluble phases formed will settle to the lake bottom for long-term storage. Reactive iron sulphide minerals will also form during treatment, which will help scavenge some COPI via co-precipitation and also act as a sacrificial anode to maintain the reduced COPI in their stable precipitated forms in the lake sediment.

Treatment will be initiated in late summer/early fall at a time when microbial respiration rates are highest. Continuous injection of glycerol to the lake, with recirculation mixing, will occur over a period of one to two months, sufficient to distribute glycerol throughout the lake. As reducing conditions develop over the subsequent months, the formation of an ice layer over the lake will help limit the ingress of oxygen and prolong the period of time that the lake will remain reducing, thus maximizing COPI removal. Much longer sustained periods of reducing conditions are anticipated for the full scale implementation than observed in pilot-scale barrel trials due to the greater water column depth and associated slower oxygen ingress and the ice cover barrier to the atmosphere. Water quality sampling will continue following the carbon injection event and will include the collection of samples at strategic depths in the water column to evaluate the development of any stratification, since the presence of an anoxic hypolimnion (lower layer of water in a stratified lake) at depth will further assist in the preservation of the reduced COPI in their stable precipitated forms.

8. REFERENCES

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APPENDIX A.

Laboratory Result Reports

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08458557

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2018/10/23

Report #: R2638991

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B890377

Received: 2018/10/15, 10:38

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Hardness Total (calculated as CaCO ₃) (1, 2)	2	N/A	2018/10/19	BBY WI-00033	Auto Calc
Mercury (Total) by CVAf (1)	2	2018/10/18	2018/10/18	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	2	N/A	2018/10/19	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	2	N/A	2018/10/18	BBY7SOP-00002	EPA 6020b R2 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08458557

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2018/10/23
Report #: R2638991
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B890377
Received: 2018/10/15, 10:38

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Diana Cruz, Project Manager
Email: DCruz@maxxam.ca
Phone# (403) 291-3077

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B890377
Report Date: 2018/10/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Maxxam ID		UO2836	UO2837		
Sampling Date		2018/10/11 13:00	2018/10/15 10:00		
COC Number		08458557	08458557		
	UNITS	BARREL LEACH TEST	BARREL LEACH TEST	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	188	187	0.50	9185885
Elements					
Total Mercury (Hg)	mg/L	<0.0000020	<0.0000020	0.0000020	9189345
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.0159	0.0151	0.00050	9189471
Total Antimony (Sb)	mg/L	0.000149	0.000155	0.000020	9189471
Total Arsenic (As)	mg/L	0.000284	0.000280	0.000020	9189471
Total Barium (Ba)	mg/L	0.0583	0.0586	0.000020	9189471
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9189471
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9189471
Total Boron (B)	mg/L	0.027	0.026	0.010	9189471
Total Cadmium (Cd)	mg/L	0.0000056	<0.0000050	0.0000050	9189471
Total Chromium (Cr)	mg/L	0.00031	0.00033	0.00010	9189471
Total Cobalt (Co)	mg/L	0.000152	0.000157	0.0000050	9189471
Total Copper (Cu)	mg/L	0.129	0.127	0.000050	9189471
Total Iron (Fe)	mg/L	0.0082	0.0077	0.0010	9189471
Total Lead (Pb)	mg/L	0.000380	0.000359	0.0000050	9189471
Total Lithium (Li)	mg/L	0.0118	0.0117	0.00050	9189471
Total Manganese (Mn)	mg/L	0.000602	0.000546	0.000050	9189471
Total Molybdenum (Mo)	mg/L	0.00194	0.00169	0.000050	9189471
Total Nickel (Ni)	mg/L	0.00197	0.00195	0.000020	9189471
Total Phosphorus (P)	mg/L	0.0076	0.0036	0.0020	9189471
Total Selenium (Se)	mg/L	0.000360	0.000370	0.000040	9189471
Total Silicon (Si)	mg/L	0.785	0.789	0.050	9189471
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9189471
Total Strontium (Sr)	mg/L	0.270	0.269	0.000050	9189471
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9189471
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9189471
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9189471
Total Uranium (U)	mg/L	0.00125	0.00124	0.0000020	9189471
RDL = Reportable Detection Limit					

Maxxam Job #: B890377
Report Date: 2018/10/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Maxxam ID		UO2836	UO2837		
Sampling Date		2018/10/11 13:00	2018/10/15 10:00		
COC Number		08458557	08458557		
	UNITS	BARREL LEACH TEST	BARREL LEACH TEST	RDL	QC Batch
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9189471
Total Zinc (Zn)	mg/L	0.0167	0.0167	0.00010	9189471
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9189471
Total Calcium (Ca)	mg/L	45.9	45.7	0.050	9186324
Total Magnesium (Mg)	mg/L	17.8	17.6	0.050	9186324
Total Potassium (K)	mg/L	4.16	4.19	0.050	9186324
Total Sodium (Na)	mg/L	27.4	27.2	0.050	9186324
Total Sulphur (S)	mg/L	28.8	28.9	3.0	9186324
RDL = Reportable Detection Limit					

Maxxam Job #: B890377
Report Date: 2018/10/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

TEST SUMMARY

Maxxam ID: UO2836
Sample ID: BARREL LEACH TEST
Matrix: Water

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hardness Total (calculated as CaCO ₃)	CALC	9185885	N/A	2018/10/19	Automated Statchk
Mercury (Total) by CVAf	CV/AF	9189345	2018/10/18	2018/10/18	Chamila Jayasinghe
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9186324	N/A	2018/10/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9189471	N/A	2018/10/18	Andrew An

Maxxam ID: UO2837
Sample ID: BARREL LEACH TEST
Matrix: Water

Collected: 2018/10/15
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hardness Total (calculated as CaCO ₃)	CALC	9185885	N/A	2018/10/19	Automated Statchk
Mercury (Total) by CVAf	CV/AF	9189345	2018/10/18	2018/10/18	Chamila Jayasinghe
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9186324	N/A	2018/10/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9189471	N/A	2018/10/18	Andrew An

Maxxam Job #: B890377
Report Date: 2018/10/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	11.0°C
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Results relate only to the items tested.

Maxxam Job #: B890377
Report Date: 2018/10/23

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9189345	Total Mercury (Hg)	2018/10/18	88	80 - 120	95	80 - 120	<0.0000020	mg/L	2.3	20
9189471	Total Aluminum (Al)	2018/10/18	96	80 - 120	104	80 - 120	<0.00050	mg/L	18	20
9189471	Total Antimony (Sb)	2018/10/18	95	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
9189471	Total Arsenic (As)	2018/10/18	97	80 - 120	103	80 - 120	<0.000020	mg/L	NC	20
9189471	Total Barium (Ba)	2018/10/18	96	80 - 120	104	80 - 120	<0.000020	mg/L	NC	20
9189471	Total Beryllium (Be)	2018/10/18	97	80 - 120	104	80 - 120	<0.000010	mg/L	NC	20
9189471	Total Bismuth (Bi)	2018/10/18	95	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9189471	Total Boron (B)	2018/10/18	98	80 - 120	104	80 - 120	<0.010	mg/L	NC	20
9189471	Total Cadmium (Cd)	2018/10/18	98	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9189471	Total Chromium (Cr)	2018/10/18	98	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
9189471	Total Cobalt (Co)	2018/10/18	95	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9189471	Total Copper (Cu)	2018/10/18	93	80 - 120	100	80 - 120	<0.000050	mg/L	0.80	20
9189471	Total Iron (Fe)	2018/10/18	96	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
9189471	Total Lead (Pb)	2018/10/18	95	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9189471	Total Lithium (Li)	2018/10/18	94	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9189471	Total Manganese (Mn)	2018/10/18	98	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9189471	Total Molybdenum (Mo)	2018/10/18	97	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9189471	Total Nickel (Ni)	2018/10/18	96	80 - 120	104	80 - 120	<0.000020	mg/L	NC	20
9189471	Total Phosphorus (P)	2018/10/18	96	80 - 120	99	80 - 120	<0.0020	mg/L	NC	20
9189471	Total Selenium (Se)	2018/10/18	95	80 - 120	101	80 - 120	<0.000040	mg/L	NC	20
9189471	Total Silicon (Si)	2018/10/18	99	80 - 120	102	80 - 120	<0.050	mg/L	NC	20
9189471	Total Silver (Ag)	2018/10/18	97	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9189471	Total Strontium (Sr)	2018/10/18	97	80 - 120	105	80 - 120	<0.000050	mg/L	3.5	20
9189471	Total Sulphur (S)	2018/10/18	96	80 - 120	101	80 - 120	<0.60	mg/L		
9189471	Total Thallium (Tl)	2018/10/18	95	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9189471	Total Tin (Sn)	2018/10/18	92	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9189471	Total Titanium (Ti)	2018/10/18	98	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
9189471	Total Uranium (U)	2018/10/18	99	80 - 120	106	80 - 120	<0.0000020	mg/L	NC	20
9189471	Total Vanadium (V)	2018/10/18	99	80 - 120	105	80 - 120	<0.00020	mg/L	NC	20
9189471	Total Zinc (Zn)	2018/10/18	102	80 - 120	105	80 - 120	<0.00010	mg/L	0.46	20

Maxxam Job #: B890377
Report Date: 2018/10/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9189471	Total Zirconium (Zr)	2018/10/18	96	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

Maxxam Job #: B890377
Report Date: 2018/10/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, B.Sc., Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: BMC MINERALS LTD.	Company Name: ALEXCO ENVIRONMENTAL	Quotation #: B50743	☒ Regular TAT 5 days (Most analyses)				
Contact Name:	Contact Name: KAI WOLOSHTYN ANDREW GAULT KRISTEN PIECOWYE	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS				
Address: 530-1130 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-01	Rush TAT (Surcharges will be applied)				
Vancouver, BC PC: V6E 4A4	Whitehorse, YK PC: V1A 2V3	Site Location: Kudz Ze Kayah	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days				
Phone:	Phone: (867) 668-6463 agault@alexcoresource.com	Site #:	Date Required:				
Email:	Email: kwoloshtyn@alexcoresource.com	Sampled By: KRISTEN PIECOWYE					
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		TOTAL LOW LEVEL METALS INCL. MERCURY & S [Grid for Analysis Requested]		LABORATORY USE ONLY CUSTODY SEAL Y/N COOLER TEMPERATURES PRESENT INITIAL COOLING MEDIA PRESENT Y/N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# OF CONTAINERS SUBMITTED		
1 Barrel Leach Test		11-Oct-18	1:00PM	Water	x	2	INCLUDE RESULTS IN CSV. FORMAT
3 Barrel Leach Test		15-Oct-18	10:00AM	Water	x	2	INCLUDE RESULTS IN CSV. FORMAT
4							
5							
6							
7							
8							
9							
10							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
KRISTEN PIECOWYE		2018-10-15	10:15AM	[Signature]		2018/10/16	08:35
[Signature]		2018-10-15	10:15AM				

include Kpiecowye @ centarystategies.com on report information

1061



B890377_COC

Your Project #: BMC-18-01
Site Location: KUDZ DE KAYAH
Your C.O.C. #: 08462574

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2018/12/11
Report #: R2662701
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B8A3309

Received: 2018/11/23, 13:04

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Sublet (Inorganics) (1)	1	N/A	2018/12/10		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Sub Vancouver to Acme

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: DCruz@maxxam.ca

Phone# (604) 734 7276

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E),

Your Project #: BMC-18-01
Site Location: KUDZ DE KAYAH
Your C.O.C. #: 08462574

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2018/12/11
Report #: R2662701
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B8A3309

Received: 2018/11/23, 13:04

signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8A3309
Report Date: 2018/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ DE KAYAH

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		UV5709	
Sampling Date		2018/11/23 10:30	
COC Number		08462574	
	UNITS	SOIL INOCULUM	QC Batch
Parameter			
Subcontract Parameter	N/A	ATTACHED	9260313

Maxxam Job #: B8A3309
Report Date: 2018/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ DE KAYAH

GENERAL COMMENTS

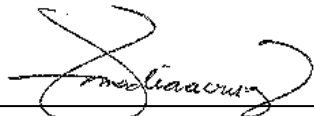
Results relate only to the items tested.

Maxxam Job #: B8A3309
Report Date: 2018/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ DE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Diana Cruz, Project Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08463386

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/01/08
Report #: R2671802
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8B2035

Received: 2018/12/28, 08:00

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride - Low Level (1)	8	N/A	2018/12/29	BBY6SOP-00011	SM 22 4500-Cl- E m
Fluoride - Low Level (1)	8	N/A	2019/01/02	BBY6SOP-00048	SM 22 4500-F C m
Hardness (calculated as CaCO ₃) (1)	8	N/A	2018/12/29	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	8	N/A	2018/12/29	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	8	N/A	2018/12/29	BBY7SOP-00002	EPA 6020b R2 m
Nitrate+Nitrite (N) (low level) (1)	8	N/A	2018/12/29	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	8	N/A	2018/12/29	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	8	N/A	2019/01/08	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	8	N/A	2018/12/28	BBY7 WI-00004	BCMOE Reqs 08/14
Sulphate - Low Level (1)	6	N/A	2018/12/29	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate - Low Level (1)	2	N/A	2018/12/31	BBY6SOP-00017	SM 22 4500-SO42- E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08463386

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/01/08
Report #: R2671802
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8B2035

Received: 2018/12/28, 08:00

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: DCruz@maxxam.ca

Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8B2035
Report Date: 2019/01/08

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VA1350	VA1351	VA1352	VA1353		VA1354	VA1355		
Sampling Date		2018/12/27 10:00	2018/12/27 10:30	2018/12/27 10:35	2018/12/27 10:50		2018/12/27 13:30	2018/12/27 11:00		
COC Number		08463386	08463386	08463386	08463386		08463386	08463386		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	QC Batch	TRIAL #5	TRIAL #6	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	ONSITE	FIELD	FIELD		ONSITE
Nitrate (N)	mg/L	0.313	0.309	0.282	0.279	9285162	0.286	0.273	0.0020	9285162
Misc. Inorganics										
Fluoride (F)	mg/L	0.640	0.650	0.620	0.630	9280742	0.620	0.620	0.010	9280742
Anions										
Dissolved Sulphate (SO4)	mg/L	90.5	87.9	87.3	89.5	9279541	88.2	88.3	0.50	9280231
Dissolved Chloride (Cl)	mg/L	15	15	15	15	9279539	15	15	0.50	9279537
Nutrients										
Nitrate plus Nitrite (N)	mg/L	0.327	0.321	0.292	0.287	9279446	0.307	0.288	0.0020	9279446
Nitrite (N)	mg/L	0.0139	0.0120	0.0094	0.0083	9279447	0.0211	0.0150	0.0020	9279447
RDL = Reportable Detection Limit										

Maxxam ID		VA1356	VA1357		
Sampling Date		2018/12/27 11:05	2018/12/27 11:10		
COC Number		08463386	08463386		
	UNITS	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters					
Filter and HNO3 Preservation	N/A	FIELD	FIELD		ONSITE
Nitrate (N)	mg/L	0.306	0.273	0.0020	9285162
Misc. Inorganics					
Fluoride (F)	mg/L	0.680	0.620	0.010	9280742
Anions					
Dissolved Sulphate (SO4)	mg/L	88.9	88.1	0.50	9279541
Dissolved Chloride (Cl)	mg/L	15	15	0.50	9279539
Nutrients					
Nitrate plus Nitrite (N)	mg/L	0.315	0.282	0.0020	9279446
Nitrite (N)	mg/L	0.0097	0.0093	0.0020	9279447
RDL = Reportable Detection Limit					

Maxxam Job #: B8B2035
Report Date: 2019/01/08

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VA1350	VA1351	VA1352	VA1353	VA1354		
Sampling Date		2018/12/27 10:00	2018/12/27 10:30	2018/12/27 10:35	2018/12/27 10:50	2018/12/27 13:30		
COC Number		08463386	08463386	08463386	08463386	08463386		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	154	155	158	153	158	0.50	9278504
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0185	0.0187	0.0119	0.0107	0.00682	0.00050	9278132
Dissolved Antimony (Sb)	mg/L	0.000981	0.000767	0.000527	0.000550	0.00114	0.000020	9278132
Dissolved Arsenic (As)	mg/L	0.000770	0.00113	0.00156	0.00147	0.00218	0.000020	9278132
Dissolved Barium (Ba)	mg/L	0.0462	0.0475	0.0631	0.0623	0.0747	0.000020	9278132
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9278132
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9278132
Dissolved Boron (B)	mg/L	0.024	0.025	0.025	0.023	0.024	0.010	9278132
Dissolved Cadmium (Cd)	mg/L	0.0000748	0.0000800	0.000383	0.000385	0.000500	0.0000050	9278132
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	0.00010	9278132
Dissolved Cobalt (Co)	mg/L	0.000336	0.000298	0.000111	0.000106	0.000209	0.0000050	9278132
Dissolved Copper (Cu)	mg/L	0.0119	0.0108	0.00572	0.00535	0.00715	0.000050	9278132
Dissolved Iron (Fe)	mg/L	0.0029	0.0025	0.0054	0.0050	0.0074	0.0010	9278132
Dissolved Lead (Pb)	mg/L	0.00175	0.00169	0.000295	0.000302	0.000291	0.0000050	9278132
Dissolved Lithium (Li)	mg/L	0.0107	0.0111	0.0112	0.0105	0.0110	0.00050	9278132
Dissolved Manganese (Mn)	mg/L	0.00291	0.00285	0.0306	0.0294	0.0751	0.000050	9278132
Dissolved Molybdenum (Mo)	mg/L	0.00188	0.00175	0.00235	0.00223	0.00320	0.000050	9278132
Dissolved Nickel (Ni)	mg/L	0.00247	0.00233	0.00197	0.00181	0.00221	0.000020	9278132
Dissolved Phosphorus (P)	mg/L	0.0027	0.0029	0.0034	0.0029	0.0030	0.0020	9278132
Dissolved Selenium (Se)	mg/L	0.000703	0.000844	0.000615	0.000610	0.000773	0.000040	9278132
Dissolved Silicon (Si)	mg/L	0.625	0.598	0.687	0.654	0.705	0.050	9278132
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9278132
Dissolved Strontium (Sr)	mg/L	0.245	0.244	0.245	0.238	0.239	0.000050	9278132
Dissolved Thallium (Tl)	mg/L	0.0000476	0.0000827	0.0000113	0.0000126	0.0000142	0.0000020	9278132
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9278132
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9278132
Dissolved Uranium (U)	mg/L	0.00277	0.00255	0.00345	0.00334	0.00589	0.0000020	9278132
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00023	<0.00020	0.00020	9278132
Dissolved Zinc (Zn)	mg/L	0.0141	0.0141	0.0190	0.0170	0.0205	0.00010	9278132
Dissolved Zirconium (Zr)	mg/L	0.00022	0.00020	0.00014	0.00012	0.00019	0.00010	9278132
RDL = Reportable Detection Limit								

Maxxam Job #: B8B2035
Report Date: 2019/01/08

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VA1350	VA1351	VA1352	VA1353	VA1354		
Sampling Date		2018/12/27 10:00	2018/12/27 10:30	2018/12/27 10:35	2018/12/27 10:50	2018/12/27 13:30		
COC Number		08463386	08463386	08463386	08463386	08463386		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	35.2	35.3	36.9	35.7	37.4	0.050	9278507
Dissolved Magnesium (Mg)	mg/L	16.1	16.1	16.0	15.6	15.7	0.050	9278507
Dissolved Potassium (K)	mg/L	4.07	4.03	4.09	3.92	4.05	0.050	9278507
Dissolved Sodium (Na)	mg/L	25.6	25.6	25.2	24.8	25.1	0.050	9278507
Dissolved Sulphur (S)	mg/L	27.4	27.3	27.5	26.4	27.7	3.0	9278507
RDL = Reportable Detection Limit								

Maxxam Job #: B8B2035
Report Date: 2019/01/08

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VA1355	VA1356	VA1357		
Sampling Date		2018/12/27 11:00	2018/12/27 11:05	2018/12/27 11:10		
COC Number		08463386	08463386	08463386		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	155	153	157	0.50	9278504
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00746	0.0191	0.0111	0.00050	9278132
Dissolved Antimony (Sb)	mg/L	0.000995	0.00179	0.000587	0.000020	9278132
Dissolved Arsenic (As)	mg/L	0.00206	0.00106	0.00189	0.000020	9278132
Dissolved Barium (Ba)	mg/L	0.0758	0.0497	0.0644	0.000020	9278132
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9278132
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9278132
Dissolved Boron (B)	mg/L	0.023	0.025	0.024	0.010	9278132
Dissolved Cadmium (Cd)	mg/L	0.000378	0.0000708	0.000384	0.0000050	9278132
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9278132
Dissolved Cobalt (Co)	mg/L	0.0000857	0.000345	0.0000745	0.0000050	9278132
Dissolved Copper (Cu)	mg/L	0.00483	0.00550	0.00553	0.000050	9278132
Dissolved Iron (Fe)	mg/L	0.0048	0.0021	0.0049	0.0010	9278132
Dissolved Lead (Pb)	mg/L	0.000252	0.00149	0.000363	0.0000050	9278132
Dissolved Lithium (Li)	mg/L	0.0104	0.0112	0.0108	0.00050	9278132
Dissolved Manganese (Mn)	mg/L	0.0538	0.00450	0.0299	0.000050	9278132
Dissolved Molybdenum (Mo)	mg/L	0.00287	0.00180	0.00458	0.000050	9278132
Dissolved Nickel (Ni)	mg/L	0.00177	0.00213	0.00183	0.000020	9278132
Dissolved Phosphorus (P)	mg/L	0.0028	0.0031	0.0031	0.0020	9278132
Dissolved Selenium (Se)	mg/L	0.000714	0.000761	0.000565	0.000040	9278132
Dissolved Silicon (Si)	mg/L	0.667	0.652	0.725	0.050	9278132
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9278132
Dissolved Strontium (Sr)	mg/L	0.233	0.246	0.238	0.000050	9278132
Dissolved Thallium (Tl)	mg/L	0.0000127	0.0000801	0.0000089	0.0000020	9278132
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9278132
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9278132
Dissolved Uranium (U)	mg/L	0.00481	0.00305	0.00339	0.0000020	9278132
Dissolved Vanadium (V)	mg/L	0.00022	<0.00020	0.00028	0.00020	9278132
Dissolved Zinc (Zn)	mg/L	0.0149	0.00816	0.0172	0.00010	9278132
Dissolved Zirconium (Zr)	mg/L	0.00012	0.00019	0.00011	0.00010	9278132
RDL = Reportable Detection Limit						

Maxxam Job #: B8B2035
Report Date: 2019/01/08

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VA1355	VA1356	VA1357		
Sampling Date		2018/12/27 11:00	2018/12/27 11:05	2018/12/27 11:10		
COC Number		08463386	08463386	08463386		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	36.5	35.0	36.9	0.050	9278507
Dissolved Magnesium (Mg)	mg/L	15.5	15.9	15.8	0.050	9278507
Dissolved Potassium (K)	mg/L	4.10	4.07	4.06	0.050	9278507
Dissolved Sodium (Na)	mg/L	25.1	25.3	24.9	0.050	9278507
Dissolved Sulphur (S)	mg/L	26.4	27.1	27.1	3.0	9278507
RDL = Reportable Detection Limit						

Maxxam Job #: B8B2035
Report Date: 2019/01/08

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C
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Revised Report V2 (2019/01/08): Report re-issued to include Nitrate parameter results for all samples. DC6

LOW LEVEL DISSOLVED METALS IN WATER (WATER) Comments

Matrix Spike Elements by ICPMS Low Level (dissolved): RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.

Maxxam Job #: B8B2035
Report Date: 2019/01/08

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9278132	Dissolved Aluminum (Al)	2018/12/29	NC	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9278132	Dissolved Antimony (Sb)	2018/12/29	100	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9278132	Dissolved Arsenic (As)	2018/12/29	NC	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9278132	Dissolved Barium (Ba)	2018/12/29	104	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9278132	Dissolved Beryllium (Be)	2018/12/29	98	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9278132	Dissolved Bismuth (Bi)	2018/12/29	101	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9278132	Dissolved Boron (B)	2018/12/29	103	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9278132	Dissolved Cadmium (Cd)	2018/12/29	98	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9278132	Dissolved Chromium (Cr)	2018/12/29	99	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9278132	Dissolved Cobalt (Co)	2018/12/29	102	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9278132	Dissolved Copper (Cu)	2018/12/29	NC	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9278132	Dissolved Iron (Fe)	2018/12/29	NC	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
9278132	Dissolved Lead (Pb)	2018/12/29	104	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9278132	Dissolved Lithium (Li)	2018/12/29	102	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9278132	Dissolved Manganese (Mn)	2018/12/29	NC	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9278132	Dissolved Molybdenum (Mo)	2018/12/29	102	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9278132	Dissolved Nickel (Ni)	2018/12/29	103	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9278132	Dissolved Phosphorus (P)	2018/12/29	97	80 - 120	98	80 - 120	<0.0020	mg/L	NC	20
9278132	Dissolved Selenium (Se)	2018/12/29	99	80 - 120	97	80 - 120	<0.000040	mg/L	NC	20
9278132	Dissolved Silicon (Si)	2018/12/29	NC	80 - 120	98	80 - 120	<0.050	mg/L	NC	20
9278132	Dissolved Silver (Ag)	2018/12/29	93	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9278132	Dissolved Strontium (Sr)	2018/12/29	NC	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9278132	Dissolved Thallium (Tl)	2018/12/29	98	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9278132	Dissolved Tin (Sn)	2018/12/29	102	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9278132	Dissolved Titanium (Ti)	2018/12/29	104	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9278132	Dissolved Uranium (U)	2018/12/29	107	80 - 120	104	80 - 120	<0.0000020	mg/L	NC	20
9278132	Dissolved Vanadium (V)	2018/12/29	101	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9278132	Dissolved Zinc (Zn)	2018/12/29	NC	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9278132	Dissolved Zirconium (Zr)	2018/12/29	99	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9279446	Nitrate plus Nitrite (N)	2018/12/29	99	80 - 120	106	80 - 120	<0.0020	mg/L	6.6	25
9279447	Nitrite (N)	2018/12/29	95	80 - 120	101	80 - 120	<0.0020	mg/L	4.1	25

Maxxam Job #: B8B2035
Report Date: 2019/01/08

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9279537	Dissolved Chloride (Cl)	2018/12/29			103	80 - 120	<0.50	mg/L		
9279539	Dissolved Chloride (Cl)	2018/12/29			103	80 - 120	<0.50	mg/L		
9279541	Dissolved Sulphate (SO4)	2018/12/29	NC	80 - 120	99	80 - 120	0.88, RDL=0.50	mg/L	1.2	20
9280231	Dissolved Sulphate (SO4)	2018/12/31	NC	80 - 120	96	80 - 120	0.57, RDL=0.50	mg/L	5.8	20
9280742	Fluoride (F)	2019/01/02	NC	80 - 120	100	80 - 120	<0.010	mg/L	0	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

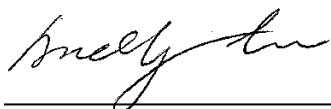
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

Maxxam Job #: B8B2035
Report Date: 2019/01/08

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Sampler Initials: KP

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Ph.D., P.Chem., Scientific Specialist



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL	Quotation #:	850743	☐ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☒ 1 Day ☐ 3 Days	
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-01		
Phone:		Phone:	(867) 668-6463 kpiecowye@alexcoresource.com	Site Location:	Kudz Ze Kayah		
Email:		Email:	agault@alexcoresource.com	Site #:		Date Required:	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		DISSOLVED LOW LEVEL METALS ANIONS (Cl, F, SO4, NO3)		LABORATORY USE ONLY CUSTODY SEAL Y / N Present Intact COOLING MEDIA PRESENT COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	DISSOLVED LOW LEVEL METALS	ANIONS (Cl, F, SO4, NO3)	# OF CONTAINERS SUBMITTED
1	Trial #1	27-Dec-18	10:00AM	Water	X	X	3
2	Trial #2	27-Dec-18	10:30AM	Water	X	X	3
3	Trial #3	27-Dec-18	10:35AM	Water	X	X	3
4	Trial #4	27-Dec-18	10:50AM	Water	X	X	3
5	Trial #5	27-Dec-18	1:30PM	Water	X	X	3
6	Trial #6	27-Dec-18	11:00AM	Water	X	X	3
7	Trial #7	27-Dec-18	11:05AM	Water	X	X	3
8	Trial #8	27-Dec-18	11:10AM	Water	X	X	3
9							
10							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
 Kristen Piecowye		2018/12/27	2:00PM	 Renee Lempert		2018/12/28	08:00



B8B2035_COC

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08463482

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/01/09
Report #: R2672523
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B900972

Received: 2019/01/03, 15:58

Sample Matrix: Water
Samples Received: 8

Analyses	Date		Date Analyzed	Laboratory Method	Analytical Method
	Quantity	Extracted			
Hardness Total (calculated as CaCO ₃) (1, 2)	8	N/A	2019/01/09	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	8	N/A	2019/01/08	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	8	N/A	2019/01/08	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	8	N/A	2019/01/07	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	6	2019/01/08	2019/01/08	BBY7SOP-00003	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	8	N/A	2019/01/09	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	2	N/A	2019/01/09	BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO ₃ Preserve for Metals (1)	8	N/A	2019/01/05	BBY7 WI-00004	BCMOE Reqs 08/14

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Your Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08463482

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/01/09
Report #: R2672523
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B900972
Received: 2019/01/03, 15:58

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Diana Cruz, Project Manager
Email: DCruz@maxxam.ca
Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VA8942	VA8943	VA8944	VA8945	VA8946	VA8947	VA8948	
Sampling Date		2019/01/03 14:20	2019/01/03 14:25	2019/01/03 14:30	2019/01/03 14:35	2019/01/03 14:30	2019/01/03 14:40	2019/01/03 14:45	
COC Number		08463482	08463482	08463482	08463482	08463482	08463482	08463482	
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	QC Batch
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	ONSITE

Maxxam ID		VA8949	
Sampling Date		2019/01/03 14:50	
COC Number		08463482	
	UNITS	TRIAL #8	QC Batch
Calculated Parameters			
Filter and HNO3 Preservation	N/A	FIELD	ONSITE

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VA8942	VA8943	VA8944	VA8945	VA8946		
Sampling Date		2019/01/03 14:20	2019/01/03 14:25	2019/01/03 14:30	2019/01/03 14:35	2019/01/03 14:30		
COC Number		08463482	08463482	08463482	08463482	08463482		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	162	161	165	165	167	0.50	9283468
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0238	0.0192	0.0120	0.0108	0.00634	0.00050	9283998
Dissolved Antimony (Sb)	mg/L	0.00149	0.00103	0.000521	0.000572	0.00118	0.000020	9283998
Dissolved Arsenic (As)	mg/L	0.00110	0.00160	0.00151	0.00157	0.00194	0.000020	9283998
Dissolved Barium (Ba)	mg/L	0.0460	0.0456	0.0600	0.0642	0.0751	0.000020	9283998
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9283998
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9283998
Dissolved Boron (B)	mg/L	0.026	0.026	0.025	0.025	0.025	0.010	9283998
Dissolved Cadmium (Cd)	mg/L	0.0000924	0.0000863	0.000382	0.000419	0.000426	0.0000050	9283998
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	0.00010	9283998
Dissolved Cobalt (Co)	mg/L	0.000370	0.000314	0.0000538	0.0000521	0.0000657	0.0000050	9283998
Dissolved Copper (Cu)	mg/L	0.0115	0.0104	0.00539	0.00512	0.00685	0.000050	9283998
Dissolved Iron (Fe)	mg/L	0.0146	0.0016	0.0036	0.0032	0.0066	0.0010	9283998
Dissolved Lead (Pb)	mg/L	0.00172	0.00134	0.000194	0.000201	0.000197	0.0000050	9283998
Dissolved Lithium (Li)	mg/L	0.0113	0.0113	0.0109	0.0106	0.0107	0.00050	9283998
Dissolved Manganese (Mn)	mg/L	0.00360	0.00275	0.0185	0.0170	0.0271	0.000050	9283998
Dissolved Molybdenum (Mo)	mg/L	0.00199	0.00173	0.00231	0.00231	0.00337	0.000050	9283998
Dissolved Nickel (Ni)	mg/L	0.00250	0.00240	0.00185	0.00177	0.00214	0.000020	9283998
Dissolved Selenium (Se)	mg/L	0.000804	0.000847	0.000573	0.000601	0.000754	0.000040	9283998
Dissolved Silicon (Si)	mg/L	0.642	0.615	0.720	0.750	0.708	0.050	9283998
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9283998
Dissolved Strontium (Sr)	mg/L	0.256	0.247	0.237	0.235	0.231	0.000050	9283998
Dissolved Thallium (Tl)	mg/L	0.0000567	0.0000868	0.0000091	0.0000137	0.0000168	0.0000020	9283998
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9283998
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9283998
Dissolved Uranium (U)	mg/L	0.00310	0.00255	0.00308	0.00325	0.00556	0.0000020	9283998
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00024	0.00021	<0.00020	0.00020	9283998
Dissolved Zinc (Zn)	mg/L	0.0142	0.0136	0.0180	0.0169	0.0197	0.00010	9283998
Dissolved Zirconium (Zr)	mg/L	0.00022	0.00019	0.00010	0.00010	0.00019	0.00010	9283998
Dissolved Calcium (Ca)	mg/L	37.7	37.5	39.8	39.5	40.4	0.050	9283543
Dissolved Magnesium (Mg)	mg/L	16.4	16.4	15.8	16.0	16.0	0.050	9283543

RDL = Reportable Detection Limit

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VA8942	VA8943	VA8944	VA8945	VA8946		
Sampling Date		2019/01/03 14:20	2019/01/03 14:25	2019/01/03 14:30	2019/01/03 14:35	2019/01/03 14:30		
COC Number		08463482	08463482	08463482	08463482	08463482		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.39	4.38	4.30	4.32	4.29	0.050	9283543
Dissolved Sodium (Na)	mg/L	26.0	25.5	25.1	25.5	25.9	0.050	9283543
Dissolved Sulphur (S)	mg/L	28.4	29.1	27.6	28.1	29.0	3.0	9283543
RDL = Reportable Detection Limit								

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VA8947	VA8948	VA8949		
Sampling Date		2019/01/03 14:40	2019/01/03 14:45	2019/01/03 14:50		
COC Number		08463482	08463482	08463482		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	164	165	165	0.50	9283468
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00768	0.0226	0.0106	0.00050	9283998
Dissolved Antimony (Sb)	mg/L	0.00102	0.00208	0.000580	0.000020	9283998
Dissolved Arsenic (As)	mg/L	0.00252	0.00130	0.00207	0.000020	9283998
Dissolved Barium (Ba)	mg/L	0.0724	0.0466	0.0628	0.000020	9283998
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9283998
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9283998
Dissolved Boron (B)	mg/L	0.025	0.026	0.025	0.010	9283998
Dissolved Cadmium (Cd)	mg/L	0.000384	0.0000809	0.000385	0.0000050	9283998
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	<0.00010	0.00010	9283998
Dissolved Cobalt (Co)	mg/L	0.0000555	0.000391	0.0000520	0.0000050	9283998
Dissolved Copper (Cu)	mg/L	0.00455	0.00547	0.00527	0.000050	9283998
Dissolved Iron (Fe)	mg/L	0.0037	0.0038	0.0040	0.0010	9283998
Dissolved Lead (Pb)	mg/L	0.000199	0.00170	0.000257	0.0000050	9283998
Dissolved Lithium (Li)	mg/L	0.0106	0.0113	0.0109	0.00050	9283998
Dissolved Manganese (Mn)	mg/L	0.0428	0.00518	0.0162	0.000050	9283998
Dissolved Molybdenum (Mo)	mg/L	0.00307	0.00175	0.00239	0.000050	9283998
Dissolved Nickel (Ni)	mg/L	0.00177	0.00220	0.00171	0.000020	9283998
Dissolved Selenium (Se)	mg/L	0.000700	0.000822	0.000573	0.000040	9283998
Dissolved Silicon (Si)	mg/L	0.709	0.668	0.730	0.050	9283998
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9283998
Dissolved Strontium (Sr)	mg/L	0.226	0.245	0.236	0.000050	9283998
Dissolved Thallium (Tl)	mg/L	0.0000125	0.0000841	0.0000076	0.0000020	9283998
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9283998
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9283998
Dissolved Uranium (U)	mg/L	0.00438	0.00297	0.00307	0.0000020	9283998
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00028	0.00020	9283998
Dissolved Zinc (Zn)	mg/L	0.0135	0.00868	0.0161	0.00010	9283998
Dissolved Zirconium (Zr)	mg/L	0.00010	0.00016	0.00012	0.00010	9283998
Dissolved Calcium (Ca)	mg/L	39.9	38.7	39.4	0.050	9283543
Dissolved Magnesium (Mg)	mg/L	15.7	16.6	16.2	0.050	9283543
RDL = Reportable Detection Limit						

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VA8947	VA8948	VA8949		
Sampling Date		2019/01/03 14:40	2019/01/03 14:45	2019/01/03 14:50		
COC Number		08463482	08463482	08463482		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.38	4.45	4.44	0.050	9283543
Dissolved Sodium (Na)	mg/L	25.6	26.2	25.7	0.050	9283543
Dissolved Sulphur (S)	mg/L	28.4	28.7	28.4	3.0	9283543
RDL = Reportable Detection Limit						

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VA8942	VA8943		
Sampling Date		2019/01/03 14:20	2019/01/03 14:25		
COC Number		08463482	08463482		
	UNITS	TRIAL #1	TRIAL #2	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO3)	mg/L	161	161	0.50	9283467
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.0610	0.0523	0.00050	9285491
Total Antimony (Sb)	mg/L	0.00157	0.00108	0.000020	9285491
Total Arsenic (As)	mg/L	0.00127	0.00184	0.000020	9285491
Total Barium (Ba)	mg/L	0.0457	0.0452	0.000020	9285491
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9285491
Total Bismuth (Bi)	mg/L	0.0000077	0.0000077	0.0000050	9285491
Total Boron (B)	mg/L	0.025	0.025	0.010	9285491
Total Cadmium (Cd)	mg/L	0.0000947	0.0000968	0.0000050	9285491
Total Chromium (Cr)	mg/L	0.00025	0.00017	0.00010	9285491
Total Cobalt (Co)	mg/L	0.000413	0.000359	0.0000050	9285491
Total Copper (Cu)	mg/L	0.0123	0.0116	0.000050	9285491
Total Iron (Fe)	mg/L	0.0479	0.0345	0.0010	9285491
Total Lead (Pb)	mg/L	0.00293	0.00256	0.0000050	9285491
Total Lithium (Li)	mg/L	0.0109	0.0106	0.00050	9285491
Total Manganese (Mn)	mg/L	0.00493	0.00448	0.000050	9285491
Total Molybdenum (Mo)	mg/L	0.00195	0.00177	0.000050	9285491
Total Nickel (Ni)	mg/L	0.00265	0.00240	0.000020	9285491
Total Phosphorus (P)	mg/L	0.0079	0.0054	0.0020	9285491
Total Selenium (Se)	mg/L	0.000880	0.000976	0.000040	9285491
Total Silicon (Si)	mg/L	0.696	0.675	0.050	9285491
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9285491
Total Strontium (Sr)	mg/L	0.229	0.230	0.000050	9285491
Total Thallium (Tl)	mg/L	0.0000506	0.0000893	0.0000020	9285491
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9285491
Total Titanium (Ti)	mg/L	0.00267	0.00220	0.00050	9285491
Total Uranium (U)	mg/L	0.00336	0.00278	0.0000020	9285491
Total Vanadium (V)	mg/L	0.00033	0.00029	0.00020	9285491
Total Zinc (Zn)	mg/L	0.0154	0.0158	0.00010	9285491
Total Zirconium (Zr)	mg/L	0.00033	0.00044	0.00010	9285491
Total Calcium (Ca)	mg/L	37.0	37.2	0.050	9283544
RDL = Reportable Detection Limit					

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VA8942	VA8943		
Sampling Date		2019/01/03 14:20	2019/01/03 14:25		
COC Number		08463482	08463482		
	UNITS	TRIAL #1	TRIAL #2	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.6	16.6	0.050	9283544
Total Potassium (K)	mg/L	4.14	4.22	0.050	9283544
Total Sodium (Na)	mg/L	26.3	26.3	0.050	9283544
Total Sulphur (S)	mg/L	27.3	27.7	3.0	9283544
RDL = Reportable Detection Limit					

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VA8944	VA8945	VA8946	VA8947	VA8948		
Sampling Date		2019/01/03 14:30	2019/01/03 14:35	2019/01/03 14:30	2019/01/03 14:40	2019/01/03 14:45		
COC Number		08463482	08463482	08463482	08463482	08463482		
	UNITS	TRIAL #3	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	174	173	180	181	178	0.50	9283467
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0795	0.0916	0.262	0.0785	0.112	0.0030	9284787
Total Antimony (Sb)	mg/L	0.000556	0.000621	0.00133	0.00110	0.00243	0.000020	9284787
Total Arsenic (As)	mg/L	0.00206	0.00217	0.00404	0.00321	0.00181	0.000020	9284787
Total Barium (Ba)	mg/L	0.0653	0.0704	0.0865	0.0831	0.0586	0.000050	9284787
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000027	0.000015	<0.000010	0.000010	9284787
Total Bismuth (Bi)	mg/L	0.000038	0.000055	0.000146	0.000039	0.000011	0.000010	9284787
Total Boron (B)	mg/L	0.025	0.024	0.025	0.025	0.027	0.010	9284787
Total Cadmium (Cd)	mg/L	0.000430	0.000478	0.000668	0.000459	0.000106	0.0000050	9284787
Total Chromium (Cr)	mg/L	0.00021	0.00026	0.00052	0.00019	0.00038	0.00010	9284787
Total Cobalt (Co)	mg/L	0.000160	0.000194	0.000403	0.000129	0.000509	0.000010	9284787
Total Copper (Cu)	mg/L	0.00711	0.00718	0.0131	0.00624	0.00648	0.00010	9284787
Total Iron (Fe)	mg/L	0.171	0.210	0.820	0.198	0.133	0.0050	9284787
Total Lead (Pb)	mg/L	0.00284	0.00421	0.0122	0.00323	0.00431	0.000020	9284787
Total Lithium (Li)	mg/L	0.0111	0.0110	0.0114	0.0113	0.0123	0.00050	9284787
Total Manganese (Mn)	mg/L	0.0295	0.0287	0.0640	0.0564	0.00951	0.00010	9284787
Total Molybdenum (Mo)	mg/L	0.00250	0.00233	0.00297	0.00307	0.00196	0.000050	9284787
Total Nickel (Ni)	mg/L	0.00216	0.00203	0.00283	0.00209	0.00256	0.00010	9284787
Total Phosphorus (P)	mg/L	0.0086	0.0072	0.0102	0.0079	0.0075	0.0050	9284787
Total Selenium (Se)	mg/L	0.000624	0.000660	0.000795	0.000799	0.000921	0.000040	9284787
Total Silicon (Si)	mg/L	0.830	0.887	1.12	0.893	0.875	0.050	9284787
Total Silver (Ag)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9284787
Total Strontium (Sr)	mg/L	0.265	0.270	0.271	0.271	0.292	0.000050	9284787
Total Thallium (Tl)	mg/L	0.0000122	0.0000180	0.0000247	0.0000159	0.000104	0.0000020	9284787
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9284787
Total Titanium (Ti)	mg/L	0.0030	0.0033	0.0113	0.0032	0.0039	0.0020	9284787
Total Uranium (U)	mg/L	0.00328	0.00329	0.00587	0.00462	0.00330	0.0000050	9284787
Total Vanadium (V)	mg/L	0.00052	0.00054	0.00115	0.00044	0.00024	0.00020	9284787
Total Zinc (Zn)	mg/L	0.0263	0.0274	0.0453	0.0215	0.0119	0.0010	9284787
Total Zirconium (Zr)	mg/L	0.00028	0.00039	0.00092	0.00036	0.00213	0.00010	9284787
Total Calcium (Ca)	mg/L	42.0	41.7	44.3	44.3	42.0	0.25	9283544

RDL = Reportable Detection Limit

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VA8944	VA8945	VA8946	VA8947	VA8948		
Sampling Date		2019/01/03 14:30	2019/01/03 14:35	2019/01/03 14:30	2019/01/03 14:40	2019/01/03 14:45		
COC Number		08463482	08463482	08463482	08463482	08463482		
	UNITS	TRIAL #3	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.9	16.6	16.9	17.1	17.8	0.25	9283544
Total Potassium (K)	mg/L	4.50	4.57	4.65	4.74	4.85	0.25	9283544
Total Sodium (Na)	mg/L	26.7	26.3	27.1	27.4	28.4	0.25	9283544
Total Sulphur (S)	mg/L	29.9	29.5	31.0	30.7	31.3	3.0	9283544
RDL = Reportable Detection Limit								

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VA8949		
Sampling Date		2019/01/03 14:50		
COC Number		08463482		
	UNITS	TRIAL #8	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	168	0.50	9283467
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0733	0.0030	9284787
Total Antimony (Sb)	mg/L	0.000591	0.000020	9284787
Total Arsenic (As)	mg/L	0.00254	0.000020	9284787
Total Barium (Ba)	mg/L	0.0673	0.000050	9284787
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9284787
Total Bismuth (Bi)	mg/L	0.000045	0.000010	9284787
Total Boron (B)	mg/L	0.023	0.010	9284787
Total Cadmium (Cd)	mg/L	0.000448	0.0000050	9284787
Total Chromium (Cr)	mg/L	0.00020	0.00010	9284787
Total Cobalt (Co)	mg/L	0.000129	0.000010	9284787
Total Copper (Cu)	mg/L	0.00664	0.00010	9284787
Total Iron (Fe)	mg/L	0.132	0.0050	9284787
Total Lead (Pb)	mg/L	0.00296	0.000020	9284787
Total Lithium (Li)	mg/L	0.0108	0.00050	9284787
Total Manganese (Mn)	mg/L	0.0278	0.00010	9284787
Total Molybdenum (Mo)	mg/L	0.00237	0.000050	9284787
Total Nickel (Ni)	mg/L	0.00188	0.00010	9284787
Total Phosphorus (P)	mg/L	<0.0050	0.0050	9284787
Total Selenium (Se)	mg/L	0.000566	0.000040	9284787
Total Silicon (Si)	mg/L	0.851	0.050	9284787
Total Silver (Ag)	mg/L	<0.000010	0.000010	9284787
Total Strontium (Sr)	mg/L	0.263	0.000050	9284787
Total Thallium (Tl)	mg/L	0.0000102	0.0000020	9284787
Total Tin (Sn)	mg/L	<0.00020	0.00020	9284787
Total Titanium (Ti)	mg/L	0.0022	0.0020	9284787
Total Uranium (U)	mg/L	0.00306	0.0000050	9284787
Total Vanadium (V)	mg/L	0.00051	0.00020	9284787
Total Zinc (Zn)	mg/L	0.0228	0.0010	9284787
Total Zirconium (Zr)	mg/L	0.00031	0.00010	9284787
Total Calcium (Ca)	mg/L	40.7	0.25	9283544
RDL = Reportable Detection Limit				

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VA8949		
Sampling Date		2019/01/03 14:50		
COC Number		08463482		
	UNITS	TRIAL #8	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.1	0.25	9283544
Total Potassium (K)	mg/L	4.53	0.25	9283544
Total Sodium (Na)	mg/L	25.5	0.25	9283544
Total Sulphur (S)	mg/L	28.9	3.0	9283544
RDL = Reportable Detection Limit				

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	13.7°C
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Sample VA8944 [TRIAL #3] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VA8945 [TRIAL #4] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VA8946 [TRIAL #5] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VA8947 [TRIAL #6] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VA8948 [TRIAL #7] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VA8949 [TRIAL #8] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Results relate only to the items tested.

Maxxam Job #: B900972
Report Date: 2019/01/09

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9283998	Dissolved Aluminum (Al)	2019/01/07	99	80 - 120	103	80 - 120	<0.00050	mg/L	3.1	20
9283998	Dissolved Antimony (Sb)	2019/01/07	98	80 - 120	101	80 - 120	<0.000020	mg/L	1.0	20
9283998	Dissolved Arsenic (As)	2019/01/07	100	80 - 120	102	80 - 120	<0.000020	mg/L	2.2	20
9283998	Dissolved Barium (Ba)	2019/01/07	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.67	20
9283998	Dissolved Beryllium (Be)	2019/01/07	99	80 - 120	104	80 - 120	<0.000010	mg/L	NC	20
9283998	Dissolved Bismuth (Bi)	2019/01/07	93	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9283998	Dissolved Boron (B)	2019/01/07	98	80 - 120	104	80 - 120	<0.010	mg/L	1.1	20
9283998	Dissolved Cadmium (Cd)	2019/01/07	97	80 - 120	100	80 - 120	<0.0000050	mg/L	0.83	20
9283998	Dissolved Chromium (Cr)	2019/01/07	96	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9283998	Dissolved Cobalt (Co)	2019/01/07	91	80 - 120	96	80 - 120	<0.0000050	mg/L	15	20
9283998	Dissolved Copper (Cu)	2019/01/07	90	80 - 120	96	80 - 120	<0.000050	mg/L	0.019	20
9283998	Dissolved Iron (Fe)	2019/01/07	99	80 - 120	101	80 - 120	<0.0010	mg/L	11	20
9283998	Dissolved Lead (Pb)	2019/01/07	93	80 - 120	99	80 - 120	<0.0000050	mg/L	0.97	20
9283998	Dissolved Lithium (Li)	2019/01/07	102	80 - 120	107	80 - 120	<0.00050	mg/L	0.090	20
9283998	Dissolved Manganese (Mn)	2019/01/07	95	80 - 120	100	80 - 120	<0.000050	mg/L	0.55	20
9283998	Dissolved Molybdenum (Mo)	2019/01/07	101	80 - 120	101	80 - 120	<0.000050	mg/L	1.4	20
9283998	Dissolved Nickel (Ni)	2019/01/07	92	80 - 120	98	80 - 120	<0.000020	mg/L	2.6	20
9283998	Dissolved Selenium (Se)	2019/01/07	93	80 - 120	96	80 - 120	<0.000040	mg/L	7.3	20
9283998	Dissolved Silicon (Si)	2019/01/07	102	80 - 120	101	80 - 120	<0.050	mg/L	0.58	20
9283998	Dissolved Silver (Ag)	2019/01/07	96	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9283998	Dissolved Strontium (Sr)	2019/01/07	NC	80 - 120	100	80 - 120	<0.000050	mg/L	1.9	20
9283998	Dissolved Thallium (Tl)	2019/01/07	94	80 - 120	101	80 - 120	<0.0000020	mg/L	18	20
9283998	Dissolved Tin (Sn)	2019/01/07	98	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9283998	Dissolved Titanium (Ti)	2019/01/07	98	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9283998	Dissolved Uranium (U)	2019/01/07	99	80 - 120	104	80 - 120	<0.0000020	mg/L	1.8	20
9283998	Dissolved Vanadium (V)	2019/01/07	99	80 - 120	100	80 - 120	<0.00020	mg/L	12	20
9283998	Dissolved Zinc (Zn)	2019/01/07	93	80 - 120	99	80 - 120	<0.00010	mg/L	0.34	20
9283998	Dissolved Zirconium (Zr)	2019/01/07	99	80 - 120	100	80 - 120	<0.00010	mg/L	12	20
9284787	Total Aluminum (Al)	2019/01/08	117	80 - 120	105	80 - 120	<0.0030	mg/L	5.4	20
9284787	Total Antimony (Sb)	2019/01/08	111	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9284787	Total Arsenic (As)	2019/01/08	116	80 - 120	106	80 - 120	<0.000020	mg/L	5.4	20
9284787	Total Barium (Ba)	2019/01/08	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.34	20

Maxxam Job #: B900972
Report Date: 2019/01/09

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9284787	Total Beryllium (Be)	2019/01/08	114	80 - 120	103	80 - 120	<0.000010	mg/L	11	20
9284787	Total Bismuth (Bi)	2019/01/08	110	80 - 120	106	80 - 120	<0.000010	mg/L	NC	20
9284787	Total Boron (B)	2019/01/08	118	80 - 120	105	80 - 120	<0.010	mg/L	0.97	20
9284787	Total Cadmium (Cd)	2019/01/08	112	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9284787	Total Chromium (Cr)	2019/01/08	112	80 - 120	103	80 - 120	<0.00010	mg/L	3.8	20
9284787	Total Cobalt (Co)	2019/01/08	109	80 - 120	102	80 - 120	<0.000010	mg/L	6.9	20
9284787	Total Copper (Cu)	2019/01/08	104	80 - 120	100	80 - 120	<0.00010	mg/L	2.0	20
9284787	Total Iron (Fe)	2019/01/08	111	80 - 120	104	80 - 120	<0.0050	mg/L	0.28	20
9284787	Total Lead (Pb)	2019/01/08	112	80 - 120	105	80 - 120	<0.000020	mg/L	3.7	20
9284787	Total Lithium (Li)	2019/01/08	114	80 - 120	103	80 - 120	<0.00050	mg/L	0.52	20
9284787	Total Manganese (Mn)	2019/01/08	110	80 - 120	104	80 - 120	<0.00010	mg/L	0.20	20
9284787	Total Molybdenum (Mo)	2019/01/08	118	80 - 120	108	80 - 120	<0.000050	mg/L	8.6	20
9284787	Total Nickel (Ni)	2019/01/08	106	80 - 120	101	80 - 120	<0.00010	mg/L	6.6	20
9284787	Total Phosphorus (P)	2019/01/08	111	80 - 120	99	80 - 120	<0.0050	mg/L		
9284787	Total Selenium (Se)	2019/01/08	114	80 - 120	105	80 - 120	<0.000040	mg/L	NC	20
9284787	Total Silicon (Si)	2019/01/08	110	80 - 120	103	80 - 120	<0.050	mg/L	2.0	20
9284787	Total Silver (Ag)	2019/01/08	112	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9284787	Total Strontium (Sr)	2019/01/08	NC	80 - 120	112	80 - 120	<0.000050	mg/L	0.31	20
9284787	Total Thallium (Tl)	2019/01/08	114	80 - 120	108	80 - 120	<0.0000020	mg/L	NC	20
9284787	Total Tin (Sn)	2019/01/08	113	80 - 120	105	80 - 120	<0.00020	mg/L	NC	20
9284787	Total Titanium (Ti)	2019/01/08	116	80 - 120	112	80 - 120	<0.0020	mg/L	NC	20
9284787	Total Uranium (U)	2019/01/08	115	80 - 120	103	80 - 120	<0.0000050	mg/L	2.7	20
9284787	Total Vanadium (V)	2019/01/08	115	80 - 120	103	80 - 120	<0.00020	mg/L	6.0	20
9284787	Total Zinc (Zn)	2019/01/08	106	80 - 120	103	80 - 120	<0.0010	mg/L	2.4	20
9284787	Total Zirconium (Zr)	2019/01/08	121 (1)	80 - 120	110	80 - 120	<0.00010	mg/L	5.4	20
9285491	Total Aluminum (Al)	2019/01/09	100	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9285491	Total Antimony (Sb)	2019/01/09	100	80 - 120	105	80 - 120	<0.000020	mg/L	NC	20
9285491	Total Arsenic (As)	2019/01/09	105	80 - 120	111	80 - 120	<0.000020	mg/L	NC	20
9285491	Total Barium (Ba)	2019/01/09	95	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9285491	Total Beryllium (Be)	2019/01/09	100	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9285491	Total Bismuth (Bi)	2019/01/09	98	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9285491	Total Boron (B)	2019/01/09	99	80 - 120	93	80 - 120	<0.010	mg/L	NC	20

Maxxam Job #: B900972
Report Date: 2019/01/09

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9285491	Total Cadmium (Cd)	2019/01/09	101	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9285491	Total Chromium (Cr)	2019/01/09	99	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9285491	Total Cobalt (Co)	2019/01/09	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9285491	Total Copper (Cu)	2019/01/09	97	80 - 120	100	80 - 120	<0.000050	mg/L	0.84	20
9285491	Total Iron (Fe)	2019/01/09	101	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
9285491	Total Lead (Pb)	2019/01/09	98	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9285491	Total Lithium (Li)	2019/01/09	97	80 - 120	92	80 - 120	<0.00050	mg/L	NC	20
9285491	Total Manganese (Mn)	2019/01/09	101	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9285491	Total Molybdenum (Mo)	2019/01/09	98	80 - 120	107	80 - 120	<0.000050	mg/L	NC	20
9285491	Total Nickel (Ni)	2019/01/09	98	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9285491	Total Phosphorus (P)	2019/01/09	105	80 - 120	106	80 - 120	<0.0020	mg/L	2.5	20
9285491	Total Selenium (Se)	2019/01/09	102	80 - 120	108	80 - 120	<0.000040	mg/L	NC	20
9285491	Total Silicon (Si)	2019/01/09	100	80 - 120	100	80 - 120	<0.050	mg/L	NC	20
9285491	Total Silver (Ag)	2019/01/09	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9285491	Total Strontium (Sr)	2019/01/09	99	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9285491	Total Thallium (Tl)	2019/01/09	96	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9285491	Total Tin (Sn)	2019/01/09	95	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9285491	Total Titanium (Ti)	2019/01/09	100	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
9285491	Total Uranium (U)	2019/01/09	100	80 - 120	104	80 - 120	<0.0000020	mg/L	NC	20
9285491	Total Vanadium (V)	2019/01/09	99	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9285491	Total Zinc (Zn)	2019/01/09	103	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9285491	Total Zirconium (Zr)	2019/01/09	100	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Job #: B900972
Report Date: 2019/01/09

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-01
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

#NAME?
08463482

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05
Page ____ of ____

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: BMC MINERALS LTD.	Company Name: ALEXCO ENVIRONMENTAL	Quotation #: B60751	☐ Regular TAT 5 days (Most analyses)		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS		
Contact Name:	Contact Name: Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:					
Address: 530-1130 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-01	Rush TAT (Surcharges will be applied)				
Vancouver, BC PC: V6E 4A4	Whitehorse, YK PC: V1A 2V3	Site Location: Kudz Ze Kayah	☐ Same Day ☒ 2 Days				
Phone:	Phone: (867) 668-6463 kpiewowye@alexcoresource.com	Site #:	☐ 1 Day ☐ 3 Days				
Email:	Email: agault@alexcoresource.com	Sampled By:	Date Required:				
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		TOTAL LOW LEVEL METALS DISSOLVED LOW LEVEL METALS		LABORATORY USE ONLY CUSTODY SEAL Y/N COOLER TEMPERATURES Present Intact Y Y 5.5.4 COOLING MEDIA PRESENT (Y) / (N)	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	TOTAL LOW LEVEL METALS		DISSOLVED LOW LEVEL METALS
1 Trial #1		03-Jan-19	14:20	Water	X	X	
2 Trial #2		03-Jan-19	14:25	Water	X	X	
3 Trial #3		03-Jan-19	14:30	Water	X	X	
4 Trial #4		03-Jan-19	14:35	Water	X	X	
5 Trial #5		03-Jan-19	14:30	Water	X	X	
6 Trial #6		03-Jan-19	14:40	Water	X	X	
7 Trial #7		03-Jan-19	14:45	Water	X	X	
8 Trial #8		03-Jan-19	14:50	Water	X	X	
9							
10							
REUNQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Christie Brizinski		2019-01-03	15:59	Yuan Peng Lin		2019/01/03	10:52

2064



B900972_COC

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08464153

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/02/07
Report #: R2683428
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B908267

Received: 2019/02/01, 14:07

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride - Low Level (1)	5	N/A	2019/02/04	BBY6SOP-00011	SM 22 4500-Cl- E m
Chloride - Low Level (1)	3	N/A	2019/02/05	BBY6SOP-00011	SM 22 4500-Cl- E m
Fluoride - Low Level (1)	8	N/A	2019/02/05	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3) (1, 2)	8	N/A	2019/02/06	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3) (1)	8	N/A	2019/02/06	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	8	N/A	2019/02/06	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	7	N/A	2019/02/05	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Low Level (dissolved) (1)	1	N/A	2019/02/06	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	3	2019/02/05	2019/02/06	BBY7SOP-00003	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	8	N/A	2019/02/06	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	5	N/A	2019/02/06	BBY7SOP-00002	EPA 6020b R2 m
Nitrate+Nitrite (N) (low level) (1)	8	N/A	2019/02/04	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	8	N/A	2019/02/04	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	8	N/A	2019/02/04	BBY WI-00033	Auto Calc
Filter and HNO3 Preserve for Metals (1)	8	N/A	2019/02/02	BBY7 WI-00004	BCMOE Reqs 08/14
Sulphate - Low Level (1)	2	N/A	2019/02/04	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate - Low Level (1)	6	N/A	2019/02/05	BBY6SOP-00017	SM 22 4500-SO42- E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08464153

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/02/07
Report #: R2683428
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B908267

Received: 2019/02/01, 14:07

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: DCruz@maxxam.ca

Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VE3803	VE3804	VE3805		VE3806		VE3807		
Sampling Date		2019/02/01 12:30	2019/02/01 12:40	2019/02/01 12:45		2019/02/01 12:50		2019/02/01 13:55		
COC Number		08464153	08464153	08464153		08464153		08464153		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	QC Batch	TRIAL #4	QC Batch	TRIAL #5	RDL	QC Batch

Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	ONSITE	FIELD	ONSITE	FIELD		ONSITE
Nitrate (N)	mg/L	0.327	0.320	0.255	9312022	0.374	9312022	0.295	0.0020	9312022
Misc. Inorganics										
Fluoride (F)	mg/L	0.730	0.740	0.680	9313791	0.670	9313791	0.780	0.010	9313791
Anions										
Dissolved Sulphate (SO4)	mg/L	88.1	81.0	87.2	9313321	80.7	9313321	81.7	0.50	9315820
Dissolved Chloride (Cl)	mg/L	15	15	15	9315847	15	9315818	14	0.50	9315818
Nutrients										
Nitrate plus Nitrite (N)	mg/L	0.533	0.442	0.255	9313035	0.392	9313035	0.302	0.0020	9313035
Nitrite (N)	mg/L	0.207	0.122	<0.0020	9313036	0.0185	9313036	0.0071	0.0020	9313036
RDL = Reportable Detection Limit										

Maxxam ID		VE3808	VE3809		VE3810		
Sampling Date		2019/02/01 12:55	2019/02/01 13:00		2019/02/01 13:05		
COC Number		08464153	08464153		08464153		
	UNITS	TRIAL #6	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch
Calculated Parameters							
Filter and HNO3 Preservation	N/A	FIELD	FIELD	ONSITE	FIELD		ONSITE
Nitrate (N)	mg/L	0.319	0.300	9312022	0.218	0.0020	9312022
Misc. Inorganics							
Fluoride (F)	mg/L	0.810	0.750	9313791	0.660	0.010	9313791
Anions							
Dissolved Sulphate (SO4)	mg/L	91.2	94.3	9313321	85.2	0.50	9315820
Dissolved Chloride (Cl)	mg/L	15	15	9315818	15	0.50	9315818
Nutrients							
Nitrate plus Nitrite (N)	mg/L	0.357	0.566	9313035	0.225	0.0020	9313035
Nitrite (N)	mg/L	0.0378	0.266	9313036	0.0070	0.0020	9313036
RDL = Reportable Detection Limit							

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VE3803	VE3804	VE3805	VE3806	VE3807		
Sampling Date		2019/02/01 12:30	2019/02/01 12:40	2019/02/01 12:45	2019/02/01 12:50	2019/02/01 13:55		
COC Number		08464153	08464153	08464153	08464153	08464153		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	161	159	163	163	169	0.50	9311840
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0249	0.0238	0.00893	0.00617	0.0134	0.00050	9312699
Dissolved Antimony (Sb)	mg/L	0.00348	0.00244	0.000513	0.000584	0.000377	0.000020	9312699
Dissolved Arsenic (As)	mg/L	0.00208	0.00388	0.00146	0.00115	0.000410	0.000020	9312699
Dissolved Barium (Ba)	mg/L	0.0481	0.0457	0.0637	0.0725	0.0504	0.000020	9312699
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9312699
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9312699
Dissolved Boron (B)	mg/L	0.023	0.022	0.021	0.020	0.023	0.010	9312699
Dissolved Cadmium (Cd)	mg/L	0.000111	0.000109	0.000365	0.000228	0.0000809	0.0000050	9312699
Dissolved Chromium (Cr)	mg/L	0.00015	0.00014	0.00015	0.00013	<0.00010	0.00010	9312699
Dissolved Cobalt (Co)	mg/L	0.000580	0.000532	0.0000468	0.0000426	0.000207	0.0000050	9312699
Dissolved Copper (Cu)	mg/L	0.00990	0.00913	0.00523	0.00487	0.0138	0.000050	9312699
Dissolved Iron (Fe)	mg/L	0.0020	0.0012	0.0019	0.0040	0.0037	0.0010	9312699
Dissolved Lead (Pb)	mg/L	0.00242	0.00108	0.0000584	0.0000554	0.000794	0.0000050	9312699
Dissolved Lithium (Li)	mg/L	0.0103	0.00948	0.00898	0.00874	0.0115	0.00050	9312699
Dissolved Manganese (Mn)	mg/L	0.00757	0.00599	0.0407	0.000911	0.00234	0.000050	9312699
Dissolved Molybdenum (Mo)	mg/L	0.00214	0.00178	0.00243	0.00247	0.00168	0.000050	9312699
Dissolved Nickel (Ni)	mg/L	0.00299	0.00287	0.00185	0.00131	0.00333	0.000020	9312699
Dissolved Selenium (Se)	mg/L	0.000982	0.00108	0.000548	0.000583	0.000539	0.000040	9312699
Dissolved Silicon (Si)	mg/L	0.637	0.603	0.780	0.899	0.647	0.050	9312699
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9312699
Dissolved Strontium (Sr)	mg/L	0.235	0.234	0.223	0.221	0.253	0.000050	9312699
Dissolved Thallium (Tl)	mg/L	0.0000670	0.000111	0.0000210	0.0000125	0.0000191	0.0000020	9312699
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9312699
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9312699
Dissolved Uranium (U)	mg/L	0.00530	0.00457	0.00366	0.00382	0.00196	0.0000020	9312699
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00028	0.00023	<0.00020	0.00020	9312699
Dissolved Zinc (Zn)	mg/L	0.0124	0.0126	0.0168	0.0143	0.0109	0.00010	9312699
Dissolved Zirconium (Zr)	mg/L	0.00020	0.00017	<0.00010	<0.00010	0.00015	0.00010	9312699
Dissolved Calcium (Ca)	mg/L	37.0	37.0	39.4	40.4	40.5	0.050	9312018
Dissolved Magnesium (Mg)	mg/L	16.6	16.1	15.8	15.1	16.4	0.050	9312018

RDL = Reportable Detection Limit

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VE3803	VE3804	VE3805	VE3806	VE3807		
Sampling Date		2019/02/01 12:30	2019/02/01 12:40	2019/02/01 12:45	2019/02/01 12:50	2019/02/01 13:55		
COC Number		08464153	08464153	08464153	08464153	08464153		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.51	4.39	4.39	4.47	4.31	0.050	9312018
Dissolved Sodium (Na)	mg/L	26.1	25.9	25.2	24.8	25.8	0.050	9312018
Dissolved Sulphur (S)	mg/L	26.7	26.2	25.4	24.9	28.0	3.0	9312018
RDL = Reportable Detection Limit								

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VE3808	VE3809	VE3810		
Sampling Date		2019/02/01 12:55	2019/02/01 13:00	2019/02/01 13:05		
COC Number		08464153	08464153	08464153		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	166	160	166	0.50	9311840
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.0131	0.0246	0.00897	0.00050	9312699
Dissolved Antimony (Sb)	mg/L	0.000544	0.00473	0.000544	0.000020	9312699
Dissolved Arsenic (As)	mg/L	0.000553	0.00218	0.00197	0.000020	9312699
Dissolved Barium (Ba)	mg/L	0.0515	0.0500	0.0647	0.000020	9312699
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9312699
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9312699
Dissolved Boron (B)	mg/L	0.024	0.023	0.021	0.010	9312699
Dissolved Cadmium (Cd)	mg/L	0.0000935	0.000112	0.000179	0.0000050	9312699
Dissolved Chromium (Cr)	mg/L	0.00012	0.00014	0.00011	0.00010	9312699
Dissolved Cobalt (Co)	mg/L	0.000205	0.000628	0.0000424	0.0000050	9312699
Dissolved Copper (Cu)	mg/L	0.0765	0.00478	0.00481	0.000050	9312699
Dissolved Iron (Fe)	mg/L	0.0016	0.0011	0.0015	0.0010	9312699
Dissolved Lead (Pb)	mg/L	0.000681	0.00184	0.0000232	0.0000050	9312699
Dissolved Lithium (Li)	mg/L	0.0101	0.0103	0.00935	0.00050	9312699
Dissolved Manganese (Mn)	mg/L	0.00178	0.0104	0.000623	0.000050	9312699
Dissolved Molybdenum (Mo)	mg/L	0.00171	0.00173	0.00244	0.000050	9312699
Dissolved Nickel (Ni)	mg/L	0.00215	0.00250	0.00145	0.000020	9312699
Dissolved Selenium (Se)	mg/L	0.000550	0.000972	0.000501	0.000040	9312699
Dissolved Silicon (Si)	mg/L	0.547	0.661	0.824	0.050	9312699
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9312699
Dissolved Strontium (Sr)	mg/L	0.238	0.227	0.224	0.000050	9312699
Dissolved Thallium (Tl)	mg/L	0.0000360	0.000103	0.0000194	0.0000020	9312699
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9312699
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9312699
Dissolved Uranium (U)	mg/L	0.00197	0.00457	0.00340	0.0000020	9312699
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00033	0.00020	9312699
Dissolved Zinc (Zn)	mg/L	0.0169	0.00882	0.0104	0.00010	9312699
Dissolved Zirconium (Zr)	mg/L	0.00013	0.00014	<0.00010	0.00010	9312699
Dissolved Calcium (Ca)	mg/L	39.8	37.0	40.3	0.050	9312018
Dissolved Magnesium (Mg)	mg/L	16.3	16.4	15.9	0.050	9312018
RDL = Reportable Detection Limit						

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VE3808	VE3809	VE3810		
Sampling Date		2019/02/01 12:55	2019/02/01 13:00	2019/02/01 13:05		
COC Number		08464153	08464153	08464153		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.26	4.45	4.40	0.050	9312018
Dissolved Sodium (Na)	mg/L	26.3	26.1	25.7	0.050	9312018
Dissolved Sulphur (S)	mg/L	25.7	26.0	25.1	3.0	9312018
RDL = Reportable Detection Limit						

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VE3803	VE3804	VE3805	VE3806	VE3810		
Sampling Date		2019/02/01 12:30	2019/02/01 12:40	2019/02/01 12:45	2019/02/01 12:50	2019/02/01 13:05		
COC Number		08464153	08464153	08464153	08464153	08464153		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #8	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	153	153	156	158	159	0.50	9311838
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0801	0.0512	0.0462	0.0238	0.0288	0.00050	9313049
Total Antimony (Sb)	mg/L	0.00350	0.00249	0.000510	0.000576	0.000530	0.000020	9313049
Total Arsenic (As)	mg/L	0.00221	0.00371	0.00165	0.00119	0.00210	0.000020	9313049
Total Barium (Ba)	mg/L	0.0521	0.0470	0.0643	0.0720	0.0643	0.000020	9313049
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9313049
Total Bismuth (Bi)	mg/L	0.0000159	0.0000114	0.0000208	0.0000100	0.0000143	0.0000050	9313049
Total Boron (B)	mg/L	0.024	0.024	0.023	0.022	0.022	0.010	9313049
Total Cadmium (Cd)	mg/L	0.000129	0.000117	0.000387	0.000254	0.000248	0.0000050	9313049
Total Chromium (Cr)	mg/L	0.00045	0.00024	0.00016	0.00011	0.00012	0.00010	9313049
Total Cobalt (Co)	mg/L	0.000611	0.000536	0.0000854	0.0000572	0.0000639	0.0000050	9313049
Total Copper (Cu)	mg/L	0.0136	0.0106	0.00605	0.00481	0.00509	0.000050	9313049
Total Iron (Fe)	mg/L	0.137	0.0799	0.0883	0.0473	0.0427	0.0010	9313049
Total Lead (Pb)	mg/L	0.00668	0.00296	0.00136	0.000528	0.00101	0.0000050	9313049
Total Lithium (Li)	mg/L	0.0101	0.0101	0.00939	0.00904	0.00930	0.00050	9313049
Total Manganese (Mn)	mg/L	0.0124	0.0104	0.0663	0.00675	0.0265	0.000050	9313049
Total Molybdenum (Mo)	mg/L	0.00200	0.00175	0.00235	0.00246	0.00234	0.000050	9313049
Total Nickel (Ni)	mg/L	0.00295	0.00268	0.00179	0.00127	0.00144	0.000020	9313049
Total Selenium (Se)	mg/L	0.00102	0.00115	0.000552	0.000596	0.000529	0.000040	9313049
Total Silicon (Si)	mg/L	0.734	0.699	0.878	0.983	0.941	0.050	9313049
Total Silver (Ag)	mg/L	0.0000261	0.0000149	0.0000116	0.0000079	0.0000077	0.0000050	9313049
Total Strontium (Sr)	mg/L	0.231	0.232	0.223	0.222	0.223	0.000050	9313049
Total Thallium (Tl)	mg/L	0.0000886	0.000160	0.0000193	0.0000131	0.0000096	0.0000020	9313049
Total Tin (Sn)	mg/L	0.00042	0.00034	0.00077	<0.00020	<0.00020	0.00020	9313049
Total Titanium (Ti)	mg/L	0.00300	0.00160	0.00177	0.00162	0.00080	0.00050	9313049
Total Uranium (U)	mg/L	0.00538	0.00463	0.00364	0.00386	0.00344	0.0000020	9313049
Total Vanadium (V)	mg/L	0.00035	0.00020	0.00038	0.00029	0.00038	0.00020	9313049
Total Zinc (Zn)	mg/L	0.0156	0.0162	0.0210	0.0161	0.0145	0.00010	9313049
Total Zirconium (Zr)	mg/L	0.00042	0.00027	0.00017	0.00016	0.00015	0.00010	9313049
Total Calcium (Ca)	mg/L	35.5	35.7	37.9	39.3	38.4	0.050	9312020
Total Magnesium (Mg)	mg/L	15.7	15.6	15.0	14.4	15.2	0.050	9312020

RDL = Reportable Detection Limit

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VE3803	VE3804	VE3805	VE3806	VE3810		
Sampling Date		2019/02/01 12:30	2019/02/01 12:40	2019/02/01 12:45	2019/02/01 12:50	2019/02/01 13:05		
COC Number		08464153	08464153	08464153	08464153	08464153		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	4.23	4.17	4.10	4.33	4.20	0.050	9312020
Total Sodium (Na)	mg/L	24.9	24.8	23.8	23.5	23.8	0.050	9312020
Total Sulphur (S)	mg/L	26.5	26.6	25.0	25.1	25.2	3.0	9312020
RDL = Reportable Detection Limit								

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VE3807	VE3808	VE3809		
Sampling Date		2019/02/01 13:55	2019/02/01 12:55	2019/02/01 13:00		
COC Number		08464153	08464153	08464153		
	UNITS	TRIAL #5	TRIAL #6	TRIAL #7	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	162	160	149	0.50	9311838
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.172	0.0788	0.0631	0.0030	9313295
Total Antimony (Sb)	mg/L	0.000531	0.000543	0.00435	0.000020	9313295
Total Arsenic (As)	mg/L	0.00116	0.000745	0.00220	0.000020	9313295
Total Barium (Ba)	mg/L	0.0629	0.0529	0.0484	0.000050	9313295
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9313295
Total Bismuth (Bi)	mg/L	0.000035	0.000019	<0.000010	0.000010	9313295
Total Boron (B)	mg/L	0.024	0.026	0.024	0.010	9313295
Total Cadmium (Cd)	mg/L	0.000125	0.0000992	0.000109	0.0000050	9313295
Total Chromium (Cr)	mg/L	0.00087	0.00038	0.00018	0.00010	9313295
Total Cobalt (Co)	mg/L	0.000335	0.000219	0.000567	0.000010	9313295
Total Copper (Cu)	mg/L	0.0149	0.0747	0.00453	0.00010	9313295
Total Iron (Fe)	mg/L	0.371	0.120	0.0455	0.0050	9313295
Total Lead (Pb)	mg/L	0.00786	0.00307	0.00282	0.000020	9313295
Total Lithium (Li)	mg/L	0.0108	0.0106	0.0103	0.00050	9313295
Total Manganese (Mn)	mg/L	0.0168	0.00720	0.0102	0.00010	9313295
Total Molybdenum (Mo)	mg/L	0.00165	0.00164	0.00164	0.000050	9313295
Total Nickel (Ni)	mg/L	0.00347	0.00215	0.00224	0.00010	9313295
Total Selenium (Se)	mg/L	0.000572	0.000563	0.000979	0.000040	9313295
Total Silicon (Si)	mg/L	0.885	0.708	0.724	0.050	9313295
Total Silver (Ag)	mg/L	0.000049	0.000017	<0.000010	0.000010	9313295
Total Strontium (Sr)	mg/L	0.245	0.240	0.220	0.000050	9313295
Total Thallium (Tl)	mg/L	0.0000608	0.0000578	0.000125	0.0000020	9313295
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9313295
Total Titanium (Ti)	mg/L	0.0078	0.0031	<0.0020	0.0020	9313295
Total Uranium (U)	mg/L	0.00216	0.00205	0.00438	0.0000050	9313295
Total Vanadium (V)	mg/L	0.00054	0.00032	0.00022	0.00020	9313295
Total Zinc (Zn)	mg/L	0.0184	0.0177	0.0095	0.0010	9313295
Total Zirconium (Zr)	mg/L	0.00063	0.00026	0.00024	0.00010	9313295
Total Calcium (Ca)	mg/L	38.7	38.3	34.3	0.25	9312020
Total Magnesium (Mg)	mg/L	15.9	15.6	15.4	0.25	9312020
RDL = Reportable Detection Limit						

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VE3807	VE3808	VE3809		
Sampling Date		2019/02/01 13:55	2019/02/01 12:55	2019/02/01 13:00		
COC Number		08464153	08464153	08464153		
	UNITS	TRIAL #5	TRIAL #6	TRIAL #7	RDL	QC Batch
Total Potassium (K)	mg/L	4.05	4.08	4.11	0.25	9312020
Total Sodium (Na)	mg/L	24.8	25.0	24.3	0.25	9312020
Total Sulphur (S)	mg/L	26.8	27.0	26.0	3.0	9312020
RDL = Reportable Detection Limit						

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	15.3°C
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Sample VE3807 [TRIAL #5] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VE3808 [TRIAL #6] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VE3809 [TRIAL #7] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Results relate only to the items tested.

Maxxam Job #: B908267
Report Date: 2019/02/07

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9312699	Dissolved Aluminum (Al)	2019/02/05	93	80 - 120	95	80 - 120	<0.00050	mg/L	1.5	20
9312699	Dissolved Antimony (Sb)	2019/02/05	97	80 - 120	101	80 - 120	<0.000020	mg/L	0.96	20
9312699	Dissolved Arsenic (As)	2019/02/05	98	80 - 120	101	80 - 120	<0.000020	mg/L	0.058	20
9312699	Dissolved Barium (Ba)	2019/02/05	97	80 - 120	101	80 - 120	<0.000020	mg/L	2.6	20
9312699	Dissolved Beryllium (Be)	2019/02/05	93	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
9312699	Dissolved Bismuth (Bi)	2019/02/05	82	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9312699	Dissolved Boron (B)	2019/02/05	92	80 - 120	96	80 - 120	<0.010	mg/L	3.5	20
9312699	Dissolved Cadmium (Cd)	2019/02/05	97	80 - 120	99	80 - 120	<0.0000050	mg/L	0.36	20
9312699	Dissolved Chromium (Cr)	2019/02/05	96	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9312699	Dissolved Cobalt (Co)	2019/02/05	94	80 - 120	100	80 - 120	<0.0000050	mg/L	1.6	20
9312699	Dissolved Copper (Cu)	2019/02/05	94	80 - 120	100	80 - 120	<0.000050	mg/L	2.8	20
9312699	Dissolved Iron (Fe)	2019/02/05	98	80 - 120	104	80 - 120	<0.0010	mg/L	12	20
9312699	Dissolved Lead (Pb)	2019/02/05	97	80 - 120	100	80 - 120	<0.0000050	mg/L	0.16	20
9312699	Dissolved Lithium (Li)	2019/02/05	92	80 - 120	91	80 - 120	<0.00050	mg/L	3.1	20
9312699	Dissolved Manganese (Mn)	2019/02/05	96	80 - 120	100	80 - 120	<0.000050	mg/L	1.6	20
9312699	Dissolved Molybdenum (Mo)	2019/02/05	96	80 - 120	101	80 - 120	<0.000050	mg/L	0.33	20
9312699	Dissolved Nickel (Ni)	2019/02/05	96	80 - 120	100	80 - 120	<0.000020	mg/L	1.6	20
9312699	Dissolved Selenium (Se)	2019/02/05	96	80 - 120	99	80 - 120	<0.000040	mg/L	2.3	20
9312699	Dissolved Silicon (Si)	2019/02/05	96	80 - 120	96	80 - 120	<0.050	mg/L	2.1	20
9312699	Dissolved Silver (Ag)	2019/02/05	90	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9312699	Dissolved Strontium (Sr)	2019/02/05	99	80 - 120	99	80 - 120	<0.000050	mg/L	1.2	20
9312699	Dissolved Thallium (Tl)	2019/02/05	97	80 - 120	100	80 - 120	<0.0000020	mg/L	7.1	20
9312699	Dissolved Tin (Sn)	2019/02/05	95	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9312699	Dissolved Titanium (Ti)	2019/02/05	96	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9312699	Dissolved Uranium (U)	2019/02/05	93	80 - 120	98	80 - 120	<0.0000020	mg/L	1.9	20
9312699	Dissolved Vanadium (V)	2019/02/05	96	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9312699	Dissolved Zinc (Zn)	2019/02/05	105	80 - 120	105	80 - 120	<0.00010	mg/L	1.2	20
9312699	Dissolved Zirconium (Zr)	2019/02/05	98	80 - 120	102	80 - 120	<0.00010	mg/L	15	20
9313035	Nitrate plus Nitrite (N)	2019/02/04	NC	80 - 120	101	80 - 120	<0.0020	mg/L	0.43	25
9313036	Nitrite (N)	2019/02/04	NC	80 - 120	99	80 - 120	<0.0020	mg/L	0.097	25
9313049	Total Aluminum (Al)	2019/02/06	94	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9313049	Total Antimony (Sb)	2019/02/06	96	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20

Maxxam Job #: B908267
Report Date: 2019/02/07

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9313049	Total Arsenic (As)	2019/02/06	96	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9313049	Total Barium (Ba)	2019/02/06	93	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9313049	Total Beryllium (Be)	2019/02/06	89	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9313049	Total Bismuth (Bi)	2019/02/06	96	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9313049	Total Boron (B)	2019/02/06	92	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
9313049	Total Cadmium (Cd)	2019/02/06	94	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9313049	Total Chromium (Cr)	2019/02/06	97	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9313049	Total Cobalt (Co)	2019/02/06	94	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9313049	Total Copper (Cu)	2019/02/06	95	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9313049	Total Iron (Fe)	2019/02/06	102	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
9313049	Total Lead (Pb)	2019/02/06	96	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9313049	Total Lithium (Li)	2019/02/06	86	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9313049	Total Manganese (Mn)	2019/02/06	97	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9313049	Total Molybdenum (Mo)	2019/02/06	94	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9313049	Total Nickel (Ni)	2019/02/06	97	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9313049	Total Selenium (Se)	2019/02/06	98	80 - 120	100	80 - 120	<0.000040	mg/L	NC	20
9313049	Total Silicon (Si)	2019/02/06	90	80 - 120	98	80 - 120	<0.050	mg/L	NC	20
9313049	Total Silver (Ag)	2019/02/06	94	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9313049	Total Strontium (Sr)	2019/02/06	93	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9313049	Total Thallium (Tl)	2019/02/06	97	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9313049	Total Tin (Sn)	2019/02/06	95	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9313049	Total Titanium (Ti)	2019/02/06	100	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9313049	Total Uranium (U)	2019/02/06	96	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9313049	Total Vanadium (V)	2019/02/06	96	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9313049	Total Zinc (Zn)	2019/02/06	99	80 - 120	103	80 - 120	<0.00010	mg/L	2.0	20
9313049	Total Zirconium (Zr)	2019/02/06	96	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9313295	Total Aluminum (Al)	2019/02/06	97	80 - 120	95	80 - 120	<0.0030	mg/L	NC	20
9313295	Total Antimony (Sb)	2019/02/06	98	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9313295	Total Arsenic (As)	2019/02/06	98	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9313295	Total Barium (Ba)	2019/02/06	97	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
9313295	Total Beryllium (Be)	2019/02/06	93	80 - 120	93	80 - 120	<0.000010	mg/L	NC	20
9313295	Total Bismuth (Bi)	2019/02/06	98	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20

Maxxam Job #: B908267
Report Date: 2019/02/07

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9313295	Total Boron (B)	2019/02/06	95	80 - 120	92	80 - 120	<0.010	mg/L	NC	20
9313295	Total Cadmium (Cd)	2019/02/06	97	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9313295	Total Chromium (Cr)	2019/02/06	97	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9313295	Total Cobalt (Co)	2019/02/06	94	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
9313295	Total Copper (Cu)	2019/02/06	94	80 - 120	95	80 - 120	<0.00010	mg/L	NC	20
9313295	Total Iron (Fe)	2019/02/06	102	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
9313295	Total Lead (Pb)	2019/02/06	99	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9313295	Total Lithium (Li)	2019/02/06	90	80 - 120	91	80 - 120	<0.00050	mg/L	NC	20
9313295	Total Manganese (Mn)	2019/02/06	97	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9313295	Total Molybdenum (Mo)	2019/02/06	98	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9313295	Total Nickel (Ni)	2019/02/06	96	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9313295	Total Selenium (Se)	2019/02/06	98	80 - 120	96	80 - 120	<0.000040	mg/L	NC	20
9313295	Total Silicon (Si)	2019/02/06	93	80 - 120	95	80 - 120	<0.050	mg/L	NC	20
9313295	Total Silver (Ag)	2019/02/06	96	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9313295	Total Strontium (Sr)	2019/02/06	96	80 - 120	95	80 - 120	<0.000050	mg/L	NC	20
9313295	Total Thallium (Tl)	2019/02/06	98	80 - 120	98	80 - 120	<0.0000020	mg/L	NC	20
9313295	Total Tin (Sn)	2019/02/06	97	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9313295	Total Titanium (Ti)	2019/02/06	96	80 - 120	98	80 - 120	<0.0020	mg/L	NC	20
9313295	Total Uranium (U)	2019/02/06	98	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9313295	Total Vanadium (V)	2019/02/06	96	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9313295	Total Zinc (Zn)	2019/02/06	97	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20
9313295	Total Zirconium (Zr)	2019/02/06	98	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9313321	Dissolved Sulphate (SO4)	2019/02/05	NC	80 - 120	95	80 - 120	0.51, RDL=0.50	mg/L	16	20
9313791	Fluoride (F)	2019/02/05	112	80 - 120	102	80 - 120	<0.010	mg/L	5.5	20
9315818	Dissolved Chloride (Cl)	2019/02/04	104	80 - 120	102	80 - 120	<0.50	mg/L	NC	20
9315820	Dissolved Sulphate (SO4)	2019/02/04	109	80 - 120	93	80 - 120	<0.50	mg/L	6.4	20

Maxxam Job #: B908267
Report Date: 2019/02/07

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9315847	Dissolved Chloride (Cl)	2019/02/05			103	80 - 120	<0.50	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

Maxxam Job #: B908267
Report Date: 2019/02/07

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

08464153

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS (NO 1) LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☐ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☒ 2 Days ☐ 1 Day ☐ 3 Days	
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02	Date Required:	
Phone:		Phone:	(867) 668-6463 kpiecowye@alexcoresource.com	Site Location:	Kudz Ze Kayah		
Email:		Email:	agault@alexcoresource.com	Site #:			
Sampled By:							
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		Analysis Requested Received in Saskatoon By: [Signature] Temp: 15 / 15 / 16 FEB 01 2019 14:07		LABORATORY USE ONLY CUSTODY SEAL Y / N Present Intact Y Y COOLING MEDIA PRESENT Y / N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	DISSOLVED LOW LEVEL METALS	TOTAL LOW LEVEL METALS	ANIONS (Cl, F, SO4, NO2, NO3)
1	Trial #1	01-Feb-19	12:30	Water	X	X	X
2	Trial #2	01-Feb-19	12:40	Water	X	X	X
3	Trial #3	01-Feb-19	12:45	Water	X	X	X
4	Trial #4	01-Feb-19	12:50	Water	X	X	X
5	Trial #5	01-Feb-19	13:55	Water	X	X	X
6	Trial #6	01-Feb-19	12:55	Water	X	X	X
7	Trial #7	01-Feb-19	13:00	Water	X	X	X
8	Trial #8	01-Feb-19	13:05	Water	X	X	X
9							
10							
REUNQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
[Signature]		2019/02/01	14:08	Yuan peng Lin [Signature]		2019/02/02	11:53

0663



B908267_COC

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08464519

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/02/28
Report #: R2691824
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B913208

Received: 2019/02/22, 14:44

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Hardness (calculated as CaCO ₃) (1)	2	N/A	2019/02/26	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	2	N/A	2019/02/26	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	2	N/A	2019/02/26	BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO ₃ Preserve for Metals (1)	2	N/A	2019/02/23	BBY7 WI-00004	BCMOE Reqs 08/14
Sulphate - Low Level (1)	2	N/A	2019/02/25	BBY6SOP-00017	SM 22 4500-SO42- E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08464519

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/02/28
Report #: R2691824
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B913208
Received: 2019/02/22, 14:44

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Diana Cruz, Project Manager
Email: DCruz@maxxam.ca
Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B913208
Report Date: 2019/02/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VG6145	VG6146		
Sampling Date		2019/02/22 14:10	2019/02/22 14:10		
COC Number		08464519	08464519		
	UNITS	1L BENCH-SCALE (10X)	500ML BENCH-SCALE(20X)	RDL	QC Batch
Calculated Parameters					
Filter and HNO3 Preservation	N/A	FIELD	FIELD		ONSITE
Anions					
Dissolved Sulphate (SO4)	mg/L	229 (1)	357 (1)	5.0	9332711
RDL = Reportable Detection Limit					
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.					

Maxxam Job #: B913208
Report Date: 2019/02/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VG6145	VG6146		
Sampling Date		2019/02/22 14:10	2019/02/22 14:10		
COC Number		08464519	08464519		
	UNITS	1L BENCH-SCALE (10X)	500ML BENCH-SCALE(20X)	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO3)	mg/L	309	449	0.50	9330514
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00639	0.00535	0.00050	9331131
Dissolved Antimony (Sb)	mg/L	0.00252	0.00484	0.000020	9331131
Dissolved Arsenic (As)	mg/L	0.517	1.19	0.000020	9331131
Dissolved Barium (Ba)	mg/L	0.0529	0.0538	0.000020	9331131
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9331131
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9331131
Dissolved Boron (B)	mg/L	0.036	0.045	0.010	9331131
Dissolved Cadmium (Cd)	mg/L	0.0406	0.0855	0.0000050	9331131
Dissolved Chromium (Cr)	mg/L	0.00014	0.00013	0.00010	9331131
Dissolved Cobalt (Co)	mg/L	0.0237	0.0476	0.0000050	9331131
Dissolved Copper (Cu)	mg/L	0.169	0.186	0.000050	9331131
Dissolved Iron (Fe)	mg/L	0.0022	0.0019	0.0010	9331131
Dissolved Lead (Pb)	mg/L	0.183	0.0535	0.0000050	9331131
Dissolved Lithium (Li)	mg/L	0.0110	0.0112	0.00050	9331131
Dissolved Manganese (Mn)	mg/L	0.00121	0.00290	0.000050	9331131
Dissolved Molybdenum (Mo)	mg/L	0.00174	0.00195	0.000050	9331131
Dissolved Nickel (Ni)	mg/L	0.0960	0.197	0.000020	9331131
Dissolved Selenium (Se)	mg/L	0.106	0.209	0.000040	9331131
Dissolved Silicon (Si)	mg/L	0.664	0.654	0.050	9331131
Dissolved Silver (Ag)	mg/L	0.0000141	0.0000370	0.0000050	9331131
Dissolved Strontium (Sr)	mg/L	0.442	0.596	0.000050	9331131
Dissolved Thallium (Tl)	mg/L	0.00133	0.00299	0.0000020	9331131
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9331131
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9331131
Dissolved Uranium (U)	mg/L	0.319	0.375	0.0000020	9331131
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9331131
Dissolved Zinc (Zn)	mg/L	3.05	6.90	0.00010	9331131
Dissolved Zirconium (Zr)	mg/L	0.00015	<0.00010	0.00010	9331131
Dissolved Calcium (Ca)	mg/L	97.1	153	0.050	9330564
RDL = Reportable Detection Limit					

Maxxam Job #: B913208
Report Date: 2019/02/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VG6145	VG6146		
Sampling Date		2019/02/22 14:10	2019/02/22 14:10		
COC Number		08464519	08464519		
	UNITS	1L BENCH-SCALE (10X)	500ML BENCH-SCALE(20X)	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.1	16.4	0.050	9330564
Dissolved Potassium (K)	mg/L	4.57	4.78	0.050	9330564
Dissolved Sodium (Na)	mg/L	26.1	26.9	0.050	9330564
Dissolved Sulphur (S)	mg/L	76.8	126	3.0	9330564
RDL = Reportable Detection Limit					

Maxxam Job #: B913208
Report Date: 2019/02/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	13.3°C
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Results relate only to the items tested.

Maxxam Job #: B913208
Report Date: 2019/02/28

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9331131	Dissolved Aluminum (Al)	2019/02/26	98	80 - 120	101	80 - 120	<0.00050	mg/L	1.1	20
9331131	Dissolved Antimony (Sb)	2019/02/26	99	80 - 120	101	80 - 120	<0.000020	mg/L	5.6	20
9331131	Dissolved Arsenic (As)	2019/02/26	100	80 - 120	102	80 - 120	<0.000020	mg/L	4.9	20
9331131	Dissolved Barium (Ba)	2019/02/26	96	80 - 120	101	80 - 120	<0.000020	mg/L	1.4	20
9331131	Dissolved Beryllium (Be)	2019/02/26	97	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9331131	Dissolved Bismuth (Bi)	2019/02/26	99	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9331131	Dissolved Boron (B)	2019/02/26	100	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
9331131	Dissolved Cadmium (Cd)	2019/02/26	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9331131	Dissolved Chromium (Cr)	2019/02/26	98	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9331131	Dissolved Cobalt (Co)	2019/02/26	94	80 - 120	100	80 - 120	<0.0000050	mg/L	0.70	20
9331131	Dissolved Copper (Cu)	2019/02/26	95	80 - 120	100	80 - 120	<0.000050	mg/L	0.56	20
9331131	Dissolved Iron (Fe)	2019/02/26	101	80 - 120	102	80 - 120	<0.0010	mg/L	0.56	20
9331131	Dissolved Lead (Pb)	2019/02/26	100	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9331131	Dissolved Lithium (Li)	2019/02/26	97	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9331131	Dissolved Manganese (Mn)	2019/02/26	97	80 - 120	102	80 - 120	<0.000050	mg/L	3.4	20
9331131	Dissolved Molybdenum (Mo)	2019/02/26	NC	80 - 120	103	80 - 120	<0.000050	mg/L	0.27	20
9331131	Dissolved Nickel (Ni)	2019/02/26	95	80 - 120	101	80 - 120	<0.000020	mg/L	15	20
9331131	Dissolved Selenium (Se)	2019/02/26	101	80 - 120	102	80 - 120	<0.000040	mg/L	2.2	20
9331131	Dissolved Silicon (Si)	2019/02/26	95	80 - 120	101	80 - 120	<0.050	mg/L	1.2	20
9331131	Dissolved Silver (Ag)	2019/02/26	99	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9331131	Dissolved Strontium (Sr)	2019/02/26	NC	80 - 120	103	80 - 120	<0.000050	mg/L	1.7	20
9331131	Dissolved Thallium (Tl)	2019/02/26	99	80 - 120	104	80 - 120	<0.0000020	mg/L	NC	20
9331131	Dissolved Tin (Sn)	2019/02/26	99	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9331131	Dissolved Titanium (Ti)	2019/02/26	96	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9331131	Dissolved Uranium (U)	2019/02/26	101	80 - 120	102	80 - 120	<0.0000020	mg/L	2.0	20
9331131	Dissolved Vanadium (V)	2019/02/26	99	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9331131	Dissolved Zinc (Zn)	2019/02/26	98	80 - 120	104	80 - 120	<0.00010	mg/L	1.5	20
9331131	Dissolved Zirconium (Zr)	2019/02/26	99	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20

Maxxam Job #: B913208
Report Date: 2019/02/28

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9332711	Dissolved Sulphate (SO4)	2019/02/25			96	80 - 120	<0.50	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

Maxxam Job #: B913208
Report Date: 2019/02/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, B.Sc., Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS (NO 1) LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☐ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☒ 3 Days	
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02	Date Required:	
Phone:		Phone:	(867) 668-6463 kpiewoye@alexcoresource.com	Site Location:	Kudz Ze Kayah		
Email:		Email:	agault@alexcoresource.com	Site #:			
				Sampled By:			
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		Analysis Requested Received in Saskatoon By: [Signature] FEB 22 2019 14:44 Temp: 14 / 13 / 13		LABORATORY USE ONLY CUSTODY SEAL Y/N COOLER TEMPERATURES Present Intact COOLING MEDIA PRESENT Y/N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	DISSOLVED LOW LEVEL METALS	SULPHATE	COMMENTS
1	1L Bench-Scale (10X)	22-Feb-19	14:10	Water	X	X	All dissolved metals samples preserved with HNO3 and field filtered.
2	500mL Bench-Scale (20X)	22-Feb-19	14:10	Water	X	X	
3							
4							
5							
6							
7							
8							
9							
10							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
[Signature]		2019/02/22	2:45PM	[Signature]		2019/02/23	10:55



B913208_COC

0304

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08466525

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/03/20
Report #: R2700075
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B917661

Received: 2019/03/11, 14:48

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Hardness Total (calculated as CaCO ₃) (1, 2)	8	N/A	2019/03/20	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	8	N/A	2019/03/20	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	8	N/A	2019/03/20	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved) (1)	8	N/A	2019/03/20	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	8	2019/03/19	2019/03/20	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (total) (1)	8	2019/03/19	2019/03/20	BBY7SOP-00003 BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO ₃ Preserve for Metals (1)	8	N/A	2019/03/19	BBY7 WI-00004	SM 23 3030B m
Sulphate - Low Level (1)	7	N/A	2019/03/19	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate - Low Level (1)	1	N/A	2019/03/20	BBY6SOP-00017	SM 22 4500-SO42- E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08466525

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/03/20
Report #: R2700075
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B917661

Received: 2019/03/11, 14:48

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: DCruz@maxxam.ca

Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VI6635	VI6636	VI6637	VI6638			VI6639		
Sampling Date		2019/03/11 13:05	2019/03/11 13:10	2019/03/11 13:15	2019/03/11 13:25			2019/03/11 14:30		
COC Number		08466525	08466525	08466525	08466525			08466525		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	RDL	QC Batch	TRIAL #5	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD		ONSITE	FIELD		ONSITE
Anions										
Dissolved Sulphate (SO4)	mg/L	217 (1)	211 (1)	204 (1)	209 (1)	5.0	9355226	193	0.50	9356555
RDL = Reportable Detection Limit										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										

Maxxam ID		VI6640	VI6641	VI6642		
Sampling Date		2019/03/11 13:30	2019/03/11 13:30	2019/03/11 13:35		
COC Number		08466525	08466525	08466525		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD		ONSITE
Anions						
Dissolved Sulphate (SO4)	mg/L	211 (1)	215 (1)	204 (1)	5.0	9355226
RDL = Reportable Detection Limit						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR DISSOLVED METALS (NO CV-HG) IN WATER

Maxxam ID		VI6635	VI6636	VI6637	VI6638	VI6639		
Sampling Date		2019/03/11 13:05	2019/03/11 13:10	2019/03/11 13:15	2019/03/11 13:25	2019/03/11 14:30		
COC Number		08466525	08466525	08466525	08466525	08466525		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	316	322	335	331	330	0.50	9354485
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0232	0.0218	0.0052	0.0042	0.0157	0.0030	9354923
Dissolved Antimony (Sb)	mg/L	0.0246	0.0238	0.0192	0.0192	0.0208	0.00050	9354923
Dissolved Arsenic (As)	mg/L	0.0573	0.0596	0.0664	0.0734	0.0495	0.00010	9354923
Dissolved Barium (Ba)	mg/L	0.0556	0.0545	0.0814	0.0885	0.0563	0.0010	9354923
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9354923
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	9354923
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9354923
Dissolved Cadmium (Cd)	mg/L	0.00422	0.00430	0.00401	0.00395	0.00431	0.000010	9354923
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	9354923
Dissolved Cobalt (Co)	mg/L	0.00281	0.00282	0.00131	0.00063	0.00284	0.00020	9354923
Dissolved Copper (Cu)	mg/L	0.0186	0.0188	0.0132	0.0141	0.0195	0.00020	9354923
Dissolved Iron (Fe)	mg/L	<0.0050	<0.0050	0.0451	0.0085	0.0061	0.0050	9354923
Dissolved Lead (Pb)	mg/L	0.0247	0.0210	0.00391	0.00202	0.0187	0.00020	9354923
Dissolved Lithium (Li)	mg/L	0.0119	0.0115	0.0100	0.0098	0.0117	0.0020	9354923
Dissolved Manganese (Mn)	mg/L	0.0172	0.0194	0.255	0.0507	0.0310	0.0010	9354923
Dissolved Mercury (Hg)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	9354923
Dissolved Molybdenum (Mo)	mg/L	0.0021	0.0018	0.0026	0.0026	0.0017	0.0010	9354923
Dissolved Nickel (Ni)	mg/L	0.0109	0.0111	0.0089	0.0085	0.0111	0.0010	9354923
Dissolved Selenium (Se)	mg/L	0.0106	0.0107	0.00954	0.00988	0.00995	0.00010	9354923
Dissolved Silicon (Si)	mg/L	0.83	0.83	1.44	1.43	0.78	0.10	9354923
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	9354923
Dissolved Strontium (Sr)	mg/L	0.441	0.466	0.458	0.528	0.492	0.0010	9354923
Dissolved Thallium (Tl)	mg/L	0.000296	0.000378	0.000120	0.000127	0.000245	0.000010	9354923
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9354923
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9354923
Dissolved Uranium (U)	mg/L	0.0408	0.0392	0.0345	0.0342	0.0357	0.00010	9354923
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9354923
Dissolved Zinc (Zn)	mg/L	0.322	0.328	0.305	0.307	0.340	0.0050	9354923
Dissolved Zirconium (Zr)	mg/L	0.00017	0.00013	0.00011	0.00012	0.00023	0.00010	9354923
Dissolved Calcium (Ca)	mg/L	97.5	100	106	105	103	0.050	9354491

RDL = Reportable Detection Limit

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR DISSOLVED METALS (NO CV-HG) IN WATER

Maxxam ID		VI6635	VI6636	VI6637	VI6638	VI6639		
Sampling Date		2019/03/11 13:05	2019/03/11 13:10	2019/03/11 13:15	2019/03/11 13:25	2019/03/11 14:30		
COC Number		08466525	08466525	08466525	08466525	08466525		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.6	17.6	17.3	16.5	17.6	0.050	9354491
Dissolved Potassium (K)	mg/L	5.08	4.92	5.02	5.12	4.66	0.050	9354491
Dissolved Sodium (Na)	mg/L	27.9	27.7	27.5	26.9	28.2	0.050	9354491
Dissolved Sulphur (S)	mg/L	85.4	88.4	84.9	86.5	86.8	3.0	9354491
RDL = Reportable Detection Limit								

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR DISSOLVED METALS (NO CV-HG) IN WATER

Maxxam ID		VI6640	VI6641	VI6642		
Sampling Date		2019/03/11 13:30	2019/03/11 13:30	2019/03/11 13:35		
COC Number		08466525	08466525	08466525		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	323	327	330	0.50	9354485
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.0031	0.0219	0.0043	0.0030	9354923
Dissolved Antimony (Sb)	mg/L	0.201	0.0265	0.0193	0.00050	9354923
Dissolved Arsenic (As)	mg/L	0.481	0.0559	0.0620	0.00010	9354923
Dissolved Barium (Ba)	mg/L	0.0765	0.0650	0.0845	0.0010	9354923
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9354923
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	9354923
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	0.050	9354923
Dissolved Cadmium (Cd)	mg/L	0.0362	0.00422	0.00343	0.000010	9354923
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	9354923
Dissolved Cobalt (Co)	mg/L	0.0236	0.00284	0.00086	0.00020	9354923
Dissolved Copper (Cu)	mg/L	0.0625	0.0155	0.00803	0.00020	9354923
Dissolved Iron (Fe)	mg/L	<0.0050	<0.0050	0.0238	0.0050	9354923
Dissolved Lead (Pb)	mg/L	0.114	0.0205	0.00220	0.00020	9354923
Dissolved Lithium (Li)	mg/L	0.0121	0.0121	0.0102	0.0020	9354923
Dissolved Manganese (Mn)	mg/L	0.0190	0.0270	0.193	0.0010	9354923
Dissolved Mercury (Hg)	mg/L	<0.000050	<0.000050	<0.000050	0.000050	9354923
Dissolved Molybdenum (Mo)	mg/L	0.0018	0.0018	0.0032	0.0010	9354923
Dissolved Nickel (Ni)	mg/L	0.0879	0.0108	0.0082	0.0010	9354923
Dissolved Selenium (Se)	mg/L	0.0918	0.0108	0.00975	0.00010	9354923
Dissolved Silicon (Si)	mg/L	0.88	0.88	1.46	0.10	9354923
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	0.000020	9354923
Dissolved Strontium (Sr)	mg/L	0.524	0.510	0.538	0.0010	9354923
Dissolved Thallium (Tl)	mg/L	0.00154	0.000368	0.000107	0.000010	9354923
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	9354923
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	9354923
Dissolved Uranium (U)	mg/L	0.325	0.0398	0.0351	0.00010	9354923
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	9354923
Dissolved Zinc (Zn)	mg/L	2.54	0.329	0.289	0.0050	9354923
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00011	0.00012	0.00010	9354923
Dissolved Calcium (Ca)	mg/L	100	101	105	0.050	9354491
RDL = Reportable Detection Limit						

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR DISSOLVED METALS (NO CV-HG) IN WATER

Maxxam ID		VI6640	VI6641	VI6642		
Sampling Date		2019/03/11 13:30	2019/03/11 13:30	2019/03/11 13:35		
COC Number		08466525	08466525	08466525		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.8	18.4	16.6	0.050	9354491
Dissolved Potassium (K)	mg/L	5.66	5.40	4.89	0.050	9354491
Dissolved Sodium (Na)	mg/L	28.1	29.5	26.7	0.050	9354491
Dissolved Sulphur (S)	mg/L	85.0	93.9	85.0	3.0	9354491
RDL = Reportable Detection Limit						

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR TOTAL METALS (NO CV-HG) IN WATER

Maxxam ID		VI6635	VI6636	VI6637	VI6638	VI6639		
Sampling Date		2019/03/11 13:05	2019/03/11 13:10	2019/03/11 13:15	2019/03/11 13:25	2019/03/11 14:30		
COC Number		08466525	08466525	08466525	08466525	08466525		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	325	333	336	323	327	0.50	9354244
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0364	0.0362	0.0159	0.0167	0.0916	0.0030	9354825
Total Antimony (Sb)	mg/L	0.0252	0.0232	0.0191	0.0195	0.0206	0.00050	9354825
Total Arsenic (As)	mg/L	0.0600	0.0596	0.0742	0.0755	0.0531	0.00010	9354825
Total Barium (Ba)	mg/L	0.0575	0.0547	0.0825	0.0884	0.0586	0.0010	9354825
Total Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9354825
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	9354825
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9354825
Total Cadmium (Cd)	mg/L	0.00427	0.00415	0.00399	0.00394	0.00424	0.000010	9354825
Total Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	9354825
Total Cobalt (Co)	mg/L	0.00271	0.00280	0.00126	0.00059	0.00274	0.00020	9354825
Total Copper (Cu)	mg/L	0.0183	0.0183	0.0130	0.0138	0.0192	0.00050	9354825
Total Iron (Fe)	mg/L	0.013	0.017	0.157	0.042	0.092	0.010	9354825
Total Lead (Pb)	mg/L	0.0264	0.0234	0.0102	0.00427	0.0247	0.00020	9354825
Total Lithium (Li)	mg/L	0.0122	0.0120	0.0103	0.0099	0.0117	0.0020	9354825
Total Manganese (Mn)	mg/L	0.0173	0.0193	0.246	0.0489	0.0313	0.0010	9354825
Total Mercury (Hg)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	9354825
Total Molybdenum (Mo)	mg/L	0.0021	0.0018	0.0026	0.0026	0.0018	0.0010	9354825
Total Nickel (Ni)	mg/L	0.0107	0.0107	0.0083	0.0078	0.0108	0.0010	9354825
Total Selenium (Se)	mg/L	0.0110	0.0112	0.00985	0.00998	0.00983	0.00010	9354825
Total Silicon (Si)	mg/L	0.94	0.92	1.54	1.49	0.92	0.10	9354825
Total Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	9354825
Total Strontium (Sr)	mg/L	0.446	0.473	0.482	0.528	0.496	0.0010	9354825
Total Thallium (Tl)	mg/L	0.000297	0.000392	0.000123	0.000131	0.000258	0.000010	9354825
Total Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9354825
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9354825
Total Uranium (U)	mg/L	0.0410	0.0410	0.0343	0.0345	0.0367	0.00010	9354825
Total Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9354825
Total Zinc (Zn)	mg/L	0.316	0.322	0.294	0.291	0.332	0.0050	9354825
Total Zirconium (Zr)	mg/L	0.00018	0.00017	0.00014	0.00012	0.00041	0.00010	9354825
Total Calcium (Ca)	mg/L	102	104	108	103	103	0.050	9354249
RDL = Reportable Detection Limit								

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR TOTAL METALS (NO CV-HG) IN WATER

Maxxam ID		VI6635	VI6636	VI6637	VI6638	VI6639		
Sampling Date		2019/03/11 13:05	2019/03/11 13:10	2019/03/11 13:15	2019/03/11 13:25	2019/03/11 14:30		
COC Number		08466525	08466525	08466525	08466525	08466525		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.9	17.4	16.4	15.8	17.1	0.050	9354249
Total Potassium (K)	mg/L	5.16	5.06	4.90	4.89	4.65	0.050	9354249
Total Sodium (Na)	mg/L	26.9	27.6	25.7	24.6	26.3	0.050	9354249
Total Sulphur (S)	mg/L	87.3	88.8	83.1	79.5	83.7	3.0	9354249
RDL = Reportable Detection Limit								

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR TOTAL METALS (NO CV-HG) IN WATER

Maxxam ID		VI6640	VI6641	VI6642		
Sampling Date		2019/03/11 13:30	2019/03/11 13:30	2019/03/11 13:35		
COC Number		08466525	08466525	08466525		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	317	328	335	0.50	9354244
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.0326	0.0386	0.0204	0.0030	9354825
Total Antimony (Sb)	mg/L	0.200	0.0264	0.0189	0.00050	9354825
Total Arsenic (As)	mg/L	0.489	0.0563	0.0670	0.00010	9354825
Total Barium (Ba)	mg/L	0.0781	0.0657	0.0859	0.0010	9354825
Total Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9354825
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	9354825
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	0.050	9354825
Total Cadmium (Cd)	mg/L	0.0359	0.00418	0.00335	0.000010	9354825
Total Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	9354825
Total Cobalt (Co)	mg/L	0.0224	0.00269	0.00089	0.00020	9354825
Total Copper (Cu)	mg/L	0.0667	0.0147	0.00816	0.00050	9354825
Total Iron (Fe)	mg/L	0.038	0.024	0.112	0.010	9354825
Total Lead (Pb)	mg/L	0.125	0.0230	0.00662	0.00020	9354825
Total Lithium (Li)	mg/L	0.0123	0.0122	0.0097	0.0020	9354825
Total Manganese (Mn)	mg/L	0.0193	0.0268	0.192	0.0010	9354825
Total Mercury (Hg)	mg/L	<0.000050	<0.000050	<0.000050	0.000050	9354825
Total Molybdenum (Mo)	mg/L	0.0018	0.0018	0.0024	0.0010	9354825
Total Nickel (Ni)	mg/L	0.0832	0.0100	0.0079	0.0010	9354825
Total Selenium (Se)	mg/L	0.0912	0.0105	0.00953	0.00010	9354825
Total Silicon (Si)	mg/L	0.94	0.95	1.59	0.10	9354825
Total Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	0.000020	9354825
Total Strontium (Sr)	mg/L	0.521	0.517	0.536	0.0010	9354825
Total Thallium (Tl)	mg/L	0.00152	0.000366	0.000103	0.000010	9354825
Total Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	9354825
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	9354825
Total Uranium (U)	mg/L	0.323	0.0397	0.0346	0.00010	9354825
Total Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	9354825
Total Zinc (Zn)	mg/L	2.48	0.312	0.277	0.0050	9354825
Total Zirconium (Zr)	mg/L	0.00028	0.00014	0.00016	0.00010	9354825
Total Calcium (Ca)	mg/L	98.2	102	108	0.050	9354249
RDL = Reportable Detection Limit						

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR TOTAL METALS (NO CV-HG) IN WATER

Maxxam ID		VI6640	VI6641	VI6642		
Sampling Date		2019/03/11 13:30	2019/03/11 13:30	2019/03/11 13:35		
COC Number		08466525	08466525	08466525		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Magnesium (Mg)	mg/L	17.3	17.7	15.8	0.050	9354249
Total Potassium (K)	mg/L	5.55	5.33	4.99	0.050	9354249
Total Sodium (Na)	mg/L	28.0	27.3	25.3	0.050	9354249
Total Sulphur (S)	mg/L	88.2	89.0	84.9	3.0	9354249
RDL = Reportable Detection Limit						

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.7°C
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Results relate only to the items tested.

Maxxam Job #: B917661
Report Date: 2019/03/20

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9354825	Total Aluminum (Al)	2019/03/20	105	80 - 120	106	80 - 120	<0.0030	mg/L	8.0	20
9354825	Total Antimony (Sb)	2019/03/20	NC	80 - 120	99	80 - 120	<0.00050	mg/L	1.5	20
9354825	Total Arsenic (As)	2019/03/20	NC	80 - 120	100	80 - 120	<0.00010	mg/L	1.5	20
9354825	Total Barium (Ba)	2019/03/20	NC	80 - 120	97	80 - 120	<0.0010	mg/L	0.54	20
9354825	Total Beryllium (Be)	2019/03/20	99	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9354825	Total Bismuth (Bi)	2019/03/20	95	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
9354825	Total Boron (B)	2019/03/20	99	80 - 120	104	80 - 120	<0.050	mg/L	NC	20
9354825	Total Cadmium (Cd)	2019/03/20	97	80 - 120	98	80 - 120	<0.000010	mg/L	0.26	20
9354825	Total Chromium (Cr)	2019/03/20	94	80 - 120	95	80 - 120	<0.0010	mg/L	NC	20
9354825	Total Cobalt (Co)	2019/03/20	92	80 - 120	94	80 - 120	<0.00020	mg/L	0.85	20
9354825	Total Copper (Cu)	2019/03/20	88	80 - 120	92	80 - 120	<0.00050	mg/L	0.38	20
9354825	Total Iron (Fe)	2019/03/20	99	80 - 120	98	80 - 120	<0.010	mg/L	0.41	20
9354825	Total Lead (Pb)	2019/03/20	99	80 - 120	101	80 - 120	<0.00020	mg/L	0.11	20
9354825	Total Lithium (Li)	2019/03/20	99	80 - 120	100	80 - 120	<0.0020	mg/L	2.1	20
9354825	Total Manganese (Mn)	2019/03/20	95	80 - 120	97	80 - 120	<0.0010	mg/L	1.1	20
9354825	Total Mercury (Hg)	2019/03/20	99	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9354825	Total Molybdenum (Mo)	2019/03/20	97	80 - 120	96	80 - 120	<0.0010	mg/L	5.0	20
9354825	Total Nickel (Ni)	2019/03/20	91	80 - 120	93	80 - 120	<0.0010	mg/L	2.9	20
9354825	Total Selenium (Se)	2019/03/20	98	80 - 120	94	80 - 120	<0.00010	mg/L	3.2	20
9354825	Total Silicon (Si)	2019/03/20	107	80 - 120	107	80 - 120	<0.10	mg/L	0.71	20
9354825	Total Silver (Ag)	2019/03/20	97	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9354825	Total Strontium (Sr)	2019/03/20	NC	80 - 120	97	80 - 120	<0.0010	mg/L	0.14	20
9354825	Total Thallium (Tl)	2019/03/20	98	80 - 120	101	80 - 120	<0.000010	mg/L	2.4	20
9354825	Total Tin (Sn)	2019/03/20	99	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
9354825	Total Titanium (Ti)	2019/03/20	97	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20
9354825	Total Uranium (U)	2019/03/20	100	80 - 120	100	80 - 120	<0.00010	mg/L	0.64	20
9354825	Total Vanadium (V)	2019/03/20	98	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
9354825	Total Zinc (Zn)	2019/03/20	NC	80 - 120	95	80 - 120	<0.0050	mg/L	0.13	20
9354825	Total Zirconium (Zr)	2019/03/20	100	80 - 120	97	80 - 120	<0.00010	mg/L	7.9	20
9354923	Dissolved Aluminum (Al)	2019/03/20	100	80 - 120	101	80 - 120	<0.0030	mg/L	0.50	20
9354923	Dissolved Antimony (Sb)	2019/03/20	NC	80 - 120	98	80 - 120	<0.00050	mg/L	0.053	20
9354923	Dissolved Arsenic (As)	2019/03/20	NC	80 - 120	98	80 - 120	<0.00010	mg/L	0.13	20

Maxxam Job #: B917661
Report Date: 2019/03/20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9354923	Dissolved Barium (Ba)	2019/03/20	NC	80 - 120	98	80 - 120	<0.0010	mg/L	1.4	20
9354923	Dissolved Beryllium (Be)	2019/03/20	95	80 - 120	95	80 - 120	<0.00010	mg/L	NC	20
9354923	Dissolved Bismuth (Bi)	2019/03/20	92	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
9354923	Dissolved Boron (B)	2019/03/20	98	80 - 120	99	80 - 120	<0.050	mg/L	NC	20
9354923	Dissolved Cadmium (Cd)	2019/03/20	94	80 - 120	97	80 - 120	<0.000010	mg/L	1.8	20
9354923	Dissolved Chromium (Cr)	2019/03/20	92	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20
9354923	Dissolved Cobalt (Co)	2019/03/20	89	80 - 120	96	80 - 120	<0.00020	mg/L	0.29	20
9354923	Dissolved Copper (Cu)	2019/03/20	87	80 - 120	94	80 - 120	<0.00020	mg/L	0.038	20
9354923	Dissolved Iron (Fe)	2019/03/20	96	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20
9354923	Dissolved Lead (Pb)	2019/03/20	93	80 - 120	97	80 - 120	<0.00020	mg/L	0.94	20
9354923	Dissolved Lithium (Li)	2019/03/20	92	80 - 120	92	80 - 120	<0.0020	mg/L	2.9	20
9354923	Dissolved Manganese (Mn)	2019/03/20	91	80 - 120	97	80 - 120	<0.0010	mg/L	0.81	20
9354923	Dissolved Mercury (Hg)	2019/03/20	96	80 - 120	96	80 - 120	<0.000050	mg/L	NC	20
9354923	Dissolved Molybdenum (Mo)	2019/03/20	92	80 - 120	96	80 - 120	<0.0010	mg/L	3.4	20
9354923	Dissolved Nickel (Ni)	2019/03/20	89	80 - 120	95	80 - 120	<0.0010	mg/L	1.8	20
9354923	Dissolved Selenium (Se)	2019/03/20	93	80 - 120	93	80 - 120	<0.00010	mg/L	1.1	20
9354923	Dissolved Silicon (Si)	2019/03/20	96	80 - 120	97	80 - 120	<0.10	mg/L	1.7	20
9354923	Dissolved Silver (Ag)	2019/03/20	96	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9354923	Dissolved Strontium (Sr)	2019/03/20	NC	80 - 120	97	80 - 120	<0.0010	mg/L	0.28	20
9354923	Dissolved Sulphur (S)	2019/03/20	NC	80 - 120	98	80 - 120	<3.0	mg/L	1.3	20
9354923	Dissolved Thallium (Tl)	2019/03/20	94	80 - 120	97	80 - 120	<0.000010	mg/L	3.8	20
9354923	Dissolved Tin (Sn)	2019/03/20	96	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
9354923	Dissolved Titanium (Ti)	2019/03/20	99	80 - 120	93	80 - 120	<0.0050	mg/L	NC	20
9354923	Dissolved Uranium (U)	2019/03/20	95	80 - 120	96	80 - 120	<0.00010	mg/L	2.4	20
9354923	Dissolved Vanadium (V)	2019/03/20	96	80 - 120	94	80 - 120	<0.0050	mg/L	NC	20
9354923	Dissolved Zinc (Zn)	2019/03/20	NC	80 - 120	95	80 - 120	<0.0050	mg/L	0.41	20
9354923	Dissolved Zirconium (Zr)	2019/03/20	95	80 - 120	96	80 - 120	<0.00010	mg/L	14	20
9355226	Dissolved Sulphate (SO4)	2019/03/19	NC	80 - 120	96	80 - 120	0.73, RDL=0.50	mg/L	0.042	20

Maxxam Job #: B917661
Report Date: 2019/03/20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

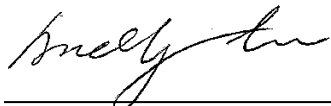
QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9356555	Dissolved Sulphate (SO4)	2019/03/20	NC	80 - 120	98	80 - 120	0.52, RDL=0.50	mg/L		
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement. Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference. Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy. Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination. NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration) NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).										

Maxxam Job #: B917661
Report Date: 2019/03/20

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Ph.D., P.Chem., Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☐ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☒ 2 Days ☐ 3 Days	
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02	Date Required:	
Phone:		Phone:	(867) 668-6463 kpiecowye@alexcoresource.com	Site Location:	Kudz Ze Kayah		
Email:		Email:	agault@alexcoresource.com	Site #:			
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ CCME (Specify) ☐ Drinking Water		☐ BC CSR Water ☐ Other (Specify) ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		pm619031101	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	DISSOLVED METALS	TOTAL METALS	ANIONS - SULPHATE
1	Trial #1	11-Mar-19	13:05	Water	X	X	X
2	Trial #2	11-Mar-19	13:10	Water	X	X	X
3	Trial #3	11-Mar-19	13:15	Water	X	X	X
4	Trial #4	11-Mar-19	13:25	Water	X	X	X
5	Trial #5	11-Mar-19	14:30	Water	X	X	X
6	Trial #6	11-Mar-19	13:30	Water	X	X	X
7	Trial #7	11-Mar-19	13:30	Water	X	X	X
8	Trial #8	11-Mar-19	13:35	Water	X	X	X
9							
10							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Kristen Piecowye		2019/03/11	14:25	BRITTANY BURLONE		2019/03/12	08:10



B917661_COC

Jasbirjit Kaur

Subject: HOLD Analysis

From: Christie Brizinski [<mailto:cbrizinski@contangostrategies.com>]

Sent: March-18-19 10:28 AM

To: Customer Service <CustomerService@maxxam.ca>; Diana Cruz <MCRUZ2@maxxam.ca>

Cc: Kristen Piecowye <kpiecowye@contangostrategies.com>; Vanessa Friesen <vfriesen@contangostrategies.com>; Andrew Gault <agault@alexcoresource.com>

Subject: Re: HOLD Analysis

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good morning,

Could you please begin analysis on these samples today (March 18), with a 2-day TAT?

Thanks!

Christie Brizinski, dip.BT | Technologist II

Contango, an AEG Company

104-411 Downey Road, Saskatoon, Saskatchewan, Canada S7N 4L8

Tel: (306) 978-3111

Email: cbrizinski@contangostrategies.com

Web: www.contangostrategies.com www.alexcoenv.com

On Mar 12, 2019, at 12:28 PM, Jasbirjit Kaur <customerservice@maxxam.ca> wrote:

Good Afternoon Christie,

I have notified our Burnaby Team.

We will Hold all these 8 Samples for Project BMC-18-02 till further notice .

Please let us know if you require anything else .

Thanks,

Sincerely,

Jasbirjit Kaur (Jas)

Project Solutions Representative ,Western Canada

customerservice@maxxam.ca

Office 403-291-3077, ext.5718

Toll Free 800.386.7247

4000 – 19 Street NE, Calgary, AB T2E 6P8

WINTER HOURS START MONDAY NOVEMBER 26, 2018.

**Sample Reception Hours: Mon-Fri 8am-6pm, Sat 9am-5pm,
Sunday CLOSED**

For urgent customer service inquiries after hours, please contact our on call project managers at **403 651 2436**
for Calgary and **780 722 8050 for Edmonton.**

Click [here](#) if you do not wish to receive announcements or occasional marketing updates from Maxxam.

The information in this e-mail and any attachments is confidential and for the sole use of the intended recipient(s).
If you have received this e-mail in error, please: accept our apologies for the inconvenience; note that any use of the
information is strictly prohibited; notify the sender as soon as possible; and then delete all copies from your system

On Tue, 12 Mar at 8:47 AM , Christie Brizinski <cbrizinski@contangostrategies.com>
wrote:

CAUTION: This email originated from outside of the organization. Do not click links or open
attachments unless you recognize the sender and know the content is safe.

CAUTION: This email originated from outside of the organization. Do not click links or open
attachments unless you recognize the sender and know the content is safe.

Hi Diana,

We submitted total/dissolved metals and sulphate samples yesterday, could you please
hold the analysis on those until further notice?

Thank you!

Christie Brizinski, dip.BT | Technologist II
Contango, an AEG Company
104-411 Downey Road, Saskatoon, Saskatchewan, Canada S7N 4L8
Tel: (306) 978-3111

Email: cbrizinski@contangostrategies.com
Web: www.contangostrategies.com www.alexcoenv.com

Your Project #: BMC-18-02
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/01
Report #: R2704524
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B921856

Received: 2019/03/26, 09:43

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	8	N/A	2019/03/29	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level	8	N/A	2019/03/28	AB SOP-00005	SM 23 2320 B m
Chloride - Low Level	8	N/A	2019/03/29	AB SOP-00020	SM 23-4500-Cl-E m
Carbon (DOC) (2)	8	N/A	2019/03/28	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level	7	N/A	2019/03/28	AB SOP-00005	SM 23 4500-F C m
Fluoride - Low Level	1	N/A	2019/03/29	AB SOP-00005	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/03/27	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/03/29	AB WI-00065	Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	8	N/A	2019/03/29	AB WI-00065	Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/03/29	AB WI-00065	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/03/29	AB WI-00065	Auto Calc
Elements by ICPMS Low Level (dissolved)	8	N/A	2019/03/28	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/03/29	AB WI-00065	Auto Calc
Elements by ICPMS Low Level (total)	8	N/A	2019/03/28	CAL SOP-00265	EPA 6020 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/03/28	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite - Low Level	8	N/A	2019/03/29	AB WI-00065	Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	8	N/A	2019/03/29	AB WI-00065	Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	8	N/A	2019/03/28	AB SOP-00023	SM 23 4110 B m
Filter and HNO ₃ Preserve for Metals	8	N/A	2019/03/27		
Orthophosphate by Konelab (low level)	8	N/A	2019/03/28	AB SOP-00025	SM 23 4500-P A, F m
Total Sulphide	8	N/A	2019/03/29	AB SOP-00080	SM 23 4500 S ₂ -A D Fm
Sulphate - Low Level	8	N/A	2019/03/29	AB SOP-00018	SM 23 4500-SO ₄ E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Your Project #: BMC-18-02
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/01
Report #: R2704524
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B921856

Received: 2019/03/26, 09:43

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: DCruz@maxxam.ca

Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VK7353		VK7354		VK7355		VK7356		
Sampling Date		2019/03/25 15:30		2019/03/25 15:45		2019/03/25 16:15		2019/03/25 16:30		
COC Number		1 of 1		1 of 1		1 of 1		1 of 1		
	UNITS	TRIAL #1	RDL	TRIAL #2	RDL	TRIAL #3	RDL	TRIAL #4	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD		FIELD		FIELD		FIELD		ONSITE
Dissolved Nitrate (NO3)	mg/L	4.9	0.013	5.0	0.013	2.7	0.013	2.4	0.013	9363168
Nitrate plus Nitrite (N)	mg/L	1.1	0.0042	1.1	0.0042	0.64	0.0042	0.55	0.0042	9363171
Dissolved Nitrite (NO2)	mg/L	0.016	0.0099	<0.0099	0.0099	0.071	0.0099	<0.0099	0.0099	9363168
Sulphide (as H2S)	mg/L	<0.0020	0.0020	<0.0020	0.0020	0.0040	0.0020	0.0050	0.0020	9362561
Misc. Inorganics										
Fluoride (F)	mg/L	0.666	0.010	0.640	0.010	0.541	0.010	0.536	0.010	9364574
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	9363589
Dissolved Organic Carbon (C)	mg/L	20	0.50	32 (1)	2.5	23	0.50	35 (1)	2.5	9364080
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9365763
Alkalinity (Total as CaCO3)	mg/L	76.8	0.50	78.8	0.50	82.4	0.50	75.7	0.50	9364573
Acidity (pH 8.3)	mg/L	12.9	1.0	10.7	1.0	20.2	1.0	20.6	1.0	9365763
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9364573
Bicarbonate (HCO3)	mg/L	93.8	0.50	96.2	0.50	101	0.50	92.4	0.50	9364573
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9364573
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9364573
Anions										
Orthophosphate (P)	mg/L	1.4 (1)	0.10	1.2 (1)	0.10	1.2 (1)	0.10	1.1 (1)	0.10	9364579
Dissolved Sulphate (SO4)	mg/L	238 (1)	1.0	235 (1)	1.0	227 (1)	1.0	240 (1)	1.0	9365194
Total Sulphide	mg/L	<0.0019	0.0019	<0.0019	0.0019	0.0041	0.0019	0.0051	0.0019	9365233
Dissolved Chloride (Cl)	mg/L	55	0.50	57	0.50	57	0.50	57	0.50	9365190
Nutrients										
Total Ammonia (N)	mg/L	3.2 (1)	0.050	3.3 (1)	0.050	3.2 (1)	0.050	3.4 (1)	0.050	9364719
Dissolved Nitrite (N)	mg/L	0.0049	0.0030	<0.0030	0.0030	0.022	0.0030	<0.0030	0.0030	9364459
Dissolved Nitrate (N)	mg/L	1.1	0.0030	1.1	0.0030	0.61	0.0030	0.55	0.0030	9364459
RDL = Reportable Detection Limit										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VK7357		VK7358		VK7359	VK7360		
Sampling Date		2019/03/25 17:50		2019/03/25 16:55		2019/03/25 17:10	2019/03/25 17:20		
COC Number		1 of 1		1 of 1		1 of 1	1 of 1		
	UNITS	TRIAL #5	RDL	TRIAL #6	RDL	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD		FIELD		FIELD	FIELD		ONSITE
Dissolved Nitrate (NO3)	mg/L	1.7	0.013	5.8	0.013	4.9	2.9	0.013	9363168
Nitrate plus Nitrite (N)	mg/L	0.39	0.0042	1.4	0.0042	1.1	0.65	0.0042	9363171
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	0.31	0.0099	<0.0099	<0.0099	0.0099	9363168
Sulphide (as H2S)	mg/L	<0.0020	0.0020	<0.0020	0.0020	<0.0020	<0.0020	0.0020	9362561
Misc. Inorganics									
Fluoride (F)	mg/L	0.689	0.010	0.689	0.010	0.649	0.530	0.010	9364574
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	<0.050	0.050	0.056	<0.050	0.050	9363589
Dissolved Organic Carbon (C)	mg/L	34 (1)	2.5	23	0.50	3.3	4.1	0.50	9364080
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	9365763
Alkalinity (Total as CaCO3)	mg/L	89.4	0.50	75.8	0.50	81.8	85.8	0.50	9364573
Acidity (pH 8.3)	mg/L	14.6	1.0	7.9	1.0	5.2	7.4	1.0	9365763
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9364573
Bicarbonate (HCO3)	mg/L	109	0.50	92.5	0.50	99.7	105	0.50	9364573
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9364573
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9364573
Anions									
Orthophosphate (P)	mg/L	1.1 (1)	0.10	1.5 (2)	0.10	0.0095 (1)	0.0015	0.0010	9364579
Dissolved Sulphate (SO4)	mg/L	235 (1)	1.0	238 (1)	1.0	232 (1)	222 (1)	1.0	9365194
Total Sulphide	mg/L	<0.0019	0.0019	<0.0019	0.0019	<0.0019	<0.0019	0.0019	9365233
Dissolved Chloride (Cl)	mg/L	55	0.50	56	0.50	56	59	0.50	9365190
Nutrients									
Total Ammonia (N)	mg/L	4.4 (1)	0.050	3.3 (1)	0.050	0.026	0.040	0.0050	9364719
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	0.094	0.0030	<0.0030	<0.0030	0.0030	9364459
Dissolved Nitrate (N)	mg/L	0.39	0.0030	1.3	0.0030	1.1	0.65	0.0030	9364459
RDL = Reportable Detection Limit									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									
(2) Detection limits raised due to matrix interference.									

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VK7353	VK7354	VK7355	VK7356	VK7357		
Sampling Date		2019/03/25 15:30	2019/03/25 15:45	2019/03/25 16:15	2019/03/25 16:30	2019/03/25 17:50		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	331	330	329	328	328	0.50	9363159
---	------	-----	-----	-----	-----	-----	------	---------

Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0102	0.0102	0.00201	0.00175	0.0206	0.00050	9364291
Dissolved Antimony (Sb)	mg/L	0.0250	0.0235	0.0162	0.0162	0.0207	0.000020	9364291
Dissolved Arsenic (As)	mg/L	0.0486	0.0463	0.0146	0.00571	0.0412	0.000020	9364291
Dissolved Barium (Ba)	mg/L	0.0719	0.0697	0.137	0.161	0.0605	0.000020	9364291
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9364291
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9364291
Dissolved Boron (B)	mg/L	0.043	0.041	0.037	0.037	0.039	0.010	9364291
Dissolved Cadmium (Cd)	mg/L	0.00393	0.00382	0.000442	0.000723	0.00419	0.0000050	9364291
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9364291
Dissolved Cobalt (Co)	mg/L	0.00322	0.00311	0.00115	0.000851	0.00316	0.0000050	9364291
Dissolved Copper (Cu)	mg/L	0.0175	0.0159	0.00155	0.00206	0.0192	0.000050	9364291
Dissolved Iron (Fe)	mg/L	0.0024	0.0058	0.0558	0.0203	0.0060	0.0010	9364291
Dissolved Lead (Pb)	mg/L	0.00906	0.00545	0.000387	0.000326	0.00922	0.0000050	9364291
Dissolved Lithium (Li)	mg/L	0.0154	0.0155	0.0126	0.0121	0.0145	0.00050	9364291
Dissolved Manganese (Mn)	mg/L	0.0474	0.0481	0.531	0.522	0.0605	0.000050	9364291
Dissolved Molybdenum (Mo)	mg/L	0.00232	0.00200	0.00334	0.00298	0.00192	0.000050	9364291
Dissolved Nickel (Ni)	mg/L	0.0119	0.0113	0.00636	0.00589	0.0117	0.000020	9364291
Dissolved Selenium (Se)	mg/L	0.0114	0.0116	0.00887	0.00958	0.0106	0.000040	9364291
Dissolved Silicon (Si)	mg/L	0.727	0.696	1.42	1.36	0.614	0.050	9364291
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9364291
Dissolved Strontium (Sr)	mg/L	0.535	0.522	0.500	0.554	0.550	0.000050	9364291
Dissolved Thallium (Tl)	mg/L	0.000359	0.000486	<0.0000020	0.0000149	0.000255	0.0000020	9364291
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9364291
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9364291
Dissolved Uranium (U)	mg/L	0.0442	0.0435	0.0290	0.0259	0.0391	0.0000020	9364291
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00071	0.00048	<0.00020	0.00020	9364291
Dissolved Zinc (Zn)	mg/L	0.305	0.292	0.122	0.106	0.343	0.00010	9364291
Dissolved Zirconium (Zr)	mg/L	0.00018	0.00010	<0.00010	0.00010	0.00017	0.00010	9364291
Dissolved Calcium (Ca)	mg/L	104	105	106	106	104	0.050	9363162
Dissolved Magnesium (Mg)	mg/L	17.3	16.5	15.5	15.5	16.5	0.050	9363162
Dissolved Potassium (K)	mg/L	8.10	7.60	7.36	7.49	6.96	0.050	9363162

RDL = Reportable Detection Limit

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VK7353	VK7354	VK7355	VK7356	VK7357		
Sampling Date		2019/03/25 15:30	2019/03/25 15:45	2019/03/25 16:15	2019/03/25 16:30	2019/03/25 17:50		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Sodium (Na)	mg/L	28.6	27.4	26.5	26.8	27.6	0.050	9363162
Dissolved Sulphur (S)	mg/L	95.1	91.2	86.3	90.9	90.2	3.0	9363162
RDL = Reportable Detection Limit								

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VK7358		VK7359	VK7360		
Sampling Date		2019/03/25 16:55		2019/03/25 17:10	2019/03/25 17:20		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	TRIAL #6	RDL	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	319	0.50	334	334	0.50	9363159
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00299	0.00050	0.00935	0.00248	0.00050	9364291
Dissolved Antimony (Sb)	mg/L	0.213 (1)	0.00010	0.0271	0.0163	0.000020	9364291
Dissolved Arsenic (As)	mg/L	0.460	0.000020	0.0397	0.00427	0.000020	9364291
Dissolved Barium (Ba)	mg/L	0.0945	0.000020	0.0821	0.138	0.000020	9364291
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	<0.000010	<0.000010	0.000010	9364291
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	<0.0000050	<0.0000050	0.0000050	9364291
Dissolved Boron (B)	mg/L	0.040	0.010	0.039	0.033	0.010	9364291
Dissolved Cadmium (Cd)	mg/L	0.0326	0.0000050	0.00401	0.000712	0.0000050	9364291
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	<0.00010	<0.00010	0.00010	9364291
Dissolved Cobalt (Co)	mg/L	0.0227	0.0000050	0.00317	0.000668	0.0000050	9364291
Dissolved Copper (Cu)	mg/L	0.0588	0.000050	0.0116	0.00290	0.000050	9364291
Dissolved Iron (Fe)	mg/L	0.0011	0.0010	0.0019	0.0096	0.0010	9364291
Dissolved Lead (Pb)	mg/L	0.0264	0.0000050	0.00923	0.000394	0.0000050	9364291
Dissolved Lithium (Li)	mg/L	0.0156	0.00050	0.0153	0.0121	0.00050	9364291
Dissolved Manganese (Mn)	mg/L	0.0249	0.000050	0.0767	0.517	0.000050	9364291
Dissolved Molybdenum (Mo)	mg/L	0.00203	0.000050	0.00191	0.00299	0.000050	9364291
Dissolved Nickel (Ni)	mg/L	0.0773	0.000020	0.0104	0.00584	0.000020	9364291
Dissolved Selenium (Se)	mg/L	0.101	0.000040	0.0118	0.00883	0.000040	9364291
Dissolved Silicon (Si)	mg/L	0.757	0.050	0.719	1.46	0.050	9364291
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	<0.0000050	<0.0000050	0.0000050	9364291
Dissolved Strontium (Sr)	mg/L	0.576	0.000050	0.624	0.592	0.000050	9364291
Dissolved Thallium (Tl)	mg/L	0.00158	0.0000020	0.000446	<0.0000020	0.0000020	9364291
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	<0.00020	<0.00020	0.00020	9364291
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	<0.00050	<0.00050	0.00050	9364291
Dissolved Uranium (U)	mg/L	0.328	0.0000020	0.0428	0.0292	0.0000020	9364291
Dissolved Vanadium (V)	mg/L	<0.00020	0.00020	<0.00020	0.00022	0.00020	9364291
Dissolved Zinc (Zn)	mg/L	2.34	0.00010	0.284	0.130	0.00010	9364291
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	<0.00010	<0.00010	0.00010	9364291
Dissolved Calcium (Ca)	mg/L	101	0.050	106	108	0.050	9363162
Dissolved Magnesium (Mg)	mg/L	16.4	0.050	16.7	15.6	0.050	9363162
RDL = Reportable Detection Limit							
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.							

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VK7358		VK7359	VK7360		
Sampling Date		2019/03/25 16:55		2019/03/25 17:10	2019/03/25 17:20		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	TRIAL #6	RDL	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.29	0.050	5.55	5.03	0.050	9363162
Dissolved Sodium (Na)	mg/L	28.0	0.050	27.7	27.0	0.050	9363162
Dissolved Sulphur (S)	mg/L	90.7	3.0	85.2	85.4	3.0	9363162
RDL = Reportable Detection Limit							

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VK7353	VK7354	VK7355	VK7356	VK7357		
Sampling Date		2019/03/25 15:30	2019/03/25 15:45	2019/03/25 16:15	2019/03/25 16:30	2019/03/25 17:50		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	328	328	329	331	330	0.50	9362569
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0895	0.0953	0.235	0.193	0.145	0.00050	9364297
Total Antimony (Sb)	mg/L	0.0250	0.0236	0.0161	0.0160	0.0210	0.000020	9364297
Total Arsenic (As)	mg/L	0.0485	0.0485	0.0294	0.0125	0.0462	0.000020	9364297
Total Barium (Ba)	mg/L	0.0819	0.0771	0.147	0.167	0.0752	0.000020	9364297
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000021	0.000022	<0.000010	0.000010	9364297
Total Bismuth (Bi)	mg/L	0.0000245	0.0000261	0.000139	0.000121	0.0000301	0.0000050	9364297
Total Boron (B)	mg/L	0.043	0.041	0.037	0.037	0.039	0.010	9364297
Total Cadmium (Cd)	mg/L	0.00389	0.00392	0.00103	0.00110	0.00417	0.0000050	9364297
Total Chromium (Cr)	mg/L	0.00045	0.00039	0.00039	0.00031	0.00055	0.00010	9364297
Total Cobalt (Co)	mg/L	0.00337	0.00336	0.00143	0.00118	0.00327	0.0000050	9364297
Total Copper (Cu)	mg/L	0.0187	0.0180	0.00748	0.00687	0.0210	0.000050	9364297
Total Iron (Fe)	mg/L	0.187	0.176	1.07	0.773	0.284	0.0010	9364297
Total Lead (Pb)	mg/L	0.0198	0.0152	0.0225	0.0170	0.0252	0.0000050	9364297
Total Lithium (Li)	mg/L	0.0158	0.0156	0.0130	0.0127	0.0152	0.00050	9364297
Total Manganese (Mn)	mg/L	0.0532	0.0542	0.542	0.542	0.0627	0.000050	9364297
Total Molybdenum (Mo)	mg/L	0.00226	0.00197	0.00297	0.00297	0.00192	0.000050	9364297
Total Nickel (Ni)	mg/L	0.0116	0.0116	0.00707	0.00651	0.0119	0.000020	9364297
Total Selenium (Se)	mg/L	0.0115	0.0116	0.00902	0.00916	0.0104	0.000040	9364297
Total Silicon (Si)	mg/L	0.808	0.765	1.64	1.55	0.760	0.050	9364297
Total Silver (Ag)	mg/L	0.0000054	0.0000064	0.0000089	<0.0000050	0.0000068	0.0000050	9364297
Total Strontium (Sr)	mg/L	0.500	0.516	0.496	0.540	0.553	0.000050	9364297
Total Thallium (Tl)	mg/L	0.000361	0.000490	0.0000104	0.0000224	0.000270	0.0000020	9364297
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9364297
Total Titanium (Ti)	mg/L	0.00312	0.00402	0.00931	0.00710	0.00398	0.00050	9364297
Total Uranium (U)	mg/L	0.0439	0.0434	0.0301	0.0254	0.0396	0.0000020	9364297
Total Vanadium (V)	mg/L	0.00036	0.00034	0.00161	0.00128	0.00044	0.00020	9364297
Total Zinc (Zn)	mg/L	0.308	0.302	0.172	0.147	0.347	0.00010	9364297
Total Zirconium (Zr)	mg/L	0.00048	0.00047	0.00103	0.00100	0.00072	0.00010	9364297
Total Calcium (Ca)	mg/L	103	104	106	107	105	0.050	9363166
Total Magnesium (Mg)	mg/L	17.1	16.7	15.9	15.8	16.6	0.050	9363166
Total Potassium (K)	mg/L	7.75	7.58	7.38	7.51	6.98	0.050	9363166

RDL = Reportable Detection Limit

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VK7353	VK7354	VK7355	VK7356	VK7357		
Sampling Date		2019/03/25 15:30	2019/03/25 15:45	2019/03/25 16:15	2019/03/25 16:30	2019/03/25 17:50		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Sodium (Na)	mg/L	28.1	28.0	27.1	27.0	27.7	0.050	9363166
Total Sulphur (S)	mg/L	92.0	91.0	85.8	88.7	90.4	3.0	9363166
RDL = Reportable Detection Limit								

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VK7358		VK7359	VK7360		
Sampling Date		2019/03/25 16:55		2019/03/25 17:10	2019/03/25 17:20		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	TRIAL #6	RDL	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	320	0.50	331	331	0.50	9362569
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.119	0.00050	0.0353	0.0620	0.00050	9364297
Total Antimony (Sb)	mg/L	0.195 (1)	0.00010	0.0270	0.0163	0.000020	9364297
Total Arsenic (As)	mg/L	0.473	0.000020	0.0411	0.0119	0.000020	9364297
Total Barium (Ba)	mg/L	0.109	0.000020	0.0836	0.139	0.000020	9364297
Total Beryllium (Be)	mg/L	0.000010	0.000010	<0.000010	<0.000010	0.000010	9364297
Total Bismuth (Bi)	mg/L	0.0000244	0.0000050	0.0000087	0.0000476	0.0000050	9364297
Total Boron (B)	mg/L	0.039	0.010	0.039	0.036	0.010	9364297
Total Cadmium (Cd)	mg/L	0.0331	0.0000050	0.00399	0.000747	0.0000050	9364297
Total Chromium (Cr)	mg/L	0.00057	0.00010	0.00012	<0.00010	0.00010	9364297
Total Cobalt (Co)	mg/L	0.0225	0.0000050	0.00324	0.000768	0.0000050	9364297
Total Copper (Cu)	mg/L	0.0816	0.000050	0.0121	0.00375	0.000050	9364297
Total Iron (Fe)	mg/L	0.252	0.0010	0.0560	0.276	0.0010	9364297
Total Lead (Pb)	mg/L	0.0979	0.0000050	0.0131	0.00704	0.0000050	9364297
Total Lithium (Li)	mg/L	0.0161	0.00050	0.0157	0.0127	0.00050	9364297
Total Manganese (Mn)	mg/L	0.0330	0.000050	0.0753	0.523	0.000050	9364297
Total Molybdenum (Mo)	mg/L	0.00197	0.000050	0.00192	0.00295	0.000050	9364297
Total Nickel (Ni)	mg/L	0.0779	0.000020	0.0103	0.00602	0.000020	9364297
Total Selenium (Se)	mg/L	0.101	0.000040	0.0116	0.00879	0.000040	9364297
Total Silicon (Si)	mg/L	0.895	0.050	0.769	1.51	0.050	9364297
Total Silver (Ag)	mg/L	0.0000089	0.0000050	<0.0000050	<0.0000050	0.0000050	9364297
Total Strontium (Sr)	mg/L	0.569	0.000050	0.633	0.588	0.000050	9364297
Total Thallium (Tl)	mg/L	0.00162	0.0000020	0.000448	0.0000052	0.0000020	9364297
Total Tin (Sn)	mg/L	<0.00020	0.00020	<0.00020	<0.00020	0.00020	9364297
Total Titanium (Ti)	mg/L	0.00317	0.00050	0.00132	0.00199	0.00050	9364297
Total Uranium (U)	mg/L	0.333	0.0000020	0.0428	0.0293	0.0000020	9364297
Total Vanadium (V)	mg/L	0.00049	0.00020	<0.00020	0.00064	0.00020	9364297
Total Zinc (Zn)	mg/L	2.42	0.00010	0.286	0.139	0.00010	9364297
Total Zirconium (Zr)	mg/L	0.00052	0.00010	0.00023	0.00028	0.00010	9364297
Total Calcium (Ca)	mg/L	101	0.050	105	107	0.050	9363166
Total Magnesium (Mg)	mg/L	16.6	0.050	16.9	15.8	0.050	9363166
RDL = Reportable Detection Limit							
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.							

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VK7358		VK7359	VK7360		
Sampling Date		2019/03/25 16:55		2019/03/25 17:10	2019/03/25 17:20		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	TRIAL #6	RDL	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	8.28	0.050	5.58	4.97	0.050	9363166
Total Sodium (Na)	mg/L	28.1	0.050	28.1	27.0	0.050	9363166
Total Sulphur (S)	mg/L	89.8	3.0	87.6	84.7	3.0	9363166
RDL = Reportable Detection Limit							

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.7°C
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Results relate only to the items tested.

Maxxam Job #: B921856
Report Date: 2019/04/01

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9363589	HCl Preserved Iron (Fe+2 Ferrous)	2019/03/27	98	80 - 120	97	90 - 110	<0.050	mg/L	NC	20
9364080	Dissolved Organic Carbon (C)	2019/03/28	102	80 - 120	99	80 - 120	<0.50	mg/L	NC	20
9364291	Dissolved Aluminum (Al)	2019/03/28	104	80 - 120	100	80 - 120	<0.00050	mg/L	3.3	20
9364291	Dissolved Antimony (Sb)	2019/03/28	100	80 - 120	91	80 - 120	<0.000020	mg/L	NC	20
9364291	Dissolved Arsenic (As)	2019/03/28	108	80 - 120	93	80 - 120	<0.000020	mg/L	13	20
9364291	Dissolved Barium (Ba)	2019/03/28	104	80 - 120	99	80 - 120	<0.000020	mg/L	0.34	20
9364291	Dissolved Beryllium (Be)	2019/03/28	117	80 - 120	104	80 - 120	<0.000010	mg/L	NC	20
9364291	Dissolved Bismuth (Bi)	2019/03/28	98	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9364291	Dissolved Boron (B)	2019/03/28	119	80 - 120	96	80 - 120	<0.010	mg/L	10	20
9364291	Dissolved Cadmium (Cd)	2019/03/28	109	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9364291	Dissolved Chromium (Cr)	2019/03/28	107	80 - 120	102	80 - 120	<0.00010	mg/L	0.46	20
9364291	Dissolved Cobalt (Co)	2019/03/28	105	80 - 120	99	80 - 120	<0.0000050	mg/L	8.4	20
9364291	Dissolved Copper (Cu)	2019/03/28	103	80 - 120	100	80 - 120	<0.000050	mg/L	0.12	20
9364291	Dissolved Iron (Fe)	2019/03/28	103	80 - 120	101	80 - 120	<0.0010	mg/L	4.2	20
9364291	Dissolved Lead (Pb)	2019/03/28	103	80 - 120	98	80 - 120	<0.0000050	mg/L	8.4	20
9364291	Dissolved Lithium (Li)	2019/03/28	115	80 - 120	110	80 - 120	<0.00050	mg/L	0.90	20
9364291	Dissolved Manganese (Mn)	2019/03/28	108	80 - 120	100	80 - 120	<0.000050	mg/L	6.1	20
9364291	Dissolved Molybdenum (Mo)	2019/03/28	108	80 - 120	103	80 - 120	<0.000050	mg/L	3.9	20
9364291	Dissolved Nickel (Ni)	2019/03/28	103	80 - 120	100	80 - 120	<0.000020	mg/L	2.7	20
9364291	Dissolved Selenium (Se)	2019/03/28	110	80 - 120	89	80 - 120	<0.000040	mg/L	NC	20
9364291	Dissolved Silicon (Si)	2019/03/28	79 (1)	80 - 120	83	80 - 120	<0.050	mg/L	0.70	20
9364291	Dissolved Silver (Ag)	2019/03/28	89	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9364291	Dissolved Strontium (Sr)	2019/03/28	NC	80 - 120	98	80 - 120	<0.000050	mg/L	1.8	20
9364291	Dissolved Thallium (Tl)	2019/03/28	102	80 - 120	99	80 - 120	<0.0000020	mg/L	NC	20
9364291	Dissolved Tin (Sn)	2019/03/28	102	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9364291	Dissolved Titanium (Ti)	2019/03/28	99	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9364291	Dissolved Uranium (U)	2019/03/28	107	80 - 120	102	80 - 120	<0.0000020	mg/L	8.3	20
9364291	Dissolved Vanadium (V)	2019/03/28	108	80 - 120	101	80 - 120	<0.00020	mg/L	1.3	20
9364291	Dissolved Zinc (Zn)	2019/03/28	116	80 - 120	100	80 - 120	<0.00010	mg/L	2.4	20
9364291	Dissolved Zirconium (Zr)	2019/03/28	102	80 - 120	93	80 - 120	<0.00010	mg/L	7.9	20
9364297	Total Aluminum (Al)	2019/03/28	99	80 - 120	99	80 - 120	<0.00050	mg/L	2.6	20
9364297	Total Antimony (Sb)	2019/03/28	NC	80 - 120	90	80 - 120	<0.000020	mg/L	0.15	20
9364297	Total Arsenic (As)	2019/03/28	87	80 - 120	92	80 - 120	<0.000020	mg/L	0.85	20

Maxxam Job #: B921856
Report Date: 2019/04/01

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9364297	Total Barium (Ba)	2019/03/28	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.23	20
9364297	Total Beryllium (Be)	2019/03/28	96	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9364297	Total Bismuth (Bi)	2019/03/28	85	80 - 120	97	80 - 120	<0.0000050	mg/L	0.17	20
9364297	Total Boron (B)	2019/03/28	95	80 - 120	106	80 - 120	<0.010	mg/L	1.9	20
9364297	Total Cadmium (Cd)	2019/03/28	89	80 - 120	95	80 - 120	<0.0000050	mg/L	0.27	20
9364297	Total Chromium (Cr)	2019/03/28	90	80 - 120	99	80 - 120	<0.00010	mg/L	1.2	20
9364297	Total Cobalt (Co)	2019/03/28	87	80 - 120	97	80 - 120	<0.0000050	mg/L	1.7	20
9364297	Total Copper (Cu)	2019/03/28	84	80 - 120	98	80 - 120	<0.000050	mg/L	0.26	20
9364297	Total Iron (Fe)	2019/03/28	99	80 - 120	99	80 - 120	<0.0010	mg/L	0.96	20
9364297	Total Lead (Pb)	2019/03/28	88	80 - 120	97	80 - 120	<0.0000050	mg/L	0.37	20
9364297	Total Lithium (Li)	2019/03/28	99	80 - 120	111	80 - 120	<0.00050	mg/L	0.93	20
9364297	Total Manganese (Mn)	2019/03/28	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.24	20
9364297	Total Molybdenum (Mo)	2019/03/28	100	80 - 120	100	80 - 120	<0.000050	mg/L	1.2	20
9364297	Total Nickel (Ni)	2019/03/28	84	80 - 120	97	80 - 120	<0.000020	mg/L	0.40	20
9364297	Total Selenium (Se)	2019/03/28	89	80 - 120	89	80 - 120	<0.000040	mg/L	1.1	20
9364297	Total Silicon (Si)	2019/03/28	70 (1)	80 - 120	86..0050	80 - 120	<0.050	mg/L	0.35	20
9364297	Total Silver (Ag)	2019/03/28	84	80 - 120	96	80 - 120	<0.0000050	mg/L	16	20
9364297	Total Strontium (Sr)	2019/03/28	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.75	20
9364297	Total Thallium (Tl)	2019/03/28	89	80 - 120	97	80 - 120	<0.0000020	mg/L	1.7	20
9364297	Total Tin (Sn)	2019/03/28	89	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9364297	Total Titanium (Ti)	2019/03/28	97	80 - 120	100	80 - 120	<0.00050	mg/L	3.9	20
9364297	Total Uranium (U)	2019/03/28	94	80 - 120	101	80 - 120	<0.0000020	mg/L	0.17	20
9364297	Total Vanadium (V)	2019/03/28	93	80 - 120	100	80 - 120	<0.00020	mg/L	4.6	20
9364297	Total Zinc (Zn)	2019/03/28	NC	80 - 120	96	80 - 120	<0.00010	mg/L	0.11	20
9364297	Total Zirconium (Zr)	2019/03/28	103	80 - 120	94	80 - 120	<0.00010	mg/L	NC	20
9364459	Dissolved Nitrate (N)	2019/03/28	103	80 - 120	100	80 - 120	<0.0030	mg/L	0.47	20
9364459	Dissolved Nitrite (N)	2019/03/28	99	80 - 120	96	80 - 120	<0.0030	mg/L	7.5	20
9364573	Alkalinity (PP as CaCO3)	2019/03/28					<0.50	mg/L	NC	20
9364573	Alkalinity (Total as CaCO3)	2019/03/28			101	80 - 120	<0.50	mg/L	0.20	20
9364573	Bicarbonate (HCO3)	2019/03/28					<0.50	mg/L	0.20	20
9364573	Carbonate (CO3)	2019/03/28					<0.50	mg/L	NC	20
9364573	Hydroxide (OH)	2019/03/28					<0.50	mg/L	NC	20
9364574	Fluoride (F)	2019/03/29	99	80 - 120	100	80 - 120	<0.010	mg/L	1.5	20

Maxxam Job #: B921856
Report Date: 2019/04/01

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9364579	Orthophosphate (P)	2019/03/28	NC	80 - 120	98	80 - 120	<0.0010	mg/L	2.1	20
9364719	Total Ammonia (N)	2019/03/28	NC	80 - 120	101	80 - 120	<0.0050	mg/L	9.1	20
9365190	Dissolved Chloride (Cl)	2019/03/29	NC	80 - 120	102	80 - 120	<0.50	mg/L	5.3	20
9365194	Dissolved Sulphate (SO4)	2019/03/29	NC	80 - 120	102	95 - 109	<0.50	mg/L	2.5	20
9365233	Total Sulphide	2019/03/29			84	80 - 120	<0.0019	mg/L	NC	20
9365763	Acidity (pH 4.5)	2019/03/29					<1.0	mg/L	NC	20
9365763	Acidity (pH 8.3)	2019/03/29			99	80 - 120	<1.0	mg/L	9.5	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Job #: B921856
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager



Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required																						
Company Name: BMC MINERALS LTD.		Company Name: ALEXCO ENVIRONMENTAL GROUP		Quotation #: B60751		☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS																						
Contact Name:		Contact Name: Andrew Gault; Kristen Piecowye; Vanessa Friesen		P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days																						
Address: 530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4		Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3		Project #: BMC-18-02																								
Phone:		Phone: (867) 668-6463 vfriesen@contangostrategies.com		Site Location: Kudz Ze Kayah																								
Email:		Email: agault@alexcoresource.com kpiewowye@contangostrategies.com		Site #:		Date Required:																						
Sampled By:																												
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:												
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA # OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE												LABORATORY USE ONLY <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">CUSTODY SEAL Y / N</th> <th rowspan="2">COOLER TEMPERATURES</th> </tr> <tr> <th>Present</th> <th>Intact</th> </tr> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">Y</td> <td style="text-align: center;">22.2</td> </tr> <tr> <td colspan="3">COOLING MEDIA PRESENT (Y) / (N)</td> </tr> </table>		CUSTODY SEAL Y / N		COOLER TEMPERATURES	Present	Intact	Y	Y	22.2	COOLING MEDIA PRESENT (Y) / (N)		
CUSTODY SEAL Y / N		COOLER TEMPERATURES																										
Present	Intact																											
Y	Y	22.2																										
COOLING MEDIA PRESENT (Y) / (N)																												
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																												
Sample Identification		Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE											
1	Trial #1		25-Mar-19	15:30	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED											
2	Trial #2		25-Mar-19	15:45	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED											
3	Trial #3		25-Mar-19	16:15	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED											
4	Trial #4		25-Mar-19	16:30	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED											
5	Trial #5		25-Mar-19	17:50	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED											
6	Trial #6		25-Mar-19	16:55	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED											
7	Trial #7		25-Mar-19	17:10	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED											
8	Trial #8		25-Mar-19	17:20	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED											
9																												
10																												
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)																		
						Tony Le		2019/03/27		08:30																		

26-Mar-19 09:43

Safiann Maiter

B921856

JOH INS-0245

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS										
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye; Vanessa Friesen	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days										
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02											
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah											
Email:		Email:	agault@alexcoresource.com kpiecowye@contangostrategies.com	Site #:												
				Sampled By:		Date Required:										
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (CL, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC		LABORATORY USE ONLY CUSTODY SEAL Y/N Present Intact COOLER TEMPERATURES COOLING MEDIA PRESENT Y/N COMMENTS										
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (CL, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1	Trial #1	25-Mar-19	15:30	Water	X	X	X	X	X	X	X	X	X	9		FIELD FILTERED AND PRESERVED
2	Trial #2	25-Mar-19	15:45	Water	X	X	X	X	X	X	X	X	X	9		FIELD FILTERED AND PRESERVED
3	Trial #3	25-Mar-19	16:15	Water	X	X	X	X	X	X	X	X	X	9		FIELD FILTERED AND PRESERVED
4	Trial #4	25-Mar-19	16:30	Water	X	X	X	X	X	X	X	X	X	9		FIELD FILTERED AND PRESERVED
5	Trial #5	25-Mar-19	17:50	Water	X	X	X	X	X	X	X	X	X	9		FIELD FILTERED AND PRESERVED
6	Trial #6	25-Mar-19	16:55	Water	X	X	X	X	X	X	X	X	X	9		FIELD FILTERED AND PRESERVED
7	Trial #7	25-Mar-19	17:10	Water	X	X	X	X	X	X	X	X	X	9		FIELD FILTERED AND PRESERVED
8	Trial #8	25-Mar-19	17:20	Water	X	X	X	X	X	X	X	X	X	9		FIELD FILTERED AND PRESERVED
9																
10																
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)						
		2019/03/26		9:43				2019/03/27		08:30						

26-Mar-19 09:43

Safiann Maiter



B921856

JOH INS-0245

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08469000

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/23
Report #: R2713386
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B925830

Received: 2019/04/08, 14:30

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	8	N/A	2019/04/10	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	8	N/A	2019/04/10	BBY6SOP-00026	SM 22 2320 B m
Chloride - Low Level (1)	8	N/A	2019/04/10	BBY6SOP-00011	SM 22 4500-Cl- E m
Carbon (DOC) (2)	8	N/A	2019/04/12	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	8	N/A	2019/04/11	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/04/10	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/04/12	AB WI-00065	Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	2	N/A	2019/04/17	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	6	N/A	2019/04/18	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	1	N/A	2019/04/17	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	7	N/A	2019/04/18	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	1	N/A	2019/04/17	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	7	N/A	2019/04/18	BBY WI-00033	Auto Calc
Ion Balance (1)	1	N/A	2019/04/17	BBY WI-00033	Auto Calc
Ion Balance (1)	7	N/A	2019/04/18	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	3	N/A	2019/04/17	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	5	N/A	2019/04/18	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2019/04/17	AB WI-00065	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	7	N/A	2019/04/18	AB WI-00065	Auto Calc
Elements by ICPMS Low Level (dissolved)	7	N/A	2019/04/16	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (dissolved)	1	N/A	2019/04/17	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Digested LL (total)	6	2019/04/15	2019/04/18	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	N/A	2019/04/17	AB WI-00065	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total)	6	N/A	2019/04/18	AB WI-00065	Auto Calc
Elements by ICPMS Low Level (total)	2	N/A	2019/04/16	CAL SOP-00265	EPA 6020 m
Ammonia-N Low Level (Preserved) (1)	8	N/A	2019/04/10	BBY6SOP-00009	EPA 350.1 m
Nitrate+Nitrite (N) (low level) (1)	8	N/A	2019/04/10	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	8	N/A	2019/04/10	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	8	N/A	2019/04/10	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	8	N/A	2019/04/09	BBY7 WI-00004	SM 23 3030B m
Orthophosphate by Konelab (low level) (1)	8	N/A	2019/04/10	BBY6SOP-00013	SM 23 4500-P E m

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08469000

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/23
Report #: R2713386
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B925830

Received: 2019/04/08, 14:30

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Sulphide	8	N/A	2019/04/11	AB SOP-00080	SM 23 4500 S2-A D Fm
Sulphate - Low Level (1)	7	N/A	2019/04/10	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate - Low Level (1)	1	N/A	2019/04/11	BBY6SOP-00017	SM 22 4500-SO42- E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08469000

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/23
Report #: R2713386
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B925830
Received: 2019/04/08, 14:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Safiann Maiter, Key Account Specialist
Email: smaiter@maxxam.ca
Phone# (403) 291-3077

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VM5759		VM5760	VM5761		VM5762		
Sampling Date		2019/04/08 11:15		2019/04/08 11:40	2019/04/08 12:00		2019/04/08 12:20		
COC Number		08469000		08469000	08469000		08469000		
	UNITS	TRIAL #1	RDL	TRIAL #2	TRIAL #3	RDL	TRIAL #4	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.2	N/A	7.9	7.9	N/A	8.1	N/A	9376335
Cation Sum	meq/L	8.0	N/A	7.9	7.8	N/A	8.0	N/A	9376335
Filter and HNO ₃ Preservation	N/A	FIELD		FIELD	FIELD		FIELD		ONSITE
Ion Balance	N/A	0.98	0.010	1.0	0.99	0.010	0.99	0.010	9376328
Ion Balance (% Difference)	%	1.0	N/A	0.079	0.77	N/A	0.78	N/A	9376333
Nitrate (N)	mg/L	<0.0020	0.0020	0.0027	0.0124	0.0020	<0.0020	0.0020	9376349
Sulphide (as H ₂ S)	mg/L	0.68	0.010	0.089	0.21	0.0020	0.43	0.020	9375470
Misc. Inorganics									
Fluoride (F)	mg/L	0.640	0.010	0.780	0.590	0.010	0.630	0.010	9379314
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.15	0.050	0.14	0.45	0.050	0.78	0.050	9377868
Dissolved Organic Carbon (C)	mg/L	4.5	0.50	6.9	5.7	0.50	11 (1)	2.5	9379375
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	9378180
Alkalinity (Total as CaCO ₃)	mg/L	79.1	0.50	75.4	84.6	0.50	80.4	0.50	9378376
Acidity (pH 8.3)	mg/L	9.7	1.0	13.5	11.9	1.0	16.4	1.0	9378180
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	9378376
Bicarbonate (HCO ₃)	mg/L	96.5	0.50	92.0	103	0.50	98.1	0.50	9378376
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	9378376
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	9378376
Anions									
Orthophosphate (P)	mg/L	1.3 (2)	0.010	1.2 (2)	1.1 (2)	0.010	0.89 (2)	0.010	9378272
Dissolved Sulphate (SO ₄)	mg/L	228 (2)	5.0	219 (2)	214 (2)	5.0	223 (2)	5.0	9378670
Total Sulphide	mg/L	0.64 (2)	0.0095	0.084	0.20	0.0019	0.40 (2)	0.019	9378853
Dissolved Chloride (Cl)	mg/L	61	0.50	62	59	0.50	63	0.50	9378668
Nutrients									
Total Ammonia (N)	mg/L	2.6 (2)	0.010	1.9	1.9	0.0050	1.4	0.0050	9378019
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	0.0027	0.0283	0.0020	<0.0020	0.0020	9378243
Nitrite (N)	mg/L	<0.0020	0.0020	<0.0020	0.0159	0.0020	<0.0020	0.0020	9378244
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to sample matrix.									
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.									

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VM5763			VM5764			VM5765		
Sampling Date		2019/04/08 14:00			2019/04/08 12:40			2019/04/08 13:00		
COC Number		08469000			08469000			08469000		
	UNITS	TRIAL #5	RDL	QC Batch	TRIAL #6	RDL	QC Batch	TRIAL #7	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.2	N/A	9376335	8.2	N/A	9376335	8.0	N/A	9376335
Cation Sum	meq/L	7.9	N/A	9376335	7.7	N/A	9376335	8.0	N/A	9376335
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.96	0.010	9376328	0.94	0.010	9376328	1.0	0.010	9376328
Ion Balance (% Difference)	%	2.0	N/A	9376333	3.2	N/A	9376333	0.12	N/A	9376333
Nitrate (N)	mg/L	<0.0020	0.0020	9376349	0.0020	0.0020	9376349	1.09	0.0020	9376349
Sulphide (as H2S)	mg/L	<0.0020	0.0020	9375470	<0.0020	0.0020	9375470	<0.0020	0.0020	9375470

Misc. Inorganics

Fluoride (F)	mg/L	0.820	0.010	9379314	0.860	0.010	9379314	0.770	0.010	9379314
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9377868	<0.050	0.050	9377868	<0.050	0.050	9377868
Dissolved Organic Carbon (C)	mg/L	19	0.50	9379375	11	0.50	9379375	2.7	0.50	9379375
Acidity (pH 4.5)	mg/L	<1.0	1.0	9378180	<1.0	1.0	9378180	<1.0	1.0	9378180
Alkalinity (Total as CaCO3)	mg/L	77.9	0.50	9378376	71.1	0.50	9378376	79.9	0.50	9378376
Acidity (pH 8.3)	mg/L	15.4	1.0	9378180	12.2	1.0	9378180	2.1	1.0	9378180
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9378376	<0.50	0.50	9378376	<0.50	0.50	9378376
Bicarbonate (HCO3)	mg/L	95.0	0.50	9378376	86.7	0.50	9378376	97.5	0.50	9378376
Carbonate (CO3)	mg/L	<0.50	0.50	9378376	<0.50	0.50	9378376	<0.50	0.50	9378376
Hydroxide (OH)	mg/L	<0.50	0.50	9378376	<0.50	0.50	9378376	<0.50	0.50	9378376

Anions

Orthophosphate (P)	mg/L	0.72 (1)	0.010	9378272	1.2 (2)	0.010	9378272	0.0057	0.0010	9378272
Dissolved Sulphate (SO4)	mg/L	229 (1)	5.0	9378670	242 (1)	5.0	9380501	219 (1)	5.0	9378670
Total Sulphide	mg/L	<0.0019	0.0019	9378853	<0.0019	0.0019	9378853	<0.0019	0.0019	9378853
Dissolved Chloride (Cl)	mg/L	62	0.50	9378668	58	0.50	9378668	61	0.50	9378668

Nutrients

Total Ammonia (N)	mg/L	2.7 (1)	0.010	9378019	1.9	0.0050	9378019	0.078	0.0050	9378019
Nitrate plus Nitrite (N)	mg/L	0.0107	0.0020	9378243	0.0020	0.0020	9378243	1.09	0.0020	9378243
Nitrite (N)	mg/L	0.0091	0.0020	9378244	<0.0020	0.0020	9378244	<0.0020	0.0020	9378244

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range. Matrix Spike invalid due to high sample concentration.

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VM5766		
Sampling Date		2019/04/08 13:20		
COC Number		08469000		
	UNITS	TRIAL #8	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	7.9	N/A	9376335
Cation Sum	meq/L	7.8	N/A	9376335
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE
Ion Balance	N/A	0.99	0.010	9376328
Ion Balance (% Difference)	%	0.48	N/A	9376333
Nitrate (N)	mg/L	0.566	0.0020	9376349
Sulphide (as H ₂ S)	mg/L	<0.0020	0.0020	9375470
Misc. Inorganics				
Fluoride (F)	mg/L	0.660	0.010	9379314
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9377868
Dissolved Organic Carbon (C)	mg/L	4.3	0.50	9379375
Acidity (pH 4.5)	mg/L	<1.0	1.0	9378180
Alkalinity (Total as CaCO ₃)	mg/L	83.6	0.50	9378376
Acidity (pH 8.3)	mg/L	3.7	1.0	9378180
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9378376
Bicarbonate (HCO ₃)	mg/L	102	0.50	9378376
Carbonate (CO ₃)	mg/L	<0.50	0.50	9378376
Hydroxide (OH)	mg/L	<0.50	0.50	9378376
Anions				
Orthophosphate (P)	mg/L	0.0020	0.0010	9378272
Dissolved Sulphate (SO ₄)	mg/L	213 (1)	5.0	9378670
Total Sulphide	mg/L	<0.0019	0.0019	9378853
Dissolved Chloride (Cl)	mg/L	61	0.50	9378668
Nutrients				
Total Ammonia (N)	mg/L	0.066	0.0050	9378019
Nitrate plus Nitrite (N)	mg/L	0.566	0.0020	9378243
Nitrite (N)	mg/L	<0.0020	0.0020	9378244
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.				

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VM5759	VM5760		VM5761		
Sampling Date		2019/04/08 11:15	2019/04/08 11:40		2019/04/08 12:00		
COC Number		08469000	08469000		08469000		
	UNITS	TRIAL #1	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	325	325	9375524	322	0.50	9375524
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.0264	0.00913	9382713	0.00373	0.00050	9382713
Dissolved Antimony (Sb)	mg/L	0.00271	0.00473	9382713	0.0117	0.000020	9382713
Dissolved Arsenic (As)	mg/L	0.0351	0.0500	9382713	0.0219	0.000020	9382713
Dissolved Barium (Ba)	mg/L	0.0806	0.0723	9382713	0.135	0.000020	9382713
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9382713	<0.000010	0.000010	9382713
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9382713	<0.0000050	0.0000050	9382713
Dissolved Boron (B)	mg/L	0.037	0.035	9382713	0.036	0.010	9382713
Dissolved Cadmium (Cd)	mg/L	0.0000916	0.000143	9382713	0.0000321	0.0000050	9382713
Dissolved Chromium (Cr)	mg/L	0.00012	<0.00010	9382713	<0.00010	0.00010	9382713
Dissolved Cobalt (Co)	mg/L	0.00351	0.00377	9382713	0.00185	0.0000050	9382713
Dissolved Copper (Cu)	mg/L	0.000739	0.00152	9382713	0.000189	0.000050	9382713
Dissolved Iron (Fe)	mg/L	0.0851	0.0898	9382713	0.458	0.0010	9382713
Dissolved Lead (Pb)	mg/L	0.000774	0.000798	9382713	0.000408	0.0000050	9382713
Dissolved Lithium (Li)	mg/L	0.0157	0.0132	9382713	0.0105	0.00050	9382713
Dissolved Manganese (Mn)	mg/L	0.0702	0.0757	9382713	0.644	0.000050	9382713
Dissolved Molybdenum (Mo)	mg/L	0.00231	0.00187	9382713	0.00279	0.000050	9382713
Dissolved Nickel (Ni)	mg/L	0.0108	0.0116	9382713	0.00598	0.000020	9382713
Dissolved Selenium (Se)	mg/L	0.000898 (1)	0.00104	9382713	0.00122	0.000040	9382713
Dissolved Silicon (Si)	mg/L	0.899	0.875	9382713	1.61	0.050	9382713
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9382713	<0.0000050	0.0000050	9382713
Dissolved Strontium (Sr)	mg/L	0.521	0.545	9382713	0.489	0.000050	9382713
Dissolved Thallium (Tl)	mg/L	0.000101	0.000315	9382713	<0.0000020	0.0000020	9387994
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9382713	<0.00020	0.00020	9382713
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9382713	<0.00050	0.00050	9382713
Dissolved Uranium (U)	mg/L	0.0376	0.0325	9382713	0.0227	0.0000020	9382713
Dissolved Vanadium (V)	mg/L	0.00022	<0.00020	9382713	0.00072	0.00020	9382713
Dissolved Zinc (Zn)	mg/L	0.0308	0.0757	9382713	0.00991	0.00010	9382713
Dissolved Zirconium (Zr)	mg/L	0.00018	0.00013	9382713	0.00019	0.00010	9382713
Dissolved Calcium (Ca)	mg/L	104	104	9375918	104	0.050	9375918
RDL = Reportable Detection Limit							
(1) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results.							

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VM5759	VM5760		VM5761		
Sampling Date		2019/04/08 11:15	2019/04/08 11:40		2019/04/08 12:00		
COC Number		08469000	08469000		08469000		
	UNITS	TRIAL #1	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.0	16.0	9375918	15.1	0.050	9375918
Dissolved Potassium (K)	mg/L	7.68	7.40	9375918	6.86	0.050	9375918
Dissolved Sodium (Na)	mg/L	25.7	24.9	9375918	23.3	0.050	9375918
Dissolved Sulphur (S)	mg/L	91.2	88.7	9375918	82.0	3.0	9375918
RDL = Reportable Detection Limit							

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VM5762	VM5763	VM5764	VM5765		
Sampling Date		2019/04/08 12:20	2019/04/08 14:00	2019/04/08 12:40	2019/04/08 13:00		
COC Number		08469000	08469000	08469000	08469000		
	UNITS	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	330	322	313	337	0.50	9375524
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00522	0.00745	0.00190	0.00987	0.00050	9382713
Dissolved Antimony (Sb)	mg/L	0.00336	0.0205	0.178	0.0264	0.000020	9382713
Dissolved Arsenic (As)	mg/L	0.0160	0.0447	0.339	0.0406	0.000020	9382713
Dissolved Barium (Ba)	mg/L	0.170	0.0610	0.0961	0.0861	0.000020	9382713
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9382713
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9382713
Dissolved Boron (B)	mg/L	0.027	0.038	0.037	0.036	0.010	9382713
Dissolved Cadmium (Cd)	mg/L	0.0000357	0.00381	0.0306	0.00363	0.0000050	9382713
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9382713
Dissolved Cobalt (Co)	mg/L	0.00171	0.00337	0.0228	0.00273	0.0000050	9382713
Dissolved Copper (Cu)	mg/L	0.000109	0.0116	0.0104	0.0101	0.000050	9382713
Dissolved Iron (Fe)	mg/L	0.716	0.0062	0.0095	0.0016	0.0010	9382713
Dissolved Lead (Pb)	mg/L	0.000205	0.00660	0.0295	0.00712	0.0000050	9382713
Dissolved Lithium (Li)	mg/L	0.0105	0.0123	0.0129	0.0148	0.00050	9382713
Dissolved Manganese (Mn)	mg/L	0.726	0.0662	0.0393	0.0692	0.000050	9382713
Dissolved Molybdenum (Mo)	mg/L	0.00247	0.00183	0.00189	0.00183	0.000050	9382713
Dissolved Nickel (Ni)	mg/L	0.00564	0.0119	0.0770	0.00941	0.000020	9382713
Dissolved Selenium (Se)	mg/L	0.00247	0.00969	0.0871	0.0114	0.000040	9382713
Dissolved Silicon (Si)	mg/L	1.70	0.744	0.929	0.905	0.050	9382713
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9382713
Dissolved Strontium (Sr)	mg/L	0.588	0.555	0.571	0.667	0.000050	9382713
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.000285	0.00162	0.000496	0.0000020	9382713
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9382713
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9382713
Dissolved Uranium (U)	mg/L	0.0160	0.0355	0.253	0.0416	0.0000020	9382713
Dissolved Vanadium (V)	mg/L	0.00059	<0.00020	0.00021	<0.00020	0.00020	9382713
Dissolved Zinc (Zn)	mg/L	0.00290	0.322	2.27	0.237	0.00010	9382713
Dissolved Zirconium (Zr)	mg/L	0.00014	0.00019	<0.00010	0.00013	0.00010	9382713
Dissolved Calcium (Ca)	mg/L	108	103	99.7	108	0.050	9375918
Dissolved Magnesium (Mg)	mg/L	14.7	15.6	15.4	16.1	0.050	9375918
RDL = Reportable Detection Limit							

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VM5762	VM5763	VM5764	VM5765		
Sampling Date		2019/04/08 12:20	2019/04/08 14:00	2019/04/08 12:40	2019/04/08 13:00		
COC Number		08469000	08469000	08469000	08469000		
	UNITS	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.29	6.56	7.91	5.76	0.050	9375918
Dissolved Sodium (Na)	mg/L	24.0	24.1	24.4	25.8	0.050	9375918
Dissolved Sulphur (S)	mg/L	88.6	85.3	85.7	87.4	3.0	9375918
RDL = Reportable Detection Limit							

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VM5766		
Sampling Date		2019/04/08 13:20		
COC Number		08469000		
	UNITS	TRIAL #8	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	331	0.50	9375524
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.00222	0.00050	9382713
Dissolved Antimony (Sb)	mg/L	0.0183	0.000020	9382713
Dissolved Arsenic (As)	mg/L	0.00472	0.000020	9382713
Dissolved Barium (Ba)	mg/L	0.183	0.000020	9382713
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	9382713
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9382713
Dissolved Boron (B)	mg/L	0.032	0.010	9382713
Dissolved Cadmium (Cd)	mg/L	0.000895	0.0000050	9382713
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	9382713
Dissolved Cobalt (Co)	mg/L	0.000293	0.0000050	9382713
Dissolved Copper (Cu)	mg/L	0.00310	0.000050	9382713
Dissolved Iron (Fe)	mg/L	0.0069	0.0010	9382713
Dissolved Lead (Pb)	mg/L	0.000304	0.0000050	9382713
Dissolved Lithium (Li)	mg/L	0.0130	0.00050	9382713
Dissolved Manganese (Mn)	mg/L	0.589	0.000050	9382713
Dissolved Molybdenum (Mo)	mg/L	0.00370	0.000050	9382713
Dissolved Nickel (Ni)	mg/L	0.00560	0.000020	9382713
Dissolved Selenium (Se)	mg/L	0.00760	0.000040	9382713
Dissolved Silicon (Si)	mg/L	1.77	0.050	9382713
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9382713
Dissolved Strontium (Sr)	mg/L	0.634	0.000050	9382713
Dissolved Thallium (Tl)	mg/L	0.0000106	0.0000020	9387994
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9382713
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9382713
Dissolved Uranium (U)	mg/L	0.0356	0.0000020	9382713
Dissolved Vanadium (V)	mg/L	<0.00020	0.00020	9382713
Dissolved Zinc (Zn)	mg/L	0.137	0.00010	9382713
Dissolved Zirconium (Zr)	mg/L	0.00013	0.00010	9382713
Dissolved Calcium (Ca)	mg/L	109	0.050	9375918
Dissolved Magnesium (Mg)	mg/L	14.6	0.050	9375918
RDL = Reportable Detection Limit				

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VM5766		
Sampling Date		2019/04/08 13:20		
COC Number		08469000		
	UNITS	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	5.07	0.050	9375918
Dissolved Sodium (Na)	mg/L	23.7	0.050	9375918
Dissolved Sulphur (S)	mg/L	84.3	3.0	9375918
RDL = Reportable Detection Limit				

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VM5764		VM5765		
Sampling Date		2019/04/08 12:40		2019/04/08 13:00		
COC Number		08469000		08469000		
	UNITS	TRIAL #6	RDL	TRIAL #7	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	320	0.50	326	0.50	9375741
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00386	0.00050	0.0251	0.00050	9382718
Total Antimony (Sb)	mg/L	0.197 (1)	0.00020	0.0262	0.00020	9382718
Total Arsenic (As)	mg/L	0.354	0.000020	0.0356	0.000020	9382718
Total Barium (Ba)	mg/L	0.0988	0.000020	0.0846	0.000020	9382718
Total Beryllium (Be)	mg/L	<0.000010	0.000010	<0.000010	0.000010	9382718
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	0.0000134	0.0000050	9382718
Total Boron (B)	mg/L	0.030	0.010	0.030	0.010	9382718
Total Cadmium (Cd)	mg/L	0.0318	0.0000050	0.00366	0.0000050	9382718
Total Chromium (Cr)	mg/L	<0.00010	0.00010	<0.00010	0.00010	9382718
Total Cobalt (Co)	mg/L	0.0231	0.0000050	0.00284	0.0000050	9382718
Total Copper (Cu)	mg/L	0.0365	0.0000050	0.0109	0.0000050	9382718
Total Iron (Fe)	mg/L	0.0146	0.0010	0.0314	0.0010	9382718
Total Lead (Pb)	mg/L	0.0369	0.0000050	0.00931	0.0000050	9382718
Total Lithium (Li)	mg/L	0.0141	0.00050	0.0129	0.00050	9382718
Total Manganese (Mn)	mg/L	0.0422	0.0000050	0.0721	0.0000050	9382718
Total Molybdenum (Mo)	mg/L	0.00196	0.0000050	0.00181	0.0000050	9382718
Total Nickel (Ni)	mg/L	0.0778	0.000020	0.0101	0.000020	9382718
Total Selenium (Se)	mg/L	0.0896	0.000040	0.0108	0.000040	9382718
Total Silicon (Si)	mg/L	0.987	0.050	0.887	0.050	9382718
Total Silver (Ag)	mg/L	<0.0000050	0.0000050	0.0000056	0.0000050	9382718
Total Strontium (Sr)	mg/L	0.594	0.0000050	0.633	0.0000050	9382718
Total Thallium (Tl)	mg/L	0.00168	0.0000020	0.000490	0.0000020	9382718
Total Tin (Sn)	mg/L	<0.00020	0.00020	<0.00020	0.00020	9382718
Total Titanium (Ti)	mg/L	<0.00050	0.00050	0.00155	0.00050	9382718
Total Uranium (U)	mg/L	0.239	0.0000020	0.0430	0.0000020	9382718
Total Vanadium (V)	mg/L	<0.00020	0.00020	<0.00020	0.00020	9382718
Total Zinc (Zn)	mg/L	2.37	0.00010	0.252	0.00010	9382718
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	0.00014	0.00010	9382718
Total Calcium (Ca)	mg/L	103	0.050	104	0.050	9378226
RDL = Reportable Detection Limit						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VM5764		VM5765		
Sampling Date		2019/04/08 12:40		2019/04/08 13:00		
COC Number		08469000		08469000		
	UNITS	TRIAL #6	RDL	TRIAL #7	RDL	QC Batch
Total Magnesium (Mg)	mg/L	15.5	0.050	16.1	0.050	9378226
Total Potassium (K)	mg/L	8.13	0.050	5.41	0.050	9378226
Total Sodium (Na)	mg/L	25.0	0.050	23.5	0.050	9378226
Total Sulphur (S)	mg/L	89.2	3.0	81.6	3.0	9378226
RDL = Reportable Detection Limit						

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VM5759	VM5760	VM5761	VM5762	VM5763		
Sampling Date		2019/04/08 11:15	2019/04/08 11:40	2019/04/08 12:00	2019/04/08 12:20	2019/04/08 14:00		
COC Number		08469000	08469000	08469000	08469000	08469000		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	317	326	323	316	318	0.50	9375741
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0097	0.0155	0.0105	0.0326	0.0215	0.0030	9382749
Total Antimony (Sb)	mg/L	0.0108	0.0136	0.0121	0.00664	0.0194	0.000020	9382749
Total Arsenic (As)	mg/L	0.0422	0.0521	0.0262	0.0157	0.0416	0.000020	9382749
Total Barium (Ba)	mg/L	0.0700	0.0717	0.135	0.163	0.0601	0.000050	9382749
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9382749
Total Bismuth (Bi)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9382749
Total Boron (B)	mg/L	0.041	0.043	0.038	0.040	0.043	0.010	9382749
Total Cadmium (Cd)	mg/L	0.000436	0.000636	0.000130	0.000204	0.00377	0.000050	9382749
Total Chromium (Cr)	mg/L	<0.00010	0.00016	<0.00010	0.00011	0.00025	0.00010	9382749
Total Cobalt (Co)	mg/L	0.00339	0.00392	0.00184	0.00179	0.00320	0.000010	9382749
Total Copper (Cu)	mg/L	0.00356	0.00393	0.00087	0.00106	0.0185	0.00010	9382749
Total Iron (Fe)	mg/L	0.0963	0.107	0.521	0.795	0.0316	0.0050	9382749
Total Lead (Pb)	mg/L	0.00241	0.00219	0.00162	0.00160	0.00781	0.000020	9382749
Total Lithium (Li)	mg/L	0.0126	0.0126	0.0104	0.00998	0.0121	0.00050	9382749
Total Manganese (Mn)	mg/L	0.0722	0.0772	0.647	0.721	0.0667	0.00010	9382749
Total Molybdenum (Mo)	mg/L	0.00203	0.00191	0.00288	0.00288	0.00178	0.000050	9382749
Total Nickel (Ni)	mg/L	0.0107	0.0116	0.00633	0.00582	0.0119	0.00010	9382749
Total Selenium (Se)	mg/L	0.00156	0.00201	0.00186	0.00177	0.00923	0.000040	9382749
Total Silicon (Si)	mg/L	0.834	0.817	1.55	1.52	0.727	0.050	9382749
Total Silver (Ag)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9382749
Total Strontium (Sr)	mg/L	0.484	0.518	0.480	0.525	0.528	0.000050	9382749
Total Thallium (Tl)	mg/L	0.000253	0.000406	<0.0000020	<0.0000020	0.000268	0.0000020	9382749
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9382749
Total Titanium (Ti)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	9382749
Total Uranium (U)	mg/L	0.0354	0.0347	0.0234	0.0172	0.0362	0.0000050	9382749
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00073	0.00067	0.00020	0.00020	9382749
Total Zinc (Zn)	mg/L	0.165	0.211	0.0470	0.0270	0.801	0.0010	9382749
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00017	0.00020	<0.00010	0.00010	9382749
Total Calcium (Ca)	mg/L	101	103	104	101	101	0.25	9378226
Total Magnesium (Mg)	mg/L	15.9	16.5	15.3	15.2	16.2	0.25	9378226

RDL = Reportable Detection Limit

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VM5759	VM5760	VM5761	VM5762	VM5763		
Sampling Date		2019/04/08 11:15	2019/04/08 11:40	2019/04/08 12:00	2019/04/08 12:20	2019/04/08 14:00		
COC Number		08469000	08469000	08469000	08469000	08469000		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Potassium (K)	mg/L	7.19	7.27	6.84	6.94	6.53	0.25	9378226
Total Sodium (Na)	mg/L	23.0	24.0	23.1	23.0	23.5	0.25	9378226
Total Sulphur (S)	mg/L	81.8	85.2	80.8	79.8	83.6	3.0	9378226
RDL = Reportable Detection Limit								

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VM5766		
Sampling Date		2019/04/08 13:20		
COC Number		08469000		
	UNITS	TRIAL #8	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	324	0.50	9375741
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0259	0.0030	9382749
Total Antimony (Sb)	mg/L	0.0132	0.000020	9382749
Total Arsenic (As)	mg/L	0.00687	0.000020	9382749
Total Barium (Ba)	mg/L	0.138	0.000050	9382749
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9382749
Total Bismuth (Bi)	mg/L	0.000017	0.000010	9382749
Total Boron (B)	mg/L	0.036	0.010	9382749
Total Cadmium (Cd)	mg/L	0.000687	0.0000050	9382749
Total Chromium (Cr)	mg/L	0.00015	0.00010	9382749
Total Cobalt (Co)	mg/L	0.000324	0.000010	9382749
Total Copper (Cu)	mg/L	0.00342	0.00010	9382749
Total Iron (Fe)	mg/L	0.151	0.0050	9382749
Total Lead (Pb)	mg/L	0.00261	0.000020	9382749
Total Lithium (Li)	mg/L	0.00985	0.00050	9382749
Total Manganese (Mn)	mg/L	0.590	0.00010	9382749
Total Molybdenum (Mo)	mg/L	0.00280	0.000050	9382749
Total Nickel (Ni)	mg/L	0.00556	0.00010	9382749
Total Selenium (Se)	mg/L	0.00717	0.000040	9382749
Total Silicon (Si)	mg/L	1.61	0.050	9382749
Total Silver (Ag)	mg/L	<0.000010	0.000010	9382749
Total Strontium (Sr)	mg/L	0.574	0.000050	9382749
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	9382749
Total Tin (Sn)	mg/L	<0.00020	0.00020	9382749
Total Titanium (Ti)	mg/L	<0.0020	0.0020	9382749
Total Uranium (U)	mg/L	0.0270	0.0000050	9382749
Total Vanadium (V)	mg/L	0.00037	0.00020	9382749
Total Zinc (Zn)	mg/L	0.126	0.0010	9382749
Total Zirconium (Zr)	mg/L	0.00019	0.00010	9382749
Total Calcium (Ca)	mg/L	105	0.25	9378226
Total Magnesium (Mg)	mg/L	15.2	0.25	9378226
RDL = Reportable Detection Limit				

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VM5766		
Sampling Date		2019/04/08 13:20		
COC Number		08469000		
	UNITS	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	4.83	0.25	9378226
Total Sodium (Na)	mg/L	23.1	0.25	9378226
Total Sulphur (S)	mg/L	80.7	3.0	9378226
RDL = Reportable Detection Limit				

Maxxam Job #: B925830
Report Date: 2019/04/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
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Sample VM5759 [TRIAL #1] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VM5760 [TRIAL #2] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VM5761 [TRIAL #3] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VM5762 [TRIAL #4] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VM5763 [TRIAL #5] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VM5766 [TRIAL #8] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VM5761, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VM5766, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.

Maxxam Job #: B925830
Report Date: 2019/04/23

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9377868	HCl Preserved Iron (Fe+2 Ferrous)	2019/04/10	101	80 - 120	95	90 - 110	<0.050	mg/L	14	20
9378019	Total Ammonia (N)	2019/04/10	NC	80 - 120	110	80 - 120	<0.0050	mg/L	0.37	20
9378180	Acidity (pH 4.5)	2019/04/10					<1.0	mg/L		
9378180	Acidity (pH 8.3)	2019/04/10			100	80 - 120	<1.0	mg/L		
9378243	Nitrate plus Nitrite (N)	2019/04/10	102	80 - 120	110	80 - 120	<0.0020	mg/L	NC	25
9378244	Nitrite (N)	2019/04/10	92	80 - 120	100	80 - 120	<0.0020	mg/L	NC	25
9378272	Orthophosphate (P)	2019/04/10	NC	80 - 120	103	80 - 120	<0.0010	mg/L	4.2	20
9378376	Alkalinity (PP as CaCO ₃)	2019/04/10					<0.50	mg/L	NC	20
9378376	Alkalinity (Total as CaCO ₃)	2019/04/10	NC	80 - 120	94	80 - 120	<0.50	mg/L	4.9	20
9378376	Bicarbonate (HCO ₃)	2019/04/10					<0.50	mg/L	4.9	20
9378376	Carbonate (CO ₃)	2019/04/10					<0.50	mg/L	NC	20
9378376	Hydroxide (OH)	2019/04/10					<0.50	mg/L	NC	20
9378668	Dissolved Chloride (Cl)	2019/04/10	NC	80 - 120	105	80 - 120	<0.50	mg/L	3.0	20
9378670	Dissolved Sulphate (SO ₄)	2019/04/10	NC	80 - 120	100	80 - 120	<0.50	mg/L	2.1	20
9378853	Total Sulphide	2019/04/11			100	80 - 120	<0.0019	mg/L	17	20
9379314	Fluoride (F)	2019/04/11	NC	80 - 120	104	80 - 120	<0.010	mg/L	0	20
9379375	Dissolved Organic Carbon (C)	2019/04/12	108	80 - 120	100	80 - 120	<0.50	mg/L	4.6	20
9380501	Dissolved Sulphate (SO ₄)	2019/04/11	96	80 - 120	90	80 - 120	<0.50	mg/L	7.0	20
9382713	Dissolved Aluminum (Al)	2019/04/16	92	80 - 120	98	80 - 120	<0.00050	mg/L	12	20
9382713	Dissolved Antimony (Sb)	2019/04/16	83	80 - 120	92	80 - 120	<0.000020	mg/L	7.3	20
9382713	Dissolved Arsenic (As)	2019/04/16	94	80 - 120	96	80 - 120	<0.000020	mg/L	0.49	20
9382713	Dissolved Barium (Ba)	2019/04/16	NC	80 - 120	100	80 - 120	<0.000020	mg/L	9.9	20
9382713	Dissolved Beryllium (Be)	2019/04/16	89	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
9382713	Dissolved Bismuth (Bi)	2019/04/16	91	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9382713	Dissolved Boron (B)	2019/04/16	102	80 - 120	78 (1)	80 - 120	<0.010	mg/L	0.94	20
9382713	Dissolved Cadmium (Cd)	2019/04/16	91	80 - 120	95	80 - 120	<0.0000050	mg/L	4.6	20
9382713	Dissolved Chromium (Cr)	2019/04/16	95	80 - 120	99	80 - 120	<0.00010	mg/L	2.7	20
9382713	Dissolved Cobalt (Co)	2019/04/16	94	80 - 120	99	80 - 120	<0.0000050	mg/L	4.5	20
9382713	Dissolved Copper (Cu)	2019/04/16	93	80 - 120	99	80 - 120	<0.000050	mg/L	4.6	20
9382713	Dissolved Iron (Fe)	2019/04/16	95	80 - 120	101	80 - 120	<0.0010	mg/L	0.20	20
9382713	Dissolved Lead (Pb)	2019/04/16	94	80 - 120	97	80 - 120	<0.0000050	mg/L	9.4	20
9382713	Dissolved Lithium (Li)	2019/04/16	83	80 - 120	103	80 - 120	<0.00050	mg/L	11	20

Maxxam Job #: B925830
Report Date: 2019/04/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9382713	Dissolved Manganese (Mn)	2019/04/16	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.77	20
9382713	Dissolved Molybdenum (Mo)	2019/04/16	96	80 - 120	101	80 - 120	<0.000050	mg/L	8.5	20
9382713	Dissolved Nickel (Ni)	2019/04/16	93	80 - 120	99	80 - 120	<0.000020	mg/L	0.15	20
9382713	Dissolved Selenium (Se)	2019/04/16	63 (1)	80 - 120	88	80 - 120	<0.000040	mg/L	1.2	20
9382713	Dissolved Silicon (Si)	2019/04/16	92	80 - 120	84	80 - 120	<0.050	mg/L	0.021	20
9382713	Dissolved Silver (Ag)	2019/04/16	88	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9382713	Dissolved Strontium (Sr)	2019/04/16	NC	80 - 120	106	80 - 120	<0.000050	mg/L	1.8	20
9382713	Dissolved Thallium (Tl)	2019/04/16	95	80 - 120	98	80 - 120	<0.0000020	mg/L	7.8	20
9382713	Dissolved Tin (Sn)	2019/04/16	95	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9382713	Dissolved Titanium (Ti)	2019/04/16	92	80 - 120	93	80 - 120	<0.00050	mg/L	NC	20
9382713	Dissolved Uranium (U)	2019/04/16	86	80 - 120	105	80 - 120	<0.0000020	mg/L	9.4	20
9382713	Dissolved Vanadium (V)	2019/04/16	99	80 - 120	101	80 - 120	<0.00020	mg/L	9.1	20
9382713	Dissolved Zinc (Zn)	2019/04/16	86	80 - 120	93	80 - 120	<0.00010	mg/L	1.1	20
9382713	Dissolved Zirconium (Zr)	2019/04/16	99	80 - 120	109	80 - 120	<0.00010	mg/L	NC	20
9382718	Total Aluminum (Al)	2019/04/16	112	80 - 120	98	80 - 120	<0.00050	mg/L	0.55	20
9382718	Total Antimony (Sb)	2019/04/16	116	80 - 120	92	80 - 120	<0.000020	mg/L	5.0	20
9382718	Total Arsenic (As)	2019/04/16	136 (1)	80 - 120	92	80 - 120	<0.000020	mg/L	14	20
9382718	Total Barium (Ba)	2019/04/16	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.17	20
9382718	Total Beryllium (Be)	2019/04/16	106	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9382718	Total Bismuth (Bi)	2019/04/16	95	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9382718	Total Boron (B)	2019/04/16	107	80 - 120	81	80 - 120	<0.010	mg/L	NC	20
9382718	Total Cadmium (Cd)	2019/04/16	113	80 - 120	94	80 - 120	<0.0000050	mg/L	15	20
9382718	Total Chromium (Cr)	2019/04/16	124 (1)	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9382718	Total Cobalt (Co)	2019/04/16	130 (1)	80 - 120	99	80 - 120	<0.0000050	mg/L		
9382718	Total Copper (Cu)	2019/04/16	120	80 - 120	98	80 - 120	<0.000050	mg/L	8.8	20
9382718	Total Iron (Fe)	2019/04/16	83	80 - 120	102	80 - 120	<0.0010	mg/L	2.1	20
9382718	Total Lead (Pb)	2019/04/16	115	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9382718	Total Lithium (Li)	2019/04/16	120	80 - 120	103	80 - 120	<0.00050	mg/L	2.4	20
9382718	Total Manganese (Mn)	2019/04/16	143 (1)	80 - 120	103	80 - 120	<0.000050	mg/L	1.7	20
9382718	Total Molybdenum (Mo)	2019/04/16	86	80 - 120	100	80 - 120	<0.000050	mg/L	1.7	20
9382718	Total Nickel (Ni)	2019/04/16	92	80 - 120	98	80 - 120	<0.000020	mg/L	12	20
9382718	Total Selenium (Se)	2019/04/16	88	80 - 120	87	80 - 120	<0.000040	mg/L	16	20

Maxxam Job #: B925830
Report Date: 2019/04/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9382718	Total Silicon (Si)	2019/04/16	NC	80 - 120	84	80 - 120	<0.050	mg/L	1.2	20
9382718	Total Silver (Ag)	2019/04/16	91	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9382718	Total Strontium (Sr)	2019/04/16	NC	80 - 120	105	80 - 120	<0.000050	mg/L	1.4	20
9382718	Total Thallium (Tl)	2019/04/16	117	80 - 120	99	80 - 120	<0.0000020	mg/L	NC	20
9382718	Total Tin (Sn)	2019/04/16	117	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9382718	Total Titanium (Ti)	2019/04/16	126 (1)	80 - 120	93	80 - 120	<0.00050	mg/L	NC	20
9382718	Total Uranium (U)	2019/04/16	NC	80 - 120	107	80 - 120	<0.0000020	mg/L	1.5	20
9382718	Total Vanadium (V)	2019/04/16	128 (1)	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9382718	Total Zinc (Zn)	2019/04/16	128 (1)	80 - 120	95	80 - 120	<0.00010	mg/L		
9382718	Total Zirconium (Zr)	2019/04/16	76 (1)	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
9382749	Total Aluminum (Al)	2019/04/18	92	80 - 120	94	80 - 120	<0.0030	mg/L	6.8	20
9382749	Total Antimony (Sb)	2019/04/18	NC	80 - 120	90	80 - 120	<0.000020	mg/L	1.8	20
9382749	Total Arsenic (As)	2019/04/18	92	80 - 120	94	80 - 120	<0.000020	mg/L	3.2	20
9382749	Total Barium (Ba)	2019/04/18	NC	80 - 120	96	80 - 120	<0.000050	mg/L	1.1	20
9382749	Total Beryllium (Be)	2019/04/18	88	80 - 120	93	80 - 120	<0.000010	mg/L	NC	20
9382749	Total Bismuth (Bi)	2019/04/18	93	80 - 120	94	80 - 120	<0.000010	mg/L	2.1	20
9382749	Total Boron (B)	2019/04/18	83	80 - 120	80	80 - 120	<0.010	mg/L	1.7	20
9382749	Total Cadmium (Cd)	2019/04/18	92	80 - 120	94	80 - 120	<0.0000050	mg/L	0.55	20
9382749	Total Chromium (Cr)	2019/04/18	94	80 - 120	92	80 - 120	<0.00010	mg/L	NC	20
9382749	Total Cobalt (Co)	2019/04/18	94	80 - 120	92	80 - 120	<0.000010	mg/L	4.8	20
9382749	Total Copper (Cu)	2019/04/18	93	80 - 120	93	80 - 120	<0.00010	mg/L	0.29	20
9382749	Total Iron (Fe)	2019/04/18	95	80 - 120	96	80 - 120	<0.0050	mg/L	0.23	20
9382749	Total Lead (Pb)	2019/04/18	94	80 - 120	94	80 - 120	<0.000020	mg/L	1.8	20
9382749	Total Lithium (Li)	2019/04/18	99	80 - 120	101	80 - 120	<0.00050	mg/L	0.54	20
9382749	Total Manganese (Mn)	2019/04/18	NC	80 - 120	95	80 - 120	<0.00010	mg/L	1.5	20
9382749	Total Molybdenum (Mo)	2019/04/18	105	80 - 120	98	80 - 120	<0.000050	mg/L	0.87	20
9382749	Total Nickel (Ni)	2019/04/18	92	80 - 120	92	80 - 120	<0.00010	mg/L	1.8	20
9382749	Total Selenium (Se)	2019/04/18	87	80 - 120	90	80 - 120	<0.000040	mg/L	0.62	20
9382749	Total Silicon (Si)	2019/04/18	76 (1)	80 - 120	77 (1)	80 - 120	<0.050	mg/L	1.1	20
9382749	Total Silver (Ag)	2019/04/18	93	80 - 120	93	80 - 120	<0.000010	mg/L	NC	20
9382749	Total Strontium (Sr)	2019/04/18	NC	80 - 120	99	80 - 120	<0.000050	mg/L	2.5	20
9382749	Total Thallium (Tl)	2019/04/18	95	80 - 120	94	80 - 120	<0.0000020	mg/L	1.8	20

Maxxam Job #: B925830
Report Date: 2019/04/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9382749	Total Tin (Sn)	2019/04/18	95	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9382749	Total Titanium (Ti)	2019/04/18	102	80 - 120	107	80 - 120	<0.0020	mg/L	NC	20
9382749	Total Uranium (U)	2019/04/18	90	80 - 120	101	80 - 120	<0.0000050	mg/L	1.1	20
9382749	Total Vanadium (V)	2019/04/18	96	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9382749	Total Zinc (Zn)	2019/04/18	NC	80 - 120	100	80 - 120	<0.0010	mg/L	1.6	20
9382749	Total Zirconium (Zr)	2019/04/18	91	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9387994	Dissolved Thallium (Tl)	2019/04/23	100	80 - 120	100	80 - 120	<0.0000020	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Job #: B925830
Report Date: 2019/04/23

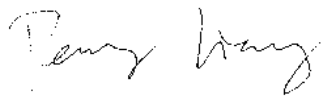
ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



Harry (Peng) Liang, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required											
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS											
Contact Name:		Contact Name:	Andrew Gault; Kristen Picowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days											
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02												
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah												
Email:		Email:	agault@alexcoresource.com kpiceowye@contangostrategies.com	Site #:													
				Sampled By:		Date Required:											
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:											
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12385		Analysis Requested Received in Saskatoon By: <i>Pauline C. W. [Signature]</i> F-4 CS-N APR 08/2019 14:30 Temp: 5/19/18		LABORATORY USE ONLY CUSTODY SEAL Present Intact COOLING MEDIA PRESENT COMMENTS											
Sample Identification		Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERRIC IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1	Trial #1		08-Apr-19	11:15	Water	X	X	X	X	X	X	X	X	X	X	10	
2	Trial #2		08-Apr-19	11:40	Water	X	X	X	X	X	X	X	X	X	X	10	
3	Trial #3		08-Apr-19	12:00	Water	X	X	X	X	X	X	X	X	X	X	10	
4	Trial #4		08-Apr-19	12:20	Water	X	X	X	X	X	X	X	X	X	X	10	
5	Trial #5		08-Apr-19	14:00	Water	X	X	X	X	X	X	X	X	X	X	10	
6	Trial #6		08-Apr-19	12:40	Water	X	X	X	X	X	X	X	X	X	X	10	
7	Trial #7		08-Apr-19	13:00	Water	X	X	X	X	X	X	X	X	X	X	10	
8	Trial #8		08-Apr-19	13:20	Water	X	X	X	X	X	X	X	X	X	X	10	
9																	
10																	
REINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)										
<i>[Signature]</i>		2019/04/08	14:30	<i>[Signature]</i> KENNETH GOLDIE		2019/04/09	08:25										



B925830_COC

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08469775

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/05/08
Report #: R2720087
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B929878

Received: 2019/04/23, 13:47

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	8	N/A	2019/04/25	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	4	N/A	2019/04/25	BBY6SOP-00026	SM 22 2320 B m
Alkalinity - Low Level (1)	4	N/A	2019/05/07	BBY6SOP-00026	SM 22 2320 B m
Chloride - Low Level (1)	4	N/A	2019/04/25	BBY6SOP-00011	SM 22 4500-Cl- E m
Chloride - Low Level (1)	4	N/A	2019/05/07	BBY6SOP-00011	SM 22 4500-Cl- E m
Carbon (DOC) (2)	8	N/A	2019/04/29	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	8	N/A	2019/04/25	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/04/25	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/04/26		Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	8	N/A	2019/04/27		Auto Calc
Hardness (calculated as CaCO ₃)	7	N/A	2019/04/27		Auto Calc
Hardness (calculated as CaCO ₃)	1	N/A	2019/04/28		Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	8	N/A	2019/04/28	BBY WI-00033	Auto Calc
Ion Balance (1)	8	N/A	2019/04/28	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	2	N/A	2019/04/27	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	6	N/A	2019/04/28	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	7	N/A	2019/04/27		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2019/04/28		Auto Calc
Elements by ICPMS Low Level (dissolved)	6	N/A	2019/04/27	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (dissolved)	1	N/A	2019/04/30	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (dissolved)	1	N/A	2019/05/03	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/04/27		Auto Calc
Elements by ICPMS Low Level (total)	1	N/A	2019/04/27	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	6	N/A	2019/04/30	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	1	N/A	2019/05/01	CAL SOP-00265	EPA 6020 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/04/25	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	8	N/A	2019/04/24	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	8	N/A	2019/04/24	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	8	N/A	2019/04/25	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals	8	N/A	2019/04/24		
Orthophosphate by Konelab (low level)	8	N/A	2019/04/25	AB SOP-00025	SM 23 4500-P A, F m

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08469775

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/05/08
Report #: R2720087
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B929878

Received: 2019/04/23, 13:47

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Sulphide	8	N/A	2019/04/26	AB SOP-00080	SM 23 4500 S2-A D Fm
Sulphate - Low Level (1)	3	N/A	2019/04/25	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate - Low Level (1)	1	N/A	2019/04/26	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate - Low Level (1)	4	N/A	2019/05/07	BBY6SOP-00017	SM 22 4500-SO42- E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08469775

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/05/08
Report #: R2720087
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B929878
Received: 2019/04/23, 13:47

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Safiann Maiter, Key Account Specialist
Email: smaiter@maxxam.ca
Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VO3868			VO3869			VO3870		
Sampling Date		2019/04/23 09:30			2019/04/23 10:15			2019/04/23 10:30		
COC Number		08469775			08469775			08469775		
	UNITS	TRIAL #1	RDL	QC Batch	TRIAL #2	RDL	QC Batch	TRIAL #3	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	8.7	N/A	9391807	8.8	N/A	9391807	8.0	N/A	9391807
Cation Sum	meq/L	8.5	N/A	9391807	8.4	N/A	9391807	8.4	N/A	9391807
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.98	0.010	9391805	0.95	0.010	9391805	1.1	0.010	9391805
Ion Balance (% Difference)	%	0.37	N/A	9391806	1.9	N/A	9391806	2.7	N/A	9391806
Nitrate (N)	mg/L	0.0236	0.0020	9391809	<0.0020	0.0020	9391809	0.307	0.0020	9391809
Sulphide (as H2S)	mg/L	0.16	0.0020	9391132	0.28	0.0020	9391132	0.0030	0.0020	9391132
Misc. Inorganics										
Fluoride (F)	mg/L	0.620	0.010	9392750	0.660	0.010	9392750	0.550	0.010	9392750
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9392859	0.24	0.050	9392859	0.14	0.050	9392859
Dissolved Organic Carbon (C)	mg/L	3.7	0.50	9394311	4.7	0.50	9394311	4.8	0.50	9394311
Acidity (pH 4.5)	mg/L	<1.0	1.0	9393145	<1.0	1.0	9393145	<1.0	1.0	9393145
Alkalinity (Total as CaCO3)	mg/L	84.7	0.50	9407188	84.9	0.50	9407188	94.2	0.50	9392692
Acidity (pH 8.3)	mg/L	10.2	1.0	9393145	17.1	1.0	9393145	13.2	1.0	9393145
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9407188	<0.50	0.50	9407188	<0.50	0.50	9392692
Bicarbonate (HCO3)	mg/L	103	0.50	9407188	104	0.50	9407188	115	0.50	9392692
Carbonate (CO3)	mg/L	<0.50	0.50	9407188	<0.50	0.50	9407188	<0.50	0.50	9392692
Hydroxide (OH)	mg/L	<0.50	0.50	9407188	<0.50	0.50	9407188	<0.50	0.50	9392692
Anions										
Orthophosphate (P)	mg/L	1.2 (1)	0.10	9392505	1.0 (1)	0.10	9392505	0.55 (1)	0.050	9392505
Dissolved Sulphate (SO4)	mg/L	246 (1)	5.0	9407755	252 (1)	5.0	9407755	208 (1)	5.0	9393352
Total Sulphide	mg/L	0.15	0.0019	9393500	0.26	0.0019	9393500	0.0025	0.0019	9393500
Dissolved Chloride (Cl)	mg/L	63	0.50	9407751	63	0.50	9407751	58	0.50	9393351
Nutrients										
Total Ammonia (N)	mg/L	2.7 (1)	0.050	9392665	2.1 (1)	0.025	9392665	1.4 (1)	0.025	9392665
Nitrate plus Nitrite (N)	mg/L	0.140	0.0020	9391875	0.0026	0.0020	9391875	0.319	0.0020	9391875
Nitrite (N)	mg/L	0.117	0.0020	9391878	0.0023	0.0020	9391878	0.0126	0.0020	9391878
RDL = Reportable Detection Limit										
N/A = Not Applicable										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VO3871		VO3872			VO3873		
Sampling Date		2019/04/23 10:45		2019/04/23 11:15			2019/04/23 11:30		
COC Number		08469775		08469775			08469775		
	UNITS	TRIAL #4	QC Batch	TRIAL #5	RDL	QC Batch	TRIAL #6	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.7	9391807	7.9	N/A	9391807	8.7	N/A	9391807
Cation Sum	meq/L	10	9391807	8.4	N/A	9391807	10	N/A	9391807
Filter and HNO ₃ Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.2	9391805	1.1	0.010	9391805	1.1	0.010	9391805
Ion Balance (% Difference)	%	8.2	9391806	3.5	N/A	9391806	7.3	N/A	9391806
Nitrate (N)	mg/L	<0.0020	9391809	<0.0020	0.0020	9391809	<0.0020	0.0020	9391809
Sulphide (as H ₂ S)	mg/L	0.19	9391132	0.0020	0.0020	9391132	1.1	0.010	9391132
Misc. Inorganics									
Fluoride (F)	mg/L	0.540	9392750	0.700	0.010	9392750	0.710	0.010	9392750
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.90	9392859	<0.050	0.050	9392859	0.10	0.050	9392859
Dissolved Organic Carbon (C)	mg/L	5.7	9393483	12	0.50	9393483	4.6	0.50	9393483
Acidity (pH 4.5)	mg/L	<1.0	9393145	<1.0	1.0	9393145	<1.0	1.0	9393145
Alkalinity (Total as CaCO ₃)	mg/L	96.0	9392692	82.4	0.50	9392692	81.1	0.50	9407188
Acidity (pH 8.3)	mg/L	17.5	9393145	15.9	1.0	9393145	9.2	1.0	9393145
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	9392692	<0.50	0.50	9392692	<0.50	0.50	9407188
Bicarbonate (HCO ₃)	mg/L	117	9392692	101	0.50	9392692	98.9	0.50	9407188
Carbonate (CO ₃)	mg/L	<0.50	9392692	<0.50	0.50	9392692	<0.50	0.50	9407188
Hydroxide (OH)	mg/L	<0.50	9392692	<0.50	0.50	9392692	<0.50	0.50	9407188
Anions									
Orthophosphate (P)	mg/L	0.45 (1)	9392505	0.60 (1)	0.050	9392505	1.1 (1)	0.10	9392505
Dissolved Sulphate (SO ₄)	mg/L	240 (1)	9394835	218 (1)	5.0	9393352	254 (1)	5.0	9407755
Total Sulphide	mg/L	0.17	9393500	0.0021	0.0019	9393500	1.0 (1)	0.0095	9393500
Dissolved Chloride (Cl)	mg/L	61	9393351	56	0.50	9393351	61	0.50	9407751
Nutrients									
Total Ammonia (N)	mg/L	2.0 (1)	9392665	1.4 (1)	0.025	9392665	1.6 (1)	0.025	9392665
Nitrate plus Nitrite (N)	mg/L	<0.0020	9391875	<0.0020	0.0020	9391875	<0.0020	0.0020	9391875
Nitrite (N)	mg/L	<0.0020	9391878	<0.0020	0.0020	9391878	<0.0020	0.0020	9391878
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VO3874		VO3875		
Sampling Date		2019/04/23 11:45		2019/04/23 12:00		
COC Number		08469775		08469775		
	UNITS	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	8.4	9391807	7.8	N/A	9391807
Cation Sum	meq/L	8.3	9391807	8.2	N/A	9391807
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.2	9391805	1.1	0.010	9391805
Ion Balance (% Difference)	%	9.9	9391806	2.9	N/A	9391806
Nitrate (N)	mg/L	0.929	9391809	0.332	0.0020	9391809
Sulphide (as H2S)	mg/L	<0.0020	9391132	<0.0020	0.0020	9391132
Misc. Inorganics						
Fluoride (F)	mg/L	0.670	9392750	0.530	0.010	9392750
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	9392859	<0.050	0.050	9392859
Dissolved Organic Carbon (C)	mg/L	2.4	9393483	3.5	0.50	9393483
Acidity (pH 4.5)	mg/L	<1.0	9393145	<1.0	1.0	9393145
Alkalinity (Total as CaCO3)	mg/L	83.1	9392692	87.2	0.50	9407188
Acidity (pH 8.3)	mg/L	1.8	9393145	3.5	1.0	9393145
Alkalinity (PP as CaCO3)	mg/L	<0.50	9392692	<0.50	0.50	9407188
Bicarbonate (HCO3)	mg/L	101	9392692	106	0.50	9407188
Carbonate (CO3)	mg/L	<0.50	9392692	<0.50	0.50	9407188
Hydroxide (OH)	mg/L	<0.50	9392692	<0.50	0.50	9407188
Anions						
Orthophosphate (P)	mg/L	0.0069	9392505	0.0036	0.0010	9392505
Dissolved Sulphate (SO4)	mg/L	237 (1)	9393352	200 (1)	5.0	9407755
Total Sulphide	mg/L	<0.0019	9393500	<0.0019	0.0019	9393500
Dissolved Chloride (Cl)	mg/L	59	9393351	65	0.50	9407751
Nutrients						
Total Ammonia (N)	mg/L	0.0076	9392665	0.015	0.0050	9392665
Nitrate plus Nitrite (N)	mg/L	0.929	9391875	0.332	0.0020	9391875
Nitrite (N)	mg/L	<0.0020	9391878	<0.0020	0.0020	9391878
RDL = Reportable Detection Limit						
N/A = Not Applicable						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VO3868		VO3869		VO3870		
Sampling Date		2019/04/23 09:30		2019/04/23 10:15		2019/04/23 10:30		
COC Number		08469775		08469775		08469775		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	343	9391649	343	9391649	343	0.50	9391649
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00921	9399075	0.00698	9392682	0.00636	0.00050	9392682
Dissolved Antimony (Sb)	mg/L	0.00262	9399075	0.00177	9392682	0.00415	0.000020	9392682
Dissolved Arsenic (As)	mg/L	0.0386	9399075	0.0401	9392682	0.0262	0.000020	9392682
Dissolved Barium (Ba)	mg/L	0.0666	9399075	0.0710	9392682	0.158	0.000020	9392682
Dissolved Beryllium (Be)	mg/L	<0.000010	9399075	<0.000010	9392682	<0.000010	0.000010	9392682
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9399075	<0.0000050	9392682	<0.0000050	0.0000050	9392682
Dissolved Boron (B)	mg/L	0.043	9399075	0.036	9392682	0.037	0.010	9392682
Dissolved Cadmium (Cd)	mg/L	0.0000495	9399075	0.0000513	9392682	0.0000421	0.0000050	9392682
Dissolved Chromium (Cr)	mg/L	<0.00010	9399075	<0.00010	9392682	<0.00010	0.00010	9392682
Dissolved Cobalt (Co)	mg/L	0.00333	9399075	0.00362	9392682	0.00156	0.0000050	9392682
Dissolved Copper (Cu)	mg/L	0.000719	9399075	0.000493	9392682	0.000363	0.000050	9392682
Dissolved Iron (Fe)	mg/L	0.137	9399075	0.224	9392682	1.14	0.0010	9399075
Dissolved Lead (Pb)	mg/L	0.000597	9399075	0.000426	9392682	0.000429	0.0000050	9392682
Dissolved Lithium (Li)	mg/L	0.0149	9399075	0.0126	9392682	0.00996	0.00050	9392682
Dissolved Manganese (Mn)	mg/L	0.0939	9399075	0.107	9392682	0.956	0.000050	9392682
Dissolved Molybdenum (Mo)	mg/L	0.00179	9399075	0.00135	9392682	0.00245	0.000050	9392682
Dissolved Nickel (Ni)	mg/L	0.0107	9399075	0.0113	9392682	0.00506	0.000020	9392682
Dissolved Selenium (Se)	mg/L	0.00216	9399075	0.00252	9392682	0.00189	0.000040	9392682
Dissolved Silicon (Si)	mg/L	0.985	9399075	0.894	9392682	1.89	0.050	9392682
Dissolved Silver (Ag)	mg/L	<0.0000050	9399075	<0.0000050	9392682	<0.0000050	0.0000050	9392682
Dissolved Strontium (Sr)	mg/L	0.485	9399075	0.534	9392682	0.561	0.000050	9392682
Dissolved Thallium (Tl)	mg/L	0.0000637	9399075	0.000112	9392682	0.0000085	0.0000020	9392682
Dissolved Tin (Sn)	mg/L	<0.00020	9399075	<0.00020	9392682	<0.00020	0.00020	9392682
Dissolved Titanium (Ti)	mg/L	<0.00050	9399075	<0.00050	9392682	0.00125	0.00050	9392682
Dissolved Uranium (U)	mg/L	0.0296	9399075	0.0271	9392682	0.0122	0.0000020	9392682
Dissolved Vanadium (V)	mg/L	<0.00020	9399075	<0.00020	9392682	0.00074	0.00020	9392682
Dissolved Zinc (Zn)	mg/L	0.0194	9399075	0.0258	9392682	0.00896	0.00010	9392682
Dissolved Zirconium (Zr)	mg/L	0.00035	9399075	0.00018	9392682	0.00033	0.00010	9392682
Dissolved Calcium (Ca)	mg/L	110	9391655	108	9391655	110	0.050	9391655
Dissolved Magnesium (Mg)	mg/L	17.5	9391655	18.0	9391655	16.8	0.050	9391655
RDL = Reportable Detection Limit								

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VO3868		VO3869		VO3870		
Sampling Date		2019/04/23 09:30		2019/04/23 10:15		2019/04/23 10:30		
COC Number		08469775		08469775		08469775		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.83	9391655	7.64	9391655	7.62	0.050	9391655
Dissolved Sodium (Na)	mg/L	27.2	9391655	27.3	9391655	26.8	0.050	9391655
Dissolved Sulphur (S)	mg/L	93.3	9391655	86.4	9391655	82.8	3.0	9391655
RDL = Reportable Detection Limit								

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VO3871		VO3872		VO3873		
Sampling Date		2019/04/23 10:45		2019/04/23 11:15		2019/04/23 11:30		
COC Number		08469775		08469775		08469775		
	UNITS	TRIAL #4	QC Batch	TRIAL #5	QC Batch	TRIAL #6	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	414	9391649	347	9391649	403	0.50	9391649
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00305	9375274	0.0137	9392682	0.00296	0.00050	9375274
Dissolved Antimony (Sb)	mg/L	0.00441	9375274	0.0211	9392682	0.0184	0.000020	9375274
Dissolved Arsenic (As)	mg/L	0.0251	9375274	0.0464	9392682	0.333	0.000020	9375274
Dissolved Barium (Ba)	mg/L	0.158	9375274	0.0637	9392682	0.0965	0.000020	9375274
Dissolved Beryllium (Be)	mg/L	<0.000010	9375274	<0.000010	9392682	<0.000010	0.000010	9375274
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9375274	<0.0000050	9392682	<0.0000050	0.0000050	9375274
Dissolved Boron (B)	mg/L	0.034	9375274	0.038	9392682	0.036	0.010	9375274
Dissolved Cadmium (Cd)	mg/L	0.0000248	9375274	0.00331	9392682	0.000242	0.0000050	9392682
Dissolved Chromium (Cr)	mg/L	0.00016	9375274	0.00013	9392682	<0.00010	0.00010	9375274
Dissolved Cobalt (Co)	mg/L	0.00162	9375274	0.00369	9392682	0.0201	0.0000050	9375274
Dissolved Copper (Cu)	mg/L	0.000110	9375274	0.00162	9392682	0.000603	0.000050	9392682
Dissolved Iron (Fe)	mg/L	0.790	9375274	0.0096	9375274	0.0636	0.0010	9375274
Dissolved Lead (Pb)	mg/L	0.000190	9375274	0.00647	9392682	0.000642	0.0000050	9392682
Dissolved Lithium (Li)	mg/L	0.00752	9375274	0.0122	9392682	0.00982	0.00050	9375274
Dissolved Manganese (Mn)	mg/L	0.906	9375274	0.0811	9392682	0.0523	0.000050	9375274
Dissolved Molybdenum (Mo)	mg/L	0.00250	9375274	0.00185	9392682	0.00181	0.000050	9375274
Dissolved Nickel (Ni)	mg/L	0.00513	9375274	0.0125	9392682	0.0760	0.000020	9375274
Dissolved Selenium (Se)	mg/L	0.00178	9375274	0.0110	9392682	0.00494	0.000040	9392682
Dissolved Silicon (Si)	mg/L	2.23	9375274	0.829	9392682	1.11	0.050	9375274
Dissolved Silver (Ag)	mg/L	<0.0000050	9375274	<0.0000050	9392682	<0.0000050	0.0000050	9375274
Dissolved Strontium (Sr)	mg/L	0.542	9375274	0.540	9392682	0.560	0.000050	9375274
Dissolved Thallium (Tl)	mg/L	<0.0000020	9375274	0.000276	9392682	0.0000361	0.0000020	9392682
Dissolved Tin (Sn)	mg/L	<0.00020	9375274	<0.00020	9392682	<0.00020	0.00020	9375274
Dissolved Titanium (Ti)	mg/L	<0.00050	9375274	0.00061	9392682	<0.00050	0.00050	9375274
Dissolved Uranium (U)	mg/L	0.0123	9375274	0.0283	9392682	0.193	0.0000020	9375274
Dissolved Vanadium (V)	mg/L	0.00073	9375274	<0.00020	9392682	0.00022	0.00020	9375274
Dissolved Zinc (Zn)	mg/L	0.00215	9375274	0.346	9392682	0.0298	0.00010	9392682
Dissolved Zirconium (Zr)	mg/L	0.00023	9375274	0.00012	9392682	<0.00010	0.00010	9375274
Dissolved Calcium (Ca)	mg/L	132	9391655	109	9391655	126	0.050	9391655
Dissolved Magnesium (Mg)	mg/L	20.6	9391655	18.1	9391655	21.7	0.050	9391655
RDL = Reportable Detection Limit								

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VO3871		VO3872		VO3873		
Sampling Date		2019/04/23 10:45		2019/04/23 11:15		2019/04/23 11:30		
COC Number		08469775		08469775		08469775		
	UNITS	TRIAL #4	QC Batch	TRIAL #5	QC Batch	TRIAL #6	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.00	9391655	6.96	9391655	8.98	0.050	9391655
Dissolved Sodium (Na)	mg/L	35.7	9391655	27.8	9391655	36.0	0.050	9391655
Dissolved Sulphur (S)	mg/L	92.7	9391655	90.6	9391655	97.1	3.0	9391655
RDL = Reportable Detection Limit								

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VO3874	VO3875		
Sampling Date		2019/04/23 11:45	2019/04/23 12:00		
COC Number		08469775	08469775		
	UNITS	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	346	345	0.50	9391649
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00858	0.00222	0.00050	9392682
Dissolved Antimony (Sb)	mg/L	0.0279	0.0119	0.000020	9392682
Dissolved Arsenic (As)	mg/L	0.0356	0.00381	0.000020	9392682
Dissolved Barium (Ba)	mg/L	0.0877	0.147	0.000020	9392682
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9392682
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9392682
Dissolved Boron (B)	mg/L	0.038	0.033	0.010	9392682
Dissolved Cadmium (Cd)	mg/L	0.00368	0.000758	0.0000050	9392682
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9392682
Dissolved Cobalt (Co)	mg/L	0.00237	0.000144	0.0000050	9392682
Dissolved Copper (Cu)	mg/L	0.0101	0.00341	0.000050	9392682
Dissolved Iron (Fe)	mg/L	0.0013	0.0106	0.0010	9392682
Dissolved Lead (Pb)	mg/L	0.00531	0.000208	0.0000050	9392682
Dissolved Lithium (Li)	mg/L	0.0129	0.00961	0.00050	9392682
Dissolved Manganese (Mn)	mg/L	0.0641	0.587	0.000050	9392682
Dissolved Molybdenum (Mo)	mg/L	0.00175	0.00279	0.000050	9392682
Dissolved Nickel (Ni)	mg/L	0.00984	0.00488	0.000020	9392682
Dissolved Selenium (Se)	mg/L	0.0145	0.00719	0.000040	9392682
Dissolved Silicon (Si)	mg/L	0.895	1.88	0.050	9392682
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9392682
Dissolved Strontium (Sr)	mg/L	0.649	0.595	0.000050	9392682
Dissolved Thallium (Tl)	mg/L	0.000532	0.0000232	0.0000020	9392682
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9392682
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9392682
Dissolved Uranium (U)	mg/L	0.0410	0.0230	0.0000020	9392682
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9392682
Dissolved Zinc (Zn)	mg/L	0.255	0.108	0.00010	9392682
Dissolved Zirconium (Zr)	mg/L	0.00012	<0.00010	0.00010	9392682
Dissolved Calcium (Ca)	mg/L	109	111	0.050	9391655
Dissolved Magnesium (Mg)	mg/L	18.2	16.7	0.050	9391655
RDL = Reportable Detection Limit					

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VO3874	VO3875		
Sampling Date		2019/04/23 11:45	2019/04/23 12:00		
COC Number		08469775	08469775		
	UNITS	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	6.08	5.16	0.050	9391655
Dissolved Sodium (Na)	mg/L	27.6	26.4	0.050	9391655
Dissolved Sulphur (S)	mg/L	82.9	85.7	3.0	9391655
RDL = Reportable Detection Limit					

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VO3868		VO3869		VO3870		
Sampling Date		2019/04/23 09:30		2019/04/23 10:15		2019/04/23 10:30		
COC Number		08469775		08469775		08469775		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	343	9391138	415	9391138	334	0.50	9391138
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00761	9392681	0.00671	9375294	0.00650	0.00050	9395423
Total Antimony (Sb)	mg/L	0.00490	9392681	0.00406	9375294	0.0109	0.000020	9395423
Total Arsenic (As)	mg/L	0.0422	9392681	0.0450	9375294	0.0355	0.000020	9395423
Total Barium (Ba)	mg/L	0.0701	9392681	0.0732	9375294	0.127	0.000020	9395423
Total Beryllium (Be)	mg/L	<0.000010	9392681	<0.000010	9375294	<0.000010	0.000010	9395423
Total Bismuth (Bi)	mg/L	<0.0000050	9392681	<0.0000050	9375294	<0.0000050	0.0000050	9395423
Total Boron (B)	mg/L	0.056	9392681	0.038	9375294	0.033	0.010	9395423
Total Cadmium (Cd)	mg/L	0.000182	9392681	0.000145	9375294	0.0000501	0.0000050	9395423
Total Chromium (Cr)	mg/L	<0.00010	9392681	<0.00010	9375294	<0.00010	0.00010	9395423
Total Cobalt (Co)	mg/L	0.00333	9392681	0.00373	9375294	0.00171	0.0000050	9395423
Total Copper (Cu)	mg/L	0.00190	9392681	0.00109	9375294	0.000779	0.000050	9395423
Total Iron (Fe)	mg/L	0.146	9392681	0.203	9375294	0.671	0.0010	9395423
Total Lead (Pb)	mg/L	0.00150	9392681	0.000951	9375294	0.00119	0.0000050	9395423
Total Lithium (Li)	mg/L	0.0120	9392681	0.00961	9375294	0.00962	0.00050	9395423
Total Manganese (Mn)	mg/L	0.0909	9392681	0.103	9375294	0.779	0.000050	9395423
Total Molybdenum (Mo)	mg/L	0.00178	9392681	0.00149	9375294	0.00295	0.000050	9395423
Total Nickel (Ni)	mg/L	0.0105	9392681	0.0111	9375294	0.00557	0.000020	9395423
Total Selenium (Se)	mg/L	0.00260	9392681	0.00200	9375294	0.00230	0.000040	9395423
Total Silicon (Si)	mg/L	0.938	9392681	1.02	9375294	1.88	0.050	9395423
Total Silver (Ag)	mg/L	<0.0000050	9392681	<0.0000050	9375294	<0.0000050	0.0000050	9395423
Total Strontium (Sr)	mg/L	0.501	9392681	0.511	9375294	0.503	0.000050	9395423
Total Thallium (Tl)	mg/L	0.000126	9392681	0.000203	9375294	0.0000072	0.0000020	9395423
Total Tin (Sn)	mg/L	<0.00020	9392681	<0.00020	9375294	<0.00020	0.00020	9395423
Total Titanium (Ti)	mg/L	0.00055	9392681	<0.00050	9375294	<0.00050	0.00050	9395423
Total Uranium (U)	mg/L	0.0292	9392681	0.0297	9375294	0.0187	0.0000020	9395423
Total Vanadium (V)	mg/L	0.00022	9392681	<0.00020	9375294	0.00082	0.00020	9395423
Total Zinc (Zn)	mg/L	0.0600	9392681	0.0774	9375294	0.0310	0.00010	9395423
Total Zirconium (Zr)	mg/L	0.00013	9392681	0.00014	9375294	0.00017	0.00010	9395423
Total Calcium (Ca)	mg/L	107	9391661	130	9391661	108	0.050	9391661
Total Magnesium (Mg)	mg/L	18.2	9391661	22.0	9391661	15.5	0.050	9391661
RDL = Reportable Detection Limit								

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VO3868		VO3869		VO3870		
Sampling Date		2019/04/23 09:30		2019/04/23 10:15		2019/04/23 10:30		
COC Number		08469775		08469775		08469775		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Total Potassium (K)	mg/L	7.84	9391661	8.09	9391661	7.37	0.050	9391661
Total Sodium (Na)	mg/L	27.7	9391661	35.8	9391661	25.5	0.050	9391661
Total Sulphur (S)	mg/L	89.0	9391661	97.0	9391661	83.5	3.0	9391661
RDL = Reportable Detection Limit								

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VO3871	VO3872	VO3873	VO3874	VO3875		
Sampling Date		2019/04/23 10:45	2019/04/23 11:15	2019/04/23 11:30	2019/04/23 11:45	2019/04/23 12:00		
COC Number		08469775	08469775	08469775	08469775	08469775		
	UNITS	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	405	412	395	417	414	0.50	9391138
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00477	0.00921	0.00163	0.0123	0.0140	0.00050	9375294
Total Antimony (Sb)	mg/L	0.00469	0.0236	0.0125	0.0304	0.0130	0.000020	9375294
Total Arsenic (As)	mg/L	0.0263	0.0470	0.318	0.0369	0.00724	0.000020	9375294
Total Barium (Ba)	mg/L	0.161	0.0645	0.0957	0.0882	0.149	0.000020	9375294
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9375294
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9375294
Total Boron (B)	mg/L	0.031	0.035	0.035	0.034	0.031	0.010	9375294
Total Cadmium (Cd)	mg/L	0.0000539	0.00428	0.000240	0.00427	0.000912	0.0000050	9375294
Total Chromium (Cr)	mg/L	0.00011	0.00011	<0.00010	<0.00010	<0.00010	0.00010	9375294
Total Cobalt (Co)	mg/L	0.00165	0.00385	0.0166	0.00237	0.000197	0.0000050	9375294
Total Copper (Cu)	mg/L	0.000289	0.0166	0.000521	0.0109	0.00389	0.000050	9375294
Total Iron (Fe)	mg/L	0.988	0.0092	0.0584	0.0117	0.124	0.0010	9375294
Total Lead (Pb)	mg/L	0.000444	0.00830	0.000552	0.00631	0.00224	0.0000050	9375294
Total Lithium (Li)	mg/L	0.00731	0.00931	0.00947	0.00939	0.00707	0.00050	9375294
Total Manganese (Mn)	mg/L	0.925	0.0776	0.0509	0.0616	0.565	0.000050	9375294
Total Molybdenum (Mo)	mg/L	0.00272	0.00214	0.00190	0.00201	0.00310	0.000050	9375294
Total Nickel (Ni)	mg/L	0.00528	0.0133	0.0734	0.0105	0.00514	0.000020	9375294
Total Selenium (Se)	mg/L	0.00146	0.0117	0.00527	0.0141	0.00763	0.000040	9375294
Total Silicon (Si)	mg/L	2.22	0.906	1.09	1.02	2.17	0.050	9375294
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9375294
Total Strontium (Sr)	mg/L	0.538	0.545	0.569	0.625	0.578	0.000050	9375294
Total Thallium (Tl)	mg/L	<0.0000020	0.000271	0.0000232	0.000524	0.0000075	0.0000020	9375294
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9375294
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00114	0.00050	9375294
Total Uranium (U)	mg/L	0.0131	0.0270	0.147	0.0433	0.0246	0.0000020	9375294
Total Vanadium (V)	mg/L	0.00075	<0.00020	<0.00020	<0.00020	0.00031	0.00020	9375294
Total Zinc (Zn)	mg/L	0.00685	0.357	0.0211	0.263	0.111	0.00010	9375294
Total Zirconium (Zr)	mg/L	0.00022	<0.00010	<0.00010	0.00013	0.00014	0.00010	9375294
Total Calcium (Ca)	mg/L	128	129	123	130	132	0.050	9391661
Total Magnesium (Mg)	mg/L	21.0	22.0	21.4	22.6	20.6	0.050	9391661

RDL = Reportable Detection Limit

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VO3871	VO3872	VO3873	VO3874	VO3875		
Sampling Date		2019/04/23 10:45	2019/04/23 11:15	2019/04/23 11:30	2019/04/23 11:45	2019/04/23 12:00		
COC Number		08469775	08469775	08469775	08469775	08469775		
	UNITS	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	8.18	7.51	8.84	6.48	5.56	0.050	9391661
Total Sodium (Na)	mg/L	35.5	36.2	36.2	36.3	35.2	0.050	9391661
Total Sulphur (S)	mg/L	94.1	95.4	95.7	94.8	89.1	3.0	9391661
RDL = Reportable Detection Limit								

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	11.7°C
Package 2	15.0°C

Version 2: Report reissued to revise the sample IDs as per COC 2019/05/08

Sample VO3870, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VO3872, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VO3873, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9375274	Dissolved Aluminum (Al)	2019/04/11	98	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9375274	Dissolved Antimony (Sb)	2019/04/11	94	80 - 120	98	80 - 120	<0.000020	mg/L	12	20
9375274	Dissolved Arsenic (As)	2019/04/11	97	80 - 120	103	80 - 120	<0.000020	mg/L	NC	20
9375274	Dissolved Barium (Ba)	2019/04/11	98	80 - 120	107	80 - 120	<0.000020	mg/L	NC	20
9375274	Dissolved Beryllium (Be)	2019/04/11	95	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9375274	Dissolved Bismuth (Bi)	2019/04/11	98	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9375274	Dissolved Boron (B)	2019/04/11	92	80 - 120	87	80 - 120	<0.010	mg/L	NC	20
9375274	Dissolved Cadmium (Cd)	2019/04/11	100	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9375274	Dissolved Chromium (Cr)	2019/04/11	98	80 - 120	111	80 - 120	<0.00010	mg/L	NC	20
9375274	Dissolved Cobalt (Co)	2019/04/11	97	80 - 120	109	80 - 120	<0.0000050	mg/L	NC	20
9375274	Dissolved Copper (Cu)	2019/04/11	96	80 - 120	109	80 - 120	<0.000050	mg/L	NC	20
9375274	Dissolved Iron (Fe)	2019/04/11	100	80 - 120	112	80 - 120	<0.0010	mg/L	NC	20
9375274	Dissolved Lead (Pb)	2019/04/11	97	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9375274	Dissolved Lithium (Li)	2019/04/11	97	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
9375274	Dissolved Manganese (Mn)	2019/04/11	101	80 - 120	112	80 - 120	<0.000050	mg/L	NC	20
9375274	Dissolved Molybdenum (Mo)	2019/04/11	101	80 - 120	108	80 - 120	<0.000050	mg/L	NC	20
9375274	Dissolved Nickel (Ni)	2019/04/11	101	80 - 120	108	80 - 120	<0.000020	mg/L	5.5	20
9375274	Dissolved Selenium (Se)	2019/04/11	97	80 - 120	98	80 - 120	<0.000040	mg/L	NC	20
9375274	Dissolved Silicon (Si)	2019/04/11	83	80 - 120	90	80 - 120	<0.050	mg/L	NC	20
9375274	Dissolved Silver (Ag)	2019/04/11	61 (1)	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9375274	Dissolved Strontium (Sr)	2019/04/11	103	80 - 120	116	80 - 120	<0.000050	mg/L	NC	20
9375274	Dissolved Thallium (Tl)	2019/04/11	98	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9375274	Dissolved Tin (Sn)	2019/04/11	97	80 - 120	105	80 - 120	<0.00020	mg/L	NC	20
9375274	Dissolved Titanium (Ti)	2019/04/11	100	80 - 120	110	80 - 120	<0.00050	mg/L	NC	20
9375274	Dissolved Uranium (U)	2019/04/11	99	80 - 120	107	80 - 120	<0.0000020	mg/L	NC	20
9375274	Dissolved Vanadium (V)	2019/04/11	98	80 - 120	110	80 - 120	<0.00020	mg/L	NC	20
9375274	Dissolved Zinc (Zn)	2019/04/11	104	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9375274	Dissolved Zirconium (Zr)	2019/04/11	94	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9375294	Total Aluminum (Al)	2019/04/09	103	80 - 120	103	80 - 120	0.00227, RDL=0.00050	mg/L		
9375294	Total Antimony (Sb)	2019/04/09	98	80 - 120	92	80 - 120	<0.000020	mg/L		
9375294	Total Arsenic (As)	2019/04/09	103	80 - 120	95	80 - 120	<0.000020	mg/L		
9375294	Total Barium (Ba)	2019/04/09	99	80 - 120	101	80 - 120	<0.000020	mg/L	7.7	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9375294	Total Beryllium (Be)	2019/04/09	108	80 - 120	103	80 - 120	<0.000010	mg/L		
9375294	Total Bismuth (Bi)	2019/04/09	97	80 - 120	100	80 - 120	<0.0000050	mg/L		
9375294	Total Boron (B)	2019/04/09	105	80 - 120	88	80 - 120	<0.010	mg/L		
9375294	Total Cadmium (Cd)	2019/04/09	106	80 - 120	100	80 - 120	<0.0000050	mg/L		
9375294	Total Chromium (Cr)	2019/04/09	98	80 - 120	99	80 - 120	<0.00010	mg/L		
9375294	Total Cobalt (Co)	2019/04/09	98	80 - 120	99	80 - 120	<0.0000050	mg/L		
9375294	Total Copper (Cu)	2019/04/09	98	80 - 120	99	80 - 120	<0.000050	mg/L		
9375294	Total Iron (Fe)	2019/04/09	103	80 - 120	106	80 - 120	<0.0010	mg/L		
9375294	Total Lead (Pb)	2019/04/09	98	80 - 120	99	80 - 120	<0.0000050	mg/L		
9375294	Total Lithium (Li)	2019/04/09	101	80 - 120	112	80 - 120	<0.00050	mg/L		
9375294	Total Manganese (Mn)	2019/04/09	98	80 - 120	99	80 - 120	<0.000050	mg/L		
9375294	Total Molybdenum (Mo)	2019/04/09	104	80 - 120	105	80 - 120	<0.000050	mg/L		
9375294	Total Nickel (Ni)	2019/04/09	97	80 - 120	99	80 - 120	<0.000020	mg/L		
9375294	Total Selenium (Se)	2019/04/09	107	80 - 120	94	80 - 120	<0.000040	mg/L		
9375294	Total Silicon (Si)	2019/04/09	75 (1)	80 - 120	79 (1)	80 - 120	<0.050	mg/L		
9375294	Total Silver (Ag)	2019/04/09	94	80 - 120	100	80 - 120	<0.0000050	mg/L		
9375294	Total Strontium (Sr)	2019/04/09	105	80 - 120	102	80 - 120	<0.000050	mg/L		
9375294	Total Thallium (Tl)	2019/04/09	98	80 - 120	100	80 - 120	<0.0000020	mg/L		
9375294	Total Tin (Sn)	2019/04/09	98	80 - 120	99	80 - 120	<0.00020	mg/L		
9375294	Total Titanium (Ti)	2019/04/09	99	80 - 120	106	80 - 120	<0.00050	mg/L		
9375294	Total Uranium (U)	2019/04/09	99	80 - 120	101	80 - 120	<0.0000020	mg/L		
9375294	Total Vanadium (V)	2019/04/09	99	80 - 120	101	80 - 120	<0.00020	mg/L		
9375294	Total Zinc (Zn)	2019/04/09	113	80 - 120	100	80 - 120	<0.00010	mg/L		
9375294	Total Zirconium (Zr)	2019/04/09	101	80 - 120	98	80 - 120	<0.00010	mg/L		
9391875	Nitrate plus Nitrite (N)	2019/04/24	99	80 - 120	93	80 - 120	<0.0020	mg/L	NC	25
9391878	Nitrite (N)	2019/04/24	104	80 - 120	99	80 - 120	<0.0020	mg/L	NC	25
9392505	Orthophosphate (P)	2019/04/25	48 (1)	80 - 120	96	80 - 120	0.0012, RDL=0.0010 (2)	mg/L		
9392665	Total Ammonia (N)	2019/04/25	92	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20
9392681	Total Aluminum (Al)	2019/04/27	116	80 - 120	106	80 - 120	<0.00050	mg/L	3.0	20
9392681	Total Antimony (Sb)	2019/04/27	97	80 - 120	94	80 - 120	<0.000020	mg/L	4.5	20
9392681	Total Arsenic (As)	2019/04/27	110	80 - 120	96	80 - 120	<0.000020	mg/L	17	20
9392681	Total Barium (Ba)	2019/04/27	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.78	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9392681	Total Beryllium (Be)	2019/04/27	101	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9392681	Total Bismuth (Bi)	2019/04/27	99	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9392681	Total Boron (B)	2019/04/27	109	80 - 120	98	80 - 120	<0.010	mg/L	18	20
9392681	Total Cadmium (Cd)	2019/04/27	101	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9392681	Total Chromium (Cr)	2019/04/27	104	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9392681	Total Cobalt (Co)	2019/04/27	105	80 - 120	99	80 - 120	<0.0000050	mg/L	19	20
9392681	Total Copper (Cu)	2019/04/27	104	80 - 120	100	80 - 120	<0.000050	mg/L	4.0	20
9392681	Total Iron (Fe)	2019/04/27	114	80 - 120	105	80 - 120	<0.0010	mg/L	5.0	20
9392681	Total Lead (Pb)	2019/04/27	101	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9392681	Total Lithium (Li)	2019/04/27	100	80 - 120	97	80 - 120	<0.00050	mg/L	5.7	20
9392681	Total Manganese (Mn)	2019/04/27	111	80 - 120	102	80 - 120	<0.000050	mg/L	4.5	20
9392681	Total Molybdenum (Mo)	2019/04/27	105	80 - 120	97	80 - 120	<0.000050	mg/L	0.48	20
9392681	Total Nickel (Ni)	2019/04/27	106	80 - 120	96	80 - 120	<0.000020	mg/L	NC	20
9392681	Total Selenium (Se)	2019/04/27	104	80 - 120	94	80 - 120	<0.000040	mg/L	0.25	20
9392681	Total Silicon (Si)	2019/04/27	80	80 - 120	83	80 - 120	<0.050	mg/L	0.88	20
9392681	Total Silver (Ag)	2019/04/27	88	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9392681	Total Strontium (Sr)	2019/04/27	NC	80 - 120	108	80 - 120	<0.000050	mg/L	1.5	20
9392681	Total Thallium (Tl)	2019/04/27	101	80 - 120	100	80 - 120	<0.0000020	mg/L	NC	20
9392681	Total Tin (Sn)	2019/04/27	100	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9392681	Total Titanium (Ti)	2019/04/27	110	80 - 120	124 (1)	80 - 120	<0.00050	mg/L	11	20
9392681	Total Uranium (U)	2019/04/27	104	80 - 120	100	80 - 120	<0.0000020	mg/L	0.26	20
9392681	Total Vanadium (V)	2019/04/27	107	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9392681	Total Zinc (Zn)	2019/04/27	103	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9392681	Total Zirconium (Zr)	2019/04/27	111	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9392682	Dissolved Aluminum (Al)	2019/04/27	98	80 - 120	106	80 - 120	<0.00050	mg/L	7.0	20
9392682	Dissolved Antimony (Sb)	2019/04/27	92	80 - 120	93	80 - 120	<0.000020	mg/L	6.4	20
9392682	Dissolved Arsenic (As)	2019/04/27	106	80 - 120	96	80 - 120	<0.000020	mg/L	1.6	20
9392682	Dissolved Barium (Ba)	2019/04/27	NC	80 - 120	98	80 - 120	<0.000020	mg/L	1.4	20
9392682	Dissolved Beryllium (Be)	2019/04/27	93	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9392682	Dissolved Bismuth (Bi)	2019/04/27	74 (1)	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9392682	Dissolved Boron (B)	2019/04/27	124 (1)	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
9392682	Dissolved Cadmium (Cd)	2019/04/27	95	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9392682	Dissolved Chromium (Cr)	2019/04/27	94	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9392682	Dissolved Cobalt (Co)	2019/04/27	95	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9392682	Dissolved Copper (Cu)	2019/04/27	94	80 - 120	100	80 - 120	<0.000050	mg/L	4.7	20
9392682	Dissolved Iron (Fe)	2019/04/27	99	80 - 120	105	80 - 120	<0.0010	mg/L	11	20
9392682	Dissolved Lead (Pb)	2019/04/27	96	80 - 120	99	80 - 120	<0.0000050	mg/L	12	20
9392682	Dissolved Lithium (Li)	2019/04/27	93	80 - 120	97	80 - 120	<0.00050	mg/L	3.9	20
9392682	Dissolved Manganese (Mn)	2019/04/27	101	80 - 120	98	80 - 120	<0.000050	mg/L	8.6	20
9392682	Dissolved Molybdenum (Mo)	2019/04/27	98	80 - 120	100	80 - 120	<0.000050	mg/L	0.46	20
9392682	Dissolved Nickel (Ni)	2019/04/27	94	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
9392682	Dissolved Selenium (Se)	2019/04/27	98	80 - 120	92	80 - 120	<0.000040	mg/L	4.5	20
9392682	Dissolved Silicon (Si)	2019/04/27	73 (1)	80 - 120	82	80 - 120	<0.050	mg/L	1.6	20
9392682	Dissolved Silver (Ag)	2019/04/27	76 (1)	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9392682	Dissolved Strontium (Sr)	2019/04/27	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.90	20
9392682	Dissolved Thallium (Tl)	2019/04/27	96	80 - 120	99	80 - 120	<0.0000020	mg/L	NC	20
9392682	Dissolved Tin (Sn)	2019/04/27	94	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9392682	Dissolved Titanium (Ti)	2019/04/27	88	80 - 120	111	80 - 120	<0.00050	mg/L	4.4	20
9392682	Dissolved Uranium (U)	2019/04/27	98	80 - 120	99	80 - 120	<0.0000020	mg/L	5.4	20
9392682	Dissolved Vanadium (V)	2019/04/27	98	80 - 120	100	80 - 120	<0.00020	mg/L	6.5	20
9392682	Dissolved Zinc (Zn)	2019/04/27	96	80 - 120	101	80 - 120	<0.00010	mg/L	11	20
9392682	Dissolved Zirconium (Zr)	2019/04/27	97	80 - 120	111	80 - 120	<0.00010	mg/L	NC	20
9392692	Alkalinity (PP as CaCO3)	2019/04/25					<0.50	mg/L	NC	20
9392692	Alkalinity (Total as CaCO3)	2019/04/25	100	80 - 120	94	80 - 120	<0.50	mg/L	NC	20
9392692	Bicarbonate (HCO3)	2019/04/25					<0.50	mg/L	NC	20
9392692	Carbonate (CO3)	2019/04/25					<0.50	mg/L	NC	20
9392692	Hydroxide (OH)	2019/04/25					<0.50	mg/L	NC	20
9392750	Fluoride (F)	2019/04/25	101	80 - 120	102	80 - 120	<0.010	mg/L	0	20
9392859	HCl Preserved Iron (Fe+2 Ferrous)	2019/04/25	93	80 - 120	97	90 - 110	<0.050	mg/L	NC	20
9393145	Acidity (pH 4.5)	2019/04/25					<1.0	mg/L	NC	20
9393145	Acidity (pH 8.3)	2019/04/25			96	80 - 120	<1.0	mg/L	NC	20
9393351	Dissolved Chloride (Cl)	2019/04/25	95	80 - 120	100	80 - 120	<0.50	mg/L	3.6	20
9393352	Dissolved Sulphate (SO4)	2019/04/25	NC	80 - 120	96	80 - 120	<0.50	mg/L	8.2	20
9393483	Dissolved Organic Carbon (C)	2019/04/29	113	80 - 120	100	80 - 120	<0.50	mg/L	0.68	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9393500	Total Sulphide	2019/04/26			101	80 - 120	<0.0019	mg/L	5.5	20
9394311	Dissolved Organic Carbon (C)	2019/04/29	98	80 - 120	93	80 - 120	<0.50	mg/L	12	20
9394835	Dissolved Sulphate (SO4)	2019/04/26	NC	80 - 120	102	80 - 120	0.60, RDL=0.50	mg/L	7.4	20
9395423	Total Aluminum (Al)	2019/04/30	103	80 - 120	95	80 - 120	<0.00050	mg/L	0.72	20
9395423	Total Antimony (Sb)	2019/04/30	103	80 - 120	102	80 - 120	<0.000020	mg/L	3.2	20
9395423	Total Arsenic (As)	2019/04/30	106	80 - 120	100	80 - 120	<0.000020	mg/L	7.1	20
9395423	Total Barium (Ba)	2019/04/30	NC	80 - 120	100	80 - 120	<0.000020	mg/L	2.0	20
9395423	Total Beryllium (Be)	2019/04/30	93	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
9395423	Total Bismuth (Bi)	2019/04/30	96	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9395423	Total Boron (B)	2019/04/30	110	80 - 120	93	80 - 120	<0.010	mg/L	NC	20
9395423	Total Cadmium (Cd)	2019/04/30	112	80 - 120	111	80 - 120	<0.0000050	mg/L	5.2	20
9395423	Total Chromium (Cr)	2019/04/30	103	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9395423	Total Cobalt (Co)	2019/04/30	100	80 - 120	101	80 - 120	<0.0000050	mg/L	1.2	20
9395423	Total Copper (Cu)	2019/04/30	101	80 - 120	102	80 - 120	<0.000050	mg/L	6.3	20
9395423	Total Iron (Fe)	2019/04/30	114	80 - 120	92	80 - 120	<0.0010	mg/L	0.21	20
9395423	Total Lead (Pb)	2019/04/30	96	80 - 120	94	80 - 120	<0.0000050	mg/L	1.8	20
9395423	Total Lithium (Li)	2019/04/30	90	80 - 120	84	80 - 120	<0.00050	mg/L	0.078	20
9395423	Total Manganese (Mn)	2019/04/30	97	80 - 120	98	80 - 120	<0.000050	mg/L	0.41	20
9395423	Total Molybdenum (Mo)	2019/04/30	111	80 - 120	108	80 - 120	<0.000050	mg/L	1.7	20
9395423	Total Nickel (Ni)	2019/04/30	98	80 - 120	101	80 - 120	<0.000020	mg/L	1.2	20
9395423	Total Selenium (Se)	2019/04/30	117	80 - 120	104	80 - 120	<0.000040	mg/L	13	20
9395423	Total Silicon (Si)	2019/04/30	NC	80 - 120	94	80 - 120	<0.050	mg/L	0.98	20
9395423	Total Silver (Ag)	2019/04/30	93	80 - 120	113	80 - 120	<0.0000050	mg/L	NC	20
9395423	Total Strontium (Sr)	2019/04/30	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.29	20
9395423	Total Thallium (Tl)	2019/04/30	97	80 - 120	95	80 - 120	<0.0000020	mg/L	NC	20
9395423	Total Tin (Sn)	2019/04/30	108	80 - 120	109	80 - 120	<0.00020	mg/L	NC	20
9395423	Total Titanium (Ti)	2019/04/30	100	80 - 120	114	80 - 120	<0.00050	mg/L	NC	20
9395423	Total Uranium (U)	2019/04/30	102	80 - 120	100	80 - 120	<0.0000020	mg/L	2.5	20
9395423	Total Vanadium (V)	2019/04/30	104	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9395423	Total Zinc (Zn)	2019/04/30	101	80 - 120	94	80 - 120	<0.00010	mg/L	1.4	20
9395423	Total Zirconium (Zr)	2019/04/30	110	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9399075	Dissolved Aluminum (Al)	2019/05/01	80	80 - 120	110	80 - 120	<0.00050	mg/L	NC	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9399075	Dissolved Antimony (Sb)	2019/05/01	87	80 - 120	94	80 - 120	<0.000020	mg/L	NC	20
9399075	Dissolved Arsenic (As)	2019/05/01	102	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9399075	Dissolved Barium (Ba)	2019/05/01	84	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9399075	Dissolved Beryllium (Be)	2019/05/01	81	80 - 120	111	80 - 120	<0.000010	mg/L	NC	20
9399075	Dissolved Bismuth (Bi)	2019/05/01	126 (1)	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9399075	Dissolved Boron (B)	2019/05/01	101	80 - 120	115	80 - 120	<0.010	mg/L	NC	20
9399075	Dissolved Cadmium (Cd)	2019/05/01	87	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9399075	Dissolved Chromium (Cr)	2019/05/01	98	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9399075	Dissolved Cobalt (Co)	2019/05/01	100	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9399075	Dissolved Copper (Cu)	2019/05/01	102	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9399075	Dissolved Iron (Fe)	2019/05/01	88	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
9399075	Dissolved Lead (Pb)	2019/05/01	84	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9399075	Dissolved Lithium (Li)	2019/05/01	88	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
9399075	Dissolved Manganese (Mn)	2019/05/01	101	80 - 120	102	80 - 120	<0.000050	mg/L	9.0	20
9399075	Dissolved Molybdenum (Mo)	2019/05/01	85	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9399075	Dissolved Nickel (Ni)	2019/05/01	101	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9399075	Dissolved Selenium (Se)	2019/05/01	92	80 - 120	92	80 - 120	<0.000040	mg/L	NC	20
9399075	Dissolved Silicon (Si)	2019/05/01	76 (1)	80 - 120	80	80 - 120	<0.050	mg/L	NC	20
9399075	Dissolved Silver (Ag)	2019/05/01	112	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9399075	Dissolved Strontium (Sr)	2019/05/01	103	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9399075	Dissolved Thallium (Tl)	2019/05/01	80	80 - 120	100	80 - 120	<0.0000020	mg/L	NC	20
9399075	Dissolved Tin (Sn)	2019/05/01	87	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9399075	Dissolved Titanium (Ti)	2019/05/01	110	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
9399075	Dissolved Uranium (U)	2019/05/01	84	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9399075	Dissolved Vanadium (V)	2019/05/01	102	80 - 120	104	80 - 120	<0.00020	mg/L	NC	20
9399075	Dissolved Zinc (Zn)	2019/05/01	113	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9399075	Dissolved Zirconium (Zr)	2019/05/01	92	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9407188	Alkalinity (PP as CaCO3)	2019/05/07					<0.50	mg/L		
9407188	Alkalinity (Total as CaCO3)	2019/05/07	NC	80 - 120	94	80 - 120	<0.50	mg/L		
9407188	Bicarbonate (HCO3)	2019/05/07					<0.50	mg/L		
9407188	Carbonate (CO3)	2019/05/07					<0.50	mg/L		
9407188	Hydroxide (OH)	2019/05/07					<0.50	mg/L		

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9407751	Dissolved Chloride (Cl)	2019/05/07			104	80 - 120	<0.50	mg/L		
9407755	Dissolved Sulphate (SO4)	2019/05/07			98	80 - 120	<0.50	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

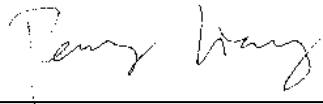
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Method blank result is $< 2 \times \text{RDL}$.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Harry (Peng) Liang, Senior Analyst



Rob Reinert, B.Sc., Scientific Spécialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required											
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS											
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days											
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02												
Phone:		Phone:	(867) 668-6463 yfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah												
Email:		Email:	agault@alexcoresource.com kpiecowye@contangostrategies.com	Site #:													
				Sampled By:		Date Required:											
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA												LABORATORY USE ONLY CUSTODY SEAL Y / N COOLER TEMPERATURES Present Intact 8.5.8 1.1.3 COOLING MEDIA PRESENT COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																	
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	
1	Trial #1	23-Apr-19	9:30AM	Water	X	X	X	X	X	X	X	X	X	X	10		Received in Saskatoon By: [Signature] APR 23 2019 13:47 Temp: 11/12/18 13/16/16
2	Trial #2	23-Apr-19	10:15AM	Water	X	X	X	X	X	X	X	X	X	X	10		
3	Trial #3	23-Apr-19	10:30AM	Water	X	X	X	X	X	X	X	X	X	X	10		
4	Trial #4	23-Apr-19	10:45AM	Water	X	X	X	X	X	X	X	X	X	X	10		
5	Trial #5	23-Apr-19	11:55 PM	Water	X	X	X	X	X	X	X	X	X	X	10		
6	Trial #6	23-Apr-19	11:30AM	Water	X	X	X	X	X	X	X	X	X	X	10		
7	Trial #7	23-Apr-19	11:45AM	Water	X	X	X	X	X	X	X	X	X	X	10		
8	Trial #8	23-Apr-19	12:00PM	Water	X	X	X	X	X	X	X	X	X	X	10		
9																	
10																	
REUNQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)										
[Signature] Kristen Piecowye		2019/04/23	13:48	[Signature] BRITTANY BAYLONE		2019/04/24	08:20										



B929878_COC

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1of1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/05/17
Report #: R2724413
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B934243

Received: 2019/05/07, 14:34

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	8	N/A	2019/05/13	AB SOP-00005	SM 23 2310 B m
Alkalinity - Low Level	8	N/A	2019/05/13	AB SOP-00005	SM 23 2320 B m
Chloride - Low Level	8	N/A	2019/05/13	AB SOP-00020	SM 23-4500-Cl-E m
Carbon (DOC) (2)	8	N/A	2019/05/13	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level	8	N/A	2019/05/13	AB SOP-00005	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/05/09	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/05/13		Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	8	N/A	2019/05/13		Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/05/13		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/05/13		Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	7	N/A	2019/05/11	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Low Level (dissolved) (1)	1	N/A	2019/05/13	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/05/13		Auto Calc
Elements by ICPMS Low Level (total) (1)	8	N/A	2019/05/11	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/05/08	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate and Nitrite - Low Level	8	N/A	2019/05/13		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	8	N/A	2019/05/13		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	8	N/A	2019/05/11	AB SOP-00023	SM 23 4110 B m
Filter and HNO ₃ Preserve for Metals (1)	8	N/A	2019/05/09	BBY7 WI-00004	SM 23 3030B m
Orthophosphate by Konelab (low level)	8	N/A	2019/05/10	AB SOP-00025	SM 23 4500-P A, F m
Total Sulphide	8	N/A	2019/05/13	AB SOP-00080	SM 23 4500 S2-A D Fm
Sulphate - Low Level	8	N/A	2019/05/13	AB SOP-00018	SM 23 4500-SO4 E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1of1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/05/17
Report #: R2724413
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B934243

Received: 2019/05/07, 14:34

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: smaiter@maxxam.ca

Phone# (403) 291-3077

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VQ3758			VQ3759		VQ3760		VQ3761		
Sampling Date		2019/05/07 10:20			2019/05/07 10:40		2019/05/07 10:50		2019/05/07 11:05		
COC Number		1of1			1of1		1of1		1of1		
	UNITS	TRIAL #1	RDL	QC Batch	TRIAL #2	RDL	TRIAL #3	RDL	TRIAL #4	RDL	QC Batch

Calculated Parameters

Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		FIELD		FIELD		ONSITE
Dissolved Nitrate (NO3)	mg/L	2.2	0.013	9408829	1.0	0.013	6.2	0.013	2.3	0.013	9408829
Nitrate plus Nitrite (N)	mg/L	2.3	0.0042	9408839	0.34	0.0042	1.4	0.0042	0.62	0.0042	9408839
Dissolved Nitrite (NO2)	mg/L	6.0	0.0099	9408829	0.38	0.0099	<0.0099	0.0099	0.33	0.0099	9408829
Sulphide (as H2S)	mg/L	0.0030	0.0020	9408797	0.0040	0.0020	<0.0020	0.0020	<0.0020	0.0020	9408797

Misc. Inorganics

Fluoride (F)	mg/L	0.632	0.010	9414920	0.640	0.010	0.555	0.010	0.538	0.010	9414920
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9411529	<0.050	0.050	0.057	0.050	<0.050	0.050	9411529
Dissolved Organic Carbon (C)	mg/L	4.0	0.50	9412800	3.9	0.50	4.9	0.50	4.8	0.50	9412800
Acidity (pH 4.5)	mg/L	<1.0	1.0	9414771	<1.0	1.0	<1.0	1.0	<1.0	1.0	9414771
Alkalinity (Total as CaCO3)	mg/L	63.4	0.50	9414917	81.5	0.50	91.0	0.50	95.4	0.50	9414917
Acidity (pH 8.3)	mg/L	6.8	1.0	9414771	6.6	1.0	5.3	1.0	8.4	1.0	9414771
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9414917	<0.50	0.50	<0.50	0.50	<0.50	0.50	9414917
Bicarbonate (HCO3)	mg/L	77.3	0.50	9414917	99.5	0.50	111	0.50	116	0.50	9414917
Carbonate (CO3)	mg/L	<0.50	0.50	9414917	<0.50	0.50	<0.50	0.50	<0.50	0.50	9414917
Hydroxide (OH)	mg/L	<0.50	0.50	9414917	<0.50	0.50	<0.50	0.50	<0.50	0.50	9414917

Anions

Orthophosphate (P)	mg/L	1.2 (1)	0.10	9413180	1.2 (1)	0.10	0.48 (1)	0.025	0.55	0.025	9413096
Dissolved Sulphate (SO4)	mg/L	231 (1)	1.0	9415373	226 (1)	1.0	210 (1)	1.0	216 (1)	1.0	9415373
Total Sulphide	mg/L	0.0030	0.0019	9414697	0.0035	0.0019	<0.0019	0.0019	<0.0019	0.0019	9414697
Dissolved Chloride (Cl)	mg/L	61	0.50	9415372	61	0.50	54	0.50	60	0.50	9415372

Nutrients

Total Ammonia (N)	mg/L	0.50 (1)	0.010	9409250	2.1 (1)	0.025	0.47 (1)	0.010	1.6 (1)	0.025	9409250
Dissolved Nitrite (N)	mg/L	1.8	0.0030	9413251	0.11	0.0030	<0.0030	0.0030	0.10	0.0030	9413251
Dissolved Nitrate (N)	mg/L	0.50	0.0030	9413251	0.23	0.0030	1.4	0.0030	0.52	0.0030	9413251

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VQ3762		VQ3763			VQ3764		
Sampling Date		2019/05/07 13:50		2019/05/07 11:30			2019/05/07 12:30		
COC Number		1of1		1of1			1of1		
	UNITS	TRIAL #5	RDL	TRIAL #6	RDL	QC Batch	TRIAL #7	RDL	QC Batch
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD		FIELD		ONSITE	FIELD		ONSITE
Dissolved Nitrate (NO3)	mg/L	<0.013	0.013	0.014	0.013	9408829	4.9	0.013	9408829
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	0.14	0.0042	9408839	1.1	0.0042	9408839
Dissolved Nitrite (NO2)	mg/L	0.014	0.0099	0.45	0.0099	9408829	<0.0099	0.0099	9408829
Sulphide (as H2S)	mg/L	<0.0020	0.0020	0.24	0.0020	9408797	<0.0020	0.0020	9408797
Misc. Inorganics									
Fluoride (F)	mg/L	0.686	0.010	0.689	0.010	9414920	0.660	0.010	9414920
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.059	0.050	<0.050	0.050	9411529	0.091	0.050	9411529
Dissolved Organic Carbon (C)	mg/L	6.5	0.50	4.1	0.50	9412818	2.5	0.50	9412800
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	9414771	<1.0	1.0	9414771
Alkalinity (Total as CaCO3)	mg/L	86.6	0.50	80.9	0.50	9414917	81.3	0.50	9414917
Acidity (pH 8.3)	mg/L	8.9	1.0	4.4	1.0	9414771	2.6	1.0	9414771
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	9414917	<0.50	0.50	9414917
Bicarbonate (HCO3)	mg/L	106	0.50	98.6	0.50	9414917	99.2	0.50	9414917
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	9414917	<0.50	0.50	9414917
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	9414917	<0.50	0.50	9414917
Anions									
Orthophosphate (P)	mg/L	0.83 (1)	0.050	1.1 (1)	0.10	9413096	0.0076	0.0010	9413096
Dissolved Sulphate (SO4)	mg/L	226 (1)	1.0	223 (1)	1.0	9415373	223 (1)	1.0	9415373
Total Sulphide	mg/L	<0.0019	0.0019	0.22	0.0019	9414697	<0.0019	0.0019	9414697
Dissolved Chloride (Cl)	mg/L	58	0.50	58	0.50	9415372	60	0.50	9415372
Nutrients									
Total Ammonia (N)	mg/L	0.96 (1)	0.010	1.8 (1)	0.025	9409250	0.054	0.0050	9409250
Dissolved Nitrite (N)	mg/L	0.0042	0.0030	0.14	0.0030	9413251	<0.0030	0.0030	9413251
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	0.0032	0.0030	9413251	1.1	0.0030	9413251
RDL = Reportable Detection Limit									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VQ3765		
Sampling Date		2019/05/07 12:45		
COC Number		1of1		
	UNITS	TRIAL #8	RDL	QC Batch
Calculated Parameters				
Filter and HNO3 Preservation	N/A	FIELD		ONSITE
Dissolved Nitrate (NO3)	mg/L	1.3	0.013	9408829
Nitrate plus Nitrite (N)	mg/L	0.30	0.0042	9408839
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9408829
Sulphide (as H2S)	mg/L	<0.0020	0.0020	9408797
Misc. Inorganics				
Fluoride (F)	mg/L	0.531	0.010	9414920
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9411529
Dissolved Organic Carbon (C)	mg/L	3.5	0.50	9412818
Acidity (pH 4.5)	mg/L	<1.0	1.0	9414771
Alkalinity (Total as CaCO3)	mg/L	83.7	0.50	9414917
Acidity (pH 8.3)	mg/L	4.2	1.0	9414771
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9414917
Bicarbonate (HCO3)	mg/L	102	0.50	9414917
Carbonate (CO3)	mg/L	<0.50	0.50	9414917
Hydroxide (OH)	mg/L	<0.50	0.50	9414917
Anions				
Orthophosphate (P)	mg/L	0.0016	0.0010	9413096
Dissolved Sulphate (SO4)	mg/L	215 (1)	1.0	9415373
Total Sulphide	mg/L	<0.0019	0.0019	9414697
Dissolved Chloride (Cl)	mg/L	61	0.50	9415372
Nutrients				
Total Ammonia (N)	mg/L	0.015	0.0050	9409250
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9413251
Dissolved Nitrate (N)	mg/L	0.30	0.0030	9413251
RDL = Reportable Detection Limit (1) Detection limits raised due to dilution to bring analyte within the calibrated range.				

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VQ3758		VQ3759		VQ3760		
Sampling Date		2019/05/07 10:20		2019/05/07 10:40		2019/05/07 10:50		
COC Number		1of1		1of1		1of1		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	347	9408804	346	9408804	334	0.50	9408804
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00385	9413289	0.00294	9413289	0.00071	0.00050	9413289
Dissolved Antimony (Sb)	mg/L	0.00396	9413289	0.00314	9413289	0.00948	0.000020	9413289
Dissolved Arsenic (As)	mg/L	0.0421	9413289	0.0433	9413289	0.0253	0.000020	9413289
Dissolved Barium (Ba)	mg/L	0.0627	9413289	0.0652	9413289	0.106	0.000020	9413289
Dissolved Beryllium (Be)	mg/L	<0.000010	9413289	<0.000010	9413289	<0.000010	0.000010	9413289
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9413289	<0.0000050	9413289	<0.0000050	0.0000050	9413289
Dissolved Boron (B)	mg/L	0.035	9413289	0.036	9413289	0.031	0.010	9413289
Dissolved Cadmium (Cd)	mg/L	0.0000360	9413289	0.0000250	9413289	0.0000210	0.0000050	9413289
Dissolved Chromium (Cr)	mg/L	0.00011	9413289	<0.00010	9413289	<0.00010	0.00010	9413289
Dissolved Cobalt (Co)	mg/L	0.00290	9413289	0.00331	9413289	0.00128	0.0000050	9413289
Dissolved Copper (Cu)	mg/L	0.000413	9413289	0.000327	9413289	0.000382	0.000050	9413289
Dissolved Iron (Fe)	mg/L	0.0593	9413289	0.0764	9413289	0.0234	0.0010	9413289
Dissolved Lead (Pb)	mg/L	0.000811	9413289	0.000259	9413289	0.0000270	0.0000050	9413289
Dissolved Lithium (Li)	mg/L	0.0120	9413289	0.0125	9413289	0.00948	0.00050	9413289
Dissolved Manganese (Mn)	mg/L	0.0919	9413289	0.120	9413289	0.824	0.000050	9413289
Dissolved Molybdenum (Mo)	mg/L	0.00169	9413289	0.00125	9413289	0.00254	0.000050	9413289
Dissolved Nickel (Ni)	mg/L	0.00958	9413289	0.00996	9413289	0.00494	0.000020	9413289
Dissolved Selenium (Se)	mg/L	0.00270	9413289	0.00321	9413289	0.00202	0.000040	9413289
Dissolved Silicon (Si)	mg/L	0.943	9413289	0.937	9413289	1.98	0.050	9413289
Dissolved Silver (Ag)	mg/L	<0.0000050	9413289	<0.0000050	9413289	<0.0000050	0.0000050	9413289
Dissolved Strontium (Sr)	mg/L	0.517	9413289	0.550	9413289	0.508	0.000050	9413289
Dissolved Thallium (Tl)	mg/L	0.0000780	9420789	0.000122	9413289	0.0000160	0.0000020	9413289
Dissolved Tin (Sn)	mg/L	<0.00020	9413289	<0.00020	9413289	<0.00020	0.00020	9413289
Dissolved Titanium (Ti)	mg/L	<0.00050	9413289	<0.00050	9413289	<0.00050	0.00050	9413289
Dissolved Uranium (U)	mg/L	0.0267	9413289	0.0260	9413289	0.0162	0.0000020	9413289
Dissolved Vanadium (V)	mg/L	0.00025	9420789	0.00045	9413289	0.00071	0.00020	9420789
Dissolved Zinc (Zn)	mg/L	0.0536	9413289	0.0151	9413289	0.0195	0.00010	9413289
Dissolved Zirconium (Zr)	mg/L	<0.00010	9413289	<0.00010	9413289	0.00012	0.00010	9413289
Dissolved Calcium (Ca)	mg/L	111	9408818	109	9408818	108	0.050	9408818
Dissolved Magnesium (Mg)	mg/L	17.1	9408818	17.7	9408818	15.9	0.050	9408818
RDL = Reportable Detection Limit								

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VQ3758		VQ3759		VQ3760		
Sampling Date		2019/05/07 10:20		2019/05/07 10:40		2019/05/07 10:50		
COC Number		1of1		1of1		1of1		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.50	9408818	7.49	9408818	6.99	0.050	9408818
Dissolved Sodium (Na)	mg/L	25.4	9408818	25.8	9408818	24.3	0.050	9408818
Dissolved Sulphur (S)	mg/L	83.3	9408818	84.7	9408818	75.5	3.0	9408818
RDL = Reportable Detection Limit								

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VQ3761		VQ3762	VQ3763		
Sampling Date		2019/05/07 11:05		2019/05/07 13:50	2019/05/07 11:30		
COC Number		1of1		1of1	1of1		
	UNITS	TRIAL #4	QC Batch	TRIAL #5	TRIAL #6	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	341	9408804	349	338	0.50	9408804
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00342	9414912	0.0106	0.00204	0.00050	9413289
Dissolved Antimony (Sb)	mg/L	0.00567	9414912	0.0196	0.0348	0.000020	9413289
Dissolved Arsenic (As)	mg/L	0.0230	9414912	0.0490	0.322	0.000020	9413289
Dissolved Barium (Ba)	mg/L	0.130	9414912	0.0638	0.0904	0.000020	9413289
Dissolved Beryllium (Be)	mg/L	<0.000010	9414912	<0.000010	<0.000010	0.000010	9413289
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9414912	<0.0000050	<0.0000050	0.0000050	9413289
Dissolved Boron (B)	mg/L	0.034	9414912	0.036	0.036	0.010	9413289
Dissolved Cadmium (Cd)	mg/L	0.0000230	9414912	0.00115	0.000489	0.0000050	9413289
Dissolved Chromium (Cr)	mg/L	<0.00010	9414912	0.00011	<0.00010	0.00010	9413289
Dissolved Cobalt (Co)	mg/L	0.00150	9414912	0.00367	0.0146	0.0000050	9413289
Dissolved Copper (Cu)	mg/L	0.000260	9414912	0.00191	0.00116	0.000050	9413289
Dissolved Iron (Fe)	mg/L	0.0828	9414912	0.0371	0.0836	0.0010	9413289
Dissolved Lead (Pb)	mg/L	0.0000920	9414912	0.00412	0.00153	0.0000050	9413289
Dissolved Lithium (Li)	mg/L	0.00941	9414912	0.0119	0.0123	0.00050	9413289
Dissolved Manganese (Mn)	mg/L	1.01	9414912	0.0923	0.0697	0.000050	9413289
Dissolved Molybdenum (Mo)	mg/L	0.00239	9414912	0.00189	0.00164	0.000050	9413289
Dissolved Nickel (Ni)	mg/L	0.00480	9414912	0.0122	0.0632	0.000020	9413289
Dissolved Selenium (Se)	mg/L	0.00225	9414912	0.00996	0.0142	0.000040	9413289
Dissolved Silicon (Si)	mg/L	1.94	9414912	0.872	1.03	0.050	9413289
Dissolved Silver (Ag)	mg/L	<0.0000050	9414912	<0.0000050	<0.0000050	0.0000050	9413289
Dissolved Strontium (Sr)	mg/L	0.542	9414912	0.588	0.601	0.000050	9413289
Dissolved Thallium (Tl)	mg/L	0.0000070	9414912	0.000217	0.000113	0.0000020	9413289
Dissolved Tin (Sn)	mg/L	<0.00020	9414912	<0.00020	<0.00020	0.00020	9413289
Dissolved Titanium (Ti)	mg/L	0.00070	9414912	<0.00050	<0.00050	0.00050	9413289
Dissolved Uranium (U)	mg/L	0.0125	9414912	0.0262	0.167	0.0000020	9413289
Dissolved Vanadium (V)	mg/L	0.00058	9414912	0.00035	0.00037	0.00020	9413289
Dissolved Zinc (Zn)	mg/L	0.0101	9414912	0.330	0.0729	0.00010	9413289
Dissolved Zirconium (Zr)	mg/L	0.00073	9420789	0.00018	<0.00010	0.00010	9413289
Dissolved Calcium (Ca)	mg/L	109	9408818	111	108	0.050	9408818
Dissolved Magnesium (Mg)	mg/L	16.6	9408818	17.3	16.6	0.050	9408818
RDL = Reportable Detection Limit							

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VQ3761		VQ3762	VQ3763		
Sampling Date		2019/05/07 11:05		2019/05/07 13:50	2019/05/07 11:30		
COC Number		1of1		1of1	1of1		
	UNITS	TRIAL #4	QC Batch	TRIAL #5	TRIAL #6	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.24	9408818	6.62	7.93	0.050	9408818
Dissolved Sodium (Na)	mg/L	25.5	9408818	25.5	25.2	0.050	9408818
Dissolved Sulphur (S)	mg/L	81.4	9408818	86.6	81.9	3.0	9408818
RDL = Reportable Detection Limit							

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VQ3764		VQ3765		
Sampling Date		2019/05/07 12:30		2019/05/07 12:45		
COC Number		1of1		1of1		
	UNITS	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	341	9408804	343	0.50	9408804
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00667	9413289	0.00193	0.00050	9413289
Dissolved Antimony (Sb)	mg/L	0.0262	9413289	0.00955	0.000020	9413289
Dissolved Arsenic (As)	mg/L	0.0332	9413289	0.00335	0.000020	9413289
Dissolved Barium (Ba)	mg/L	0.0890	9413289	0.148	0.000020	9413289
Dissolved Beryllium (Be)	mg/L	<0.000010	9413289	<0.000010	0.000010	9413289
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9413289	<0.0000050	0.0000050	9413289
Dissolved Boron (B)	mg/L	0.036	9413289	0.031	0.010	9413289
Dissolved Cadmium (Cd)	mg/L	0.00346 (1)	9413289	0.000757	0.0000050	9413289
Dissolved Chromium (Cr)	mg/L	<0.00010	9413289	<0.00010	0.00010	9413289
Dissolved Cobalt (Co)	mg/L	0.00171	9413289	0.000106	0.0000050	9413289
Dissolved Copper (Cu)	mg/L	0.00855	9413289	0.00349	0.000050	9413289
Dissolved Iron (Fe)	mg/L	<0.0010	9413289	0.0072	0.0010	9413289
Dissolved Lead (Pb)	mg/L	0.00396	9413289	0.000126	0.0000050	9413289
Dissolved Lithium (Li)	mg/L	0.0128	9413289	0.00912	0.00050	9413289
Dissolved Manganese (Mn)	mg/L	0.0533	9413289	0.484	0.000050	9413289
Dissolved Molybdenum (Mo)	mg/L	0.00297	9413289	0.00269	0.000050	9413289
Dissolved Nickel (Ni)	mg/L	0.00923	9413289	0.00446	0.000020	9413289
Dissolved Selenium (Se)	mg/L	0.0109	9413289	0.00531	0.000040	9413289
Dissolved Silicon (Si)	mg/L	0.888	9413289	1.90	0.050	9413289
Dissolved Silver (Ag)	mg/L	<0.0000050	9413289	<0.0000050	0.0000050	9413289
Dissolved Strontium (Sr)	mg/L	0.667	9413289	0.604	0.000050	9413289
Dissolved Thallium (Tl)	mg/L	0.000463	9413289	0.0000200	0.0000020	9413289
Dissolved Tin (Sn)	mg/L	<0.00020	9413289	<0.00020	0.00020	9413289
Dissolved Titanium (Ti)	mg/L	<0.00050	9413289	<0.00050	0.00050	9413289
Dissolved Uranium (U)	mg/L	0.0413	9413289	0.0220	0.0000020	9413289
Dissolved Vanadium (V)	mg/L	<0.00020	9420789	0.00032	0.00020	9413289
Dissolved Zinc (Zn)	mg/L	0.228	9413289	0.0902	0.00010	9413289
Dissolved Zirconium (Zr)	mg/L	0.00010	9413289	<0.00010	0.00010	9413289
Dissolved Calcium (Ca)	mg/L	108	9408818	111	0.050	9408818
RDL = Reportable Detection Limit						
(1) Dissolved greater than total. Reanalysis yields similar results.						

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VQ3764		VQ3765		
Sampling Date		2019/05/07 12:30		2019/05/07 12:45		
COC Number		1of1		1of1		
	UNITS	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.3	9408818	16.0	0.050	9408818
Dissolved Potassium (K)	mg/L	5.94	9408818	5.02	0.050	9408818
Dissolved Sodium (Na)	mg/L	25.3 (1)	9408818	24.5	0.050	9408818
Dissolved Sulphur (S)	mg/L	79.8	9408818	78.0	3.0	9408818
RDL = Reportable Detection Limit						
(1) Dissolved greater than total. Reanalysis yields similar results.						

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VQ3758	VQ3759	VQ3760	VQ3761	VQ3762		
Sampling Date		2019/05/07 10:20	2019/05/07 10:40	2019/05/07 10:50	2019/05/07 11:05	2019/05/07 13:50		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	354	359	356	352	347	0.50	9408803
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00504	0.00490	0.00170	0.00447	0.0122	0.00050	9413067
Total Antimony (Sb)	mg/L	0.00425	0.00334	0.00978	0.00556	0.0202	0.000020	9413067
Total Arsenic (As)	mg/L	0.0430	0.0438	0.0291	0.0255	0.0486	0.000020	9413067
Total Barium (Ba)	mg/L	0.0627	0.0673	0.112	0.136	0.0655	0.000020	9413067
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9413067
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9413067
Total Boron (B)	mg/L	0.037	0.037	0.033	0.034	0.037	0.010	9413067
Total Cadmium (Cd)	mg/L	0.0000900	0.0000580	0.0000380	0.0000430	0.00273	0.0000050	9413067
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9413067
Total Cobalt (Co)	mg/L	0.00289	0.00321	0.00131	0.00144	0.00361	0.0000050	9413067
Total Copper (Cu)	mg/L	0.000840	0.00101	0.000598	0.000371	0.0117	0.000050	9413067
Total Iron (Fe)	mg/L	0.0935	0.159	0.315	0.340	0.0335	0.0010	9413067
Total Lead (Pb)	mg/L	0.00163	0.000799	0.000772	0.00108	0.00842	0.0000050	9413067
Total Lithium (Li)	mg/L	0.0133	0.0130	0.0103	0.0102	0.0129	0.00050	9413067
Total Manganese (Mn)	mg/L	0.0923	0.123	0.842	1.01	0.0908	0.000050	9413067
Total Molybdenum (Mo)	mg/L	0.00173	0.00127	0.00262	0.00235	0.00188	0.000050	9413067
Total Nickel (Ni)	mg/L	0.00947	0.00964	0.00485	0.00461	0.0119	0.000020	9413067
Total Selenium (Se)	mg/L	0.00323	0.00375	0.00216	0.00248	0.00950	0.000040	9413067
Total Silicon (Si)	mg/L	1.03 (1)	1.00	2.11	2.13	0.886	0.050	9413067
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9413067
Total Strontium (Sr)	mg/L	0.536	0.559	0.533	0.596	0.601	0.000050	9413067
Total Thallium (Tl)	mg/L	0.0000620	0.000129	0.0000210	0.0000150	0.000243	0.0000020	9413067
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9413067
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9413067
Total Uranium (U)	mg/L	0.0277	0.0256	0.0169	0.0125	0.0245	0.0000020	9413067
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00032	0.00024	<0.00020	0.00020	9413067
Total Zinc (Zn)	mg/L	0.0596	0.0177	0.0223	0.0116	0.334	0.00010	9413067
Total Zirconium (Zr)	mg/L	0.00016	0.00014	0.00019	0.00024	0.00016	0.00010	9413067
Total Calcium (Ca)	mg/L	113	115	115	113	110	0.050	9408823

RDL = Reportable Detection Limit

(1) Matrix Spike outside acceptance criteria due to sample matrix interference.

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VQ3758	VQ3759	VQ3760	VQ3761	VQ3762		
Sampling Date		2019/05/07 10:20	2019/05/07 10:40	2019/05/07 10:50	2019/05/07 11:05	2019/05/07 13:50		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Magnesium (Mg)	mg/L	17.6	17.7	16.7	16.6	17.5	0.050	9408823
Total Potassium (K)	mg/L	7.66	7.40	7.19	7.33	6.76	0.050	9408823
Total Sodium (Na)	mg/L	26.0	25.7	25.5	25.5	25.8	0.050	9408823
Total Sulphur (S)	mg/L	88.7	87.6	81.3	83.4	87.5	3.0	9408823
RDL = Reportable Detection Limit								

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VQ3763	VQ3764	VQ3765		
Sampling Date		2019/05/07 11:30	2019/05/07 12:30	2019/05/07 12:45		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	343	356	353	0.50	9408803
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00302	0.0149	0.0181	0.00050	9413067
Total Antimony (Sb)	mg/L	0.0472	0.0273	0.0101	0.000020	9413067
Total Arsenic (As)	mg/L	0.354	0.0340	0.00561	0.000020	9413067
Total Barium (Ba)	mg/L	0.0942	0.0915	0.153	0.000020	9413067
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9413067
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000120	0.0000050	9413067
Total Boron (B)	mg/L	0.038	0.038	0.033	0.010	9413067
Total Cadmium (Cd)	mg/L	0.00301	0.00360	0.000806	0.0000050	9413067
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9413067
Total Cobalt (Co)	mg/L	0.0152	0.00172	0.000120	0.0000050	9413067
Total Copper (Cu)	mg/L	0.00644	0.00873	0.00351	0.000050	9413067
Total Iron (Fe)	mg/L	0.129	0.0107	0.103	0.0010	9413067
Total Lead (Pb)	mg/L	0.00787	0.00487	0.00146	0.0000050	9413067
Total Lithium (Li)	mg/L	0.0134	0.0138	0.00997	0.00050	9413067
Total Manganese (Mn)	mg/L	0.0712	0.0540	0.488	0.000050	9413067
Total Molybdenum (Mo)	mg/L	0.00169	0.00185	0.00271	0.000050	9413067
Total Nickel (Ni)	mg/L	0.0643	0.00916	0.00435	0.000020	9413067
Total Selenium (Se)	mg/L	0.0164	0.0119	0.00563	0.000040	9413067
Total Silicon (Si)	mg/L	1.08	0.998	2.10	0.050	9413067
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9413067
Total Strontium (Sr)	mg/L	0.626	0.688	0.626	0.000050	9413067
Total Thallium (Tl)	mg/L	0.000288	0.000352	0.0000550	0.0000020	9413067
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9413067
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9413067
Total Uranium (U)	mg/L	0.172	0.0418	0.0221	0.0000020	9413067
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9413067
Total Zinc (Zn)	mg/L	0.339	0.235	0.0924	0.00010	9413067
Total Zirconium (Zr)	mg/L	0.00011	0.00014	0.00041	0.00010	9413067
Total Calcium (Ca)	mg/L	109	113	114	0.050	9408823
Total Magnesium (Mg)	mg/L	17.4	18.0	16.4	0.050	9408823
RDL = Reportable Detection Limit						

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VQ3763	VQ3764	VQ3765		
Sampling Date		2019/05/07 11:30	2019/05/07 12:30	2019/05/07 12:45		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	8.23	6.09	5.06	0.050	9408823
Total Sodium (Na)	mg/L	26.5	26.5	25.1	0.050	9408823
Total Sulphur (S)	mg/L	87.7	86.7	82.4	3.0	9408823
RDL = Reportable Detection Limit						

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	11.0°C
Package 2	12.3°C

Sample VQ3758, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VQ3760, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VQ3761, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VQ3764, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9409250	Total Ammonia (N)	2019/05/08	NC	80 - 120	101	80 - 120	<0.0050	mg/L	0.75	20
9411529	HCl Preserved Iron (Fe+2 Ferrous)	2019/05/09	99	80 - 120	100	90 - 110	<0.050	mg/L	NC	20
9412800	Dissolved Organic Carbon (C)	2019/05/13	NC	80 - 120	108	80 - 120	<0.50	mg/L	0.71	20
9412818	Dissolved Organic Carbon (C)	2019/05/13	100	80 - 120	105	80 - 120	<0.50	mg/L	NC	20
9413067	Total Aluminum (Al)	2019/05/11	107	80 - 120	103	80 - 120	<0.00050	mg/L	2.6	20
9413067	Total Antimony (Sb)	2019/05/11	101	80 - 120	100	80 - 120	<0.000020	mg/L	2.4	20
9413067	Total Arsenic (As)	2019/05/11	110	80 - 120	103	80 - 120	<0.000020	mg/L	0.62	20
9413067	Total Barium (Ba)	2019/05/11	NC	80 - 120	102	80 - 120	<0.000020	mg/L	1.2	20
9413067	Total Beryllium (Be)	2019/05/11	105	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9413067	Total Bismuth (Bi)	2019/05/11	99	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9413067	Total Boron (B)	2019/05/11	101	80 - 120	99	80 - 120	<0.010	mg/L	3.2	20
9413067	Total Cadmium (Cd)	2019/05/11	102	80 - 120	100	80 - 120	<0.0000050	mg/L	0	20
9413067	Total Chromium (Cr)	2019/05/11	100	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9413067	Total Cobalt (Co)	2019/05/11	100	80 - 120	97	80 - 120	<0.0000050	mg/L	0.56	20
9413067	Total Copper (Cu)	2019/05/11	92	80 - 120	95	80 - 120	<0.000050	mg/L	5.0	20
9413067	Total Iron (Fe)	2019/05/11	104	80 - 120	104	80 - 120	<0.0010	mg/L	1.8	20
9413067	Total Lead (Pb)	2019/05/11	103	80 - 120	103	80 - 120	<0.0000050	mg/L	1.6	20
9413067	Total Lithium (Li)	2019/05/11	103	80 - 120	102	80 - 120	<0.00050	mg/L	0.90	20
9413067	Total Manganese (Mn)	2019/05/11	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.13	20
9413067	Total Molybdenum (Mo)	2019/05/11	108	80 - 120	100	80 - 120	<0.000050	mg/L	2.2	20
9413067	Total Nickel (Ni)	2019/05/11	94	80 - 120	97	80 - 120	<0.000020	mg/L	1.7	20
9413067	Total Selenium (Se)	2019/05/11	109	80 - 120	101	80 - 120	<0.000040	mg/L	1.3	20
9413067	Total Silicon (Si)	2019/05/11	54 (1)	80 - 120	100	80 - 120	<0.050	mg/L	1.3	20
9413067	Total Silver (Ag)	2019/05/11	83	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9413067	Total Strontium (Sr)	2019/05/11	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.63	20
9413067	Total Thallium (Tl)	2019/05/11	100	80 - 120	102	80 - 120	<0.0000020	mg/L	19	20
9413067	Total Tin (Sn)	2019/05/11	104	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9413067	Total Titanium (Ti)	2019/05/11	109	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9413067	Total Uranium (U)	2019/05/11	104	80 - 120	102	80 - 120	<0.0000020	mg/L	0.41	20
9413067	Total Vanadium (V)	2019/05/11	102	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9413067	Total Zinc (Zn)	2019/05/11	NC	80 - 120	99	80 - 120	<0.00010	mg/L	0.45	20
9413067	Total Zirconium (Zr)	2019/05/11	113	80 - 120	102	80 - 120	<0.00010	mg/L	17	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9413096	Orthophosphate (P)	2019/05/10	104	80 - 120	94	80 - 120	<0.0010	mg/L	1.9	20
9413180	Orthophosphate (P)	2019/05/10	81	80 - 120	95	80 - 120	<0.0010	mg/L	NC	20
9413251	Dissolved Nitrate (N)	2019/05/11	102	80 - 120	100	80 - 120	<0.0030	mg/L	2.4	20
9413251	Dissolved Nitrite (N)	2019/05/11	101	80 - 120	99	80 - 120	<0.0030	mg/L	0.077	20
9413289	Dissolved Aluminum (Al)	2019/05/11	100	80 - 120	103	80 - 120	<0.00050	mg/L	2.5	20
9413289	Dissolved Antimony (Sb)	2019/05/11	99	80 - 120	97	80 - 120	<0.000020	mg/L	1.8	20
9413289	Dissolved Arsenic (As)	2019/05/11	104	80 - 120	104	80 - 120	0.000021, RDL=0.000020 (2)	mg/L	0.30	20
9413289	Dissolved Barium (Ba)	2019/05/11	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.37	20
9413289	Dissolved Beryllium (Be)	2019/05/11	100	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9413289	Dissolved Bismuth (Bi)	2019/05/11	98	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9413289	Dissolved Boron (B)	2019/05/11	98	80 - 120	100	80 - 120	<0.010	mg/L	2.0	20
9413289	Dissolved Cadmium (Cd)	2019/05/11	97	80 - 120	98	80 - 120	<0.0000050	mg/L	8.7	20
9413289	Dissolved Chromium (Cr)	2019/05/11	97	80 - 120	98	80 - 120	<0.00010	mg/L	7.7	20
9413289	Dissolved Cobalt (Co)	2019/05/11	94	80 - 120	97	80 - 120	<0.0000050	mg/L	0.14	20
9413289	Dissolved Copper (Cu)	2019/05/11	89	80 - 120	95	80 - 120	<0.000050	mg/L	1.2	20
9413289	Dissolved Iron (Fe)	2019/05/11	103	80 - 120	104	80 - 120	<0.0010	mg/L	1.8	20
9413289	Dissolved Lead (Pb)	2019/05/11	102	80 - 120	101	80 - 120	<0.0000050	mg/L	0.37	20
9413289	Dissolved Lithium (Li)	2019/05/11	97	80 - 120	101	80 - 120	<0.00050	mg/L	2.0	20
9413289	Dissolved Manganese (Mn)	2019/05/11	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.095	20
9413289	Dissolved Molybdenum (Mo)	2019/05/11	105	80 - 120	99	80 - 120	<0.000050	mg/L	1.1	20
9413289	Dissolved Nickel (Ni)	2019/05/11	91	80 - 120	97	80 - 120	<0.000020	mg/L	0.74	20
9413289	Dissolved Selenium (Se)	2019/05/11	102	80 - 120	100	80 - 120	<0.000040	mg/L	1.3	20
9413289	Dissolved Silicon (Si)	2019/05/11	93	80 - 120	103	80 - 120	<0.050	mg/L	3.7	20
9413289	Dissolved Silver (Ag)	2019/05/11	96	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9413289	Dissolved Strontium (Sr)	2019/05/11	NC	80 - 120	102	80 - 120	<0.000050	mg/L	1.5	20
9413289	Dissolved Thallium (Tl)	2019/05/11	97	80 - 120	102	80 - 120	0.0000030, RDL=0.0000020 (3)	mg/L		
9413289	Dissolved Tin (Sn)	2019/05/11	99	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9413289	Dissolved Titanium (Ti)	2019/05/11	102	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9413289	Dissolved Uranium (U)	2019/05/11	102	80 - 120	100	80 - 120	0.0000030, RDL=0.0000020 (4)	mg/L	0.52	20
9413289	Dissolved Vanadium (V)	2019/05/11	98	80 - 120	96	80 - 120	<0.00020	mg/L		
9413289	Dissolved Zinc (Zn)	2019/05/11	NC	80 - 120	100	80 - 120	<0.00010	mg/L	0.12	20
9413289	Dissolved Zirconium (Zr)	2019/05/11	108	80 - 120	103	80 - 120	<0.00010	mg/L	12	20
9414697	Total Sulphide	2019/05/13			110	80 - 120	<0.0019	mg/L	NC	20
9414771	Acidity (pH 4.5)	2019/05/13					<1.0	mg/L	NC	20
9414771	Acidity (pH 8.3)	2019/05/13			97	80 - 120	<1.0	mg/L	13	20
9414912	Dissolved Aluminum (Al)	2019/05/13	101	80 - 120	98	80 - 120	<0.00050	mg/L	3.8	20
9414912	Dissolved Antimony (Sb)	2019/05/13	103	80 - 120	100	80 - 120	<0.000020	mg/L	10	20
9414912	Dissolved Arsenic (As)	2019/05/13	107	80 - 120	97	80 - 120	<0.000020	mg/L	2.5	20
9414912	Dissolved Barium (Ba)	2019/05/13	NC	80 - 120	99	80 - 120	<0.000020	mg/L	1.3	20
9414912	Dissolved Beryllium (Be)	2019/05/13	100	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
9414912	Dissolved Bismuth (Bi)	2019/05/13	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9414912	Dissolved Boron (B)	2019/05/13	NC	80 - 120	93	80 - 120	<0.010	mg/L	0.86	20
9414912	Dissolved Cadmium (Cd)	2019/05/13	102	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9414912	Dissolved Chromium (Cr)	2019/05/13	98	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9414912	Dissolved Cobalt (Co)	2019/05/13	96	80 - 120	98	80 - 120	<0.0000050	mg/L	1.2	20
9414912	Dissolved Copper (Cu)	2019/05/13	95	80 - 120	98	80 - 120	<0.000050	mg/L	2.2	20
9414912	Dissolved Iron (Fe)	2019/05/13	107	80 - 120	101	80 - 120	<0.0010	mg/L	0.45	20
9414912	Dissolved Lead (Pb)	2019/05/13	101	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9414912	Dissolved Lithium (Li)	2019/05/13	NC	80 - 120	94	80 - 120	<0.00050	mg/L	0.91	20
9414912	Dissolved Manganese (Mn)	2019/05/13	114	80 - 120	100	80 - 120	<0.000050	mg/L	4.2	20
9414912	Dissolved Molybdenum (Mo)	2019/05/13	NC	80 - 120	100	80 - 120	<0.000050	mg/L	2.2	20
9414912	Dissolved Nickel (Ni)	2019/05/13	95	80 - 120	99	80 - 120	<0.000020	mg/L	4.4	20
9414912	Dissolved Selenium (Se)	2019/05/13	108	80 - 120	101	80 - 120	<0.000040	mg/L	NC	20
9414912	Dissolved Silicon (Si)	2019/05/13	99	80 - 120	96	80 - 120	<0.050	mg/L	1.1	20
9414912	Dissolved Silver (Ag)	2019/05/13	86	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9414912	Dissolved Strontium (Sr)	2019/05/13	NC	80 - 120	95	80 - 120	<0.000050	mg/L	1.8	20
9414912	Dissolved Thallium (Tl)	2019/05/13	88	80 - 120	100	80 - 120	<0.0000020	mg/L	NC	20
9414912	Dissolved Tin (Sn)	2019/05/13	101	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9414912	Dissolved Titanium (Ti)	2019/05/13	104	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9414912	Dissolved Uranium (U)	2019/05/13	107	80 - 120	101	80 - 120	<0.0000020	mg/L	2.3	20
9414912	Dissolved Vanadium (V)	2019/05/13	104	80 - 120	99	80 - 120	<0.00020	mg/L	5.5	20
9414912	Dissolved Zinc (Zn)	2019/05/13	99	80 - 120	99	80 - 120	<0.00010	mg/L	7.2	20
9414917	Alkalinity (PP as CaCO ₃)	2019/05/13					<0.50	mg/L	NC	20
9414917	Alkalinity (Total as CaCO ₃)	2019/05/13			99	80 - 120	<0.50	mg/L	3.3	20
9414917	Bicarbonate (HCO ₃)	2019/05/13					<0.50	mg/L	3.3	20
9414917	Carbonate (CO ₃)	2019/05/13					<0.50	mg/L	NC	20
9414917	Hydroxide (OH)	2019/05/13					<0.50	mg/L	NC	20
9414920	Fluoride (F)	2019/05/13	94	80 - 120	92	80 - 120	<0.010	mg/L	0.45	20
9415372	Dissolved Chloride (Cl)	2019/05/13	NC	80 - 120	103	80 - 120	<0.50	mg/L	1.7	20
9415373	Dissolved Sulphate (SO ₄)	2019/05/13	NC	80 - 120	102	95 - 109	<0.50	mg/L	1.1	20
9420789	Dissolved Thallium (Tl)	2019/05/16			101	80 - 120	<0.0000020	mg/L		
9420789	Dissolved Vanadium (V)	2019/05/16			99	80 - 120	<0.00020	mg/L		
9420789	Dissolved Zirconium (Zr)	2019/05/16			99	80 - 120	<0.00010	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Method blank exceeds acceptance limits for As- 2X RDL acceptable for low level metals determination.

(3) Method blank exceeds acceptance limits for Tl- 2X RDL acceptable for low level metals determination.

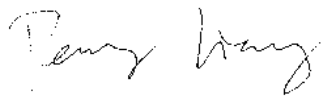
(4) Method blank exceeds acceptance limits for U- 2X RDL acceptable for low level metals determination.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager



Harry (Peng) Liang, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name: BMC MINERALS LTD.		Company Name: ALEXCO ENVIRONMENTAL GROUP		Quotation #: B60751		☒ Regular TAT 5 days (Most analyses)										
Contact Name:		Contact Name: Andrew Gault; Kristen Piecowye		P.O. #/ AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS										
Address: 530-1130 WEST PENDER ST		Address: UNIT 3 151 INDUSTRIAL RD		Project #: BMC-18-02		Rush TAT (Surcharges will be applied)										
Vancouver, BC PC: V6E 4A4		Whitehorse, YK PC: V1A 2V3		Site Location: Kudz Ze Kayah		☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days										
Phone:		Phone: (867) 668-6463 vfriesen@contangostrategies.com		Site #:		Date Required:										
Email:		Email: agault@alexcoresource.com kpiecowye@contangostrategies.com		Sampled By: Received in Saskatoon												
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		Analysis Requested: Leahann Temp: 12, 10, 13, 11, 13 MAY 07 2019		LABORATORY USE ONLY CUSTODY SEAL Y/N COOLER TEMPERATURES Present Intact COOLING MEDIA PRESENT Y/N COMMENTS										
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERRIC IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1	Trial #1	07-May-19	10:20	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED ALL REQUIRED SAMPLES
2	Trial #2	07-May-19	10:40	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED ALL REQUIRED SAMPLES
3	Trial #3	07-May-19	10:50	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED ALL REQUIRED SAMPLES
4	Trial #4	07-May-19	11:05	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED ALL REQUIRED SAMPLES
5	Trial #5	07-May-19	13:50	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED ALL REQUIRED SAMPLES
6	Trial #6	07-May-19	11:30	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED ALL REQUIRED SAMPLES
7	Trial #7	07-May-19	12:30	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED ALL REQUIRED SAMPLES
8	Trial #8	07-May-19	12:45	Water	X	X	X	X	X	X	X	X	X	X	10	FIELD FILTERED AND PRESERVED ALL REQUIRED SAMPLES
9																
10																
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)						
		2019/05/07		14:35				2019/05/07		0845						

07-May-19 14:34
Safiann Maiter
B934243
DH7 INS-0215

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1of1

Attention: Andrew Gault

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/05/31
Report #: R2730598
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B938509

Received: 2019/05/21, 15:00

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	8	N/A	2019/05/24	AB SOP-00005	SM 23 2310 B m
Alkalinity - Low Level	6	N/A	2019/05/27	AB SOP-00005	SM 23 2320 B m
Alkalinity - Low Level	2	N/A	2019/05/31	AB SOP-00005	SM 23 2320 B m
Low level chloride/sulphate by AC	8	N/A	2019/05/28	AB SOP-00020 / AB SOP-0001	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (1)	7	N/A	2019/05/27	AB SOP-00087	MMCW 119 1996 m
Carbon (DOC) (1)	1	N/A	2019/05/28	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level	8	N/A	2019/05/27	AB SOP-00005	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/05/23	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/05/24		Auto Calc
Hardness Total (calculated as CaCO ₃) (2)	8	N/A	2019/05/28		Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/05/28		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/05/28		Auto Calc
Elements by ICPMS Low Level (dissolved)	8	N/A	2019/05/27	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/05/28		Auto Calc
Elements by ICPMS Low Level (total)	8	N/A	2019/05/27	CAL SOP-00265	EPA 6020 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/05/26	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite - Low Level	8	N/A	2019/05/24		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	8	N/A	2019/05/24		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	8	N/A	2019/05/24	AB SOP-00023	SM 23 4110 B m
Orthophosphate by Konelab (low level)	8	N/A	2019/05/23	AB SOP-00025	SM 23 4500-P A, F m
Total Sulphide	8	N/A	2019/05/24	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1of1

Attention: Andrew Gault

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/05/31
Report #: R2730598
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B938509

Received: 2019/05/21, 15:00

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: smaiter@maxxam.ca

Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VS3814		VS3815		VS3816		VS3817		
Sampling Date		2019/05/21 11:20		2019/05/21 11:40		2019/05/21 12:00		2019/05/21 12:15		
COC Number		1of1		1of1		1of1		1of1		
	UNITS	TRIAL #1	RDL	TRIAL #2	RDL	TRIAL #3	RDL	TRIAL #4	RDL	QC Batch
Calculated Parameters										
Dissolved Nitrate (NO3)	mg/L	10	0.013	3.1	0.013	6.8	0.013	5.5	0.013	9428028
Nitrate plus Nitrite (N)	mg/L	2.6	0.0042	0.74	0.0042	1.5	0.0042	1.3	0.0042	9427658
Dissolved Nitrite (NO2)	mg/L	0.80	0.0099	0.11	0.0099	<0.0099	0.0099	0.27	0.0099	9428028
Sulphide (as H2S)	mg/L	<0.0020	0.0020	<0.0020	0.0020	<0.0020	0.0020	<0.0020	0.0020	9427217
Misc. Inorganics										
Fluoride (F)	mg/L	0.650	0.010	0.653	0.010	0.540	0.010	0.522	0.010	9434406
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	9428708
Dissolved Organic Carbon (C)	mg/L	3.9	0.50	4.2	0.50	5.3	0.50	5.0	0.50	9431198
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9430524
Alkalinity (Total as CaCO3)	mg/L	64.1	0.50	77.7	0.50	85.5	0.50	84.7	0.50	9434395
Acidity (pH 8.3)	mg/L	8.4	1.0	14.3	1.0	12.9	1.0	17.0	1.0	9430524
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9434395
Bicarbonate (HCO3)	mg/L	78.2	0.50	94.8	0.50	104	0.50	103	0.50	9434395
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9434395
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9434395
Anions										
Orthophosphate (P)	mg/L	1.0 (1)	0.10	1.2 (1)	0.10	0.41 (1)	0.025	0.49 (1)	0.025	9429256
Total Sulphide	mg/L	<0.0019	0.0019	<0.0019	0.0019	<0.0019	0.0019	<0.0019	0.0019	9428989
Dissolved Chloride (Cl)	mg/L	62	0.50	61	0.50	60	0.50	62	0.50	9435804
Dissolved Sulphate (SO4)	mg/L	240 (1)	1.0	250 (1)	1.0	220 (1)	1.0	220 (1)	1.0	9435804
Nutrients										
Total Ammonia (N)	mg/L	0.046	0.0050	2.0 (1)	0.025	0.13	0.0050	0.93 (1)	0.010	9428767
Dissolved Nitrite (N)	mg/L	0.24	0.0030	0.035	0.0030	<0.0030	0.0030	0.082	0.0030	9429282
Dissolved Nitrate (N)	mg/L	2.4	0.0030	0.70	0.0030	1.5	0.0030	1.2	0.0030	9429282
RDL = Reportable Detection Limit										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VS3818		VS3819		VS3820	VS3821		
Sampling Date		2019/05/21 14:30		2019/05/21 12:50		2019/05/21 13:10	2019/05/21 13:30		
COC Number		1of1		1of1		1of1	1of1		
	UNITS	TRIAL #5	RDL	TRIAL #6	RDL	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters									
Dissolved Nitrate (NO3)	mg/L	<0.013	0.013	0.072	0.013	4.6	0.91	0.013	9428028
Nitrate plus Nitrite (N)	mg/L	0.0053	0.0042	0.62	0.0042	1.1	0.21	0.0042	9427658
Dissolved Nitrite (NO2)	mg/L	0.018	0.0099	2.0	0.0099	0.012	0.012	0.0099	9428028
Sulphide (as H2S)	mg/L	<0.0020	0.0020	0.080	0.0020	<0.0020	<0.0020	0.0020	9427217
Misc. Inorganics									
Fluoride (F)	mg/L	0.689	0.010	0.689	0.010	0.699	0.527	0.010	9434406
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.11	0.050	<0.050	0.050	<0.050	<0.050	0.050	9428708
Dissolved Organic Carbon (C)	mg/L	4.7	0.50	4.1	0.50	2.8	3.5	0.50	9431198
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	9430524
Alkalinity (Total as CaCO3)	mg/L	83.4	0.50	96.7 (1)	0.50	79.6	83.0	0.50	9434395
Acidity (pH 8.3)	mg/L	17.2	1.0	8.3	1.0	3.1	5.6	1.0	9430524
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9434395
Bicarbonate (HCO3)	mg/L	102	0.50	118 (1)	0.50	97.1	101	0.50	9434395
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9434395
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9434395
Anions									
Orthophosphate (P)	mg/L	0.93 (2)	0.050	1.2 (2)	0.10	0.011	0.0028	0.0010	9429256
Total Sulphide	mg/L	<0.0019	0.0019	0.076	0.0019	<0.0019	<0.0019	0.0019	9428989
Dissolved Chloride (Cl)	mg/L	59	0.50	59	0.50	60	63	0.50	9435804
Dissolved Sulphate (SO4)	mg/L	240 (2)	1.0	240 (2)	1.0	230 (2)	220 (2)	1.0	9435804
Nutrients									
Total Ammonia (N)	mg/L	1.0 (2)	0.025	1.4 (2)	0.025	0.049	0.020	0.0050	9428767
Dissolved Nitrite (N)	mg/L	0.0053	0.0030	0.61	0.0030	0.0036	0.0037	0.0030	9429282
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	0.016	0.0030	1.0	0.20	0.0030	9429282
RDL = Reportable Detection Limit									
(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Unable to reanalyze due to insufficient sample.									
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.									

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VS3814	VS3815	VS3816	VS3817	VS3818		
Sampling Date		2019/05/21 11:20	2019/05/21 11:40	2019/05/21 12:00	2019/05/21 12:15	2019/05/21 14:30		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	341	343	336	340	346	0.50	9427643
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00335	0.00298	0.00110	0.00158	0.0112	0.00050	9429728
Dissolved Antimony (Sb)	mg/L	0.00458	0.00366	0.00969	0.00569	0.0151	0.000020	9429728
Dissolved Arsenic (As)	mg/L	0.0408	0.0423	0.0219	0.0218	0.0513	0.000020	9429728
Dissolved Barium (Ba)	mg/L	0.0316	0.0459	0.103	0.126	0.0646	0.000020	9429728
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9429728
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9429728
Dissolved Boron (B)	mg/L	0.036	0.036	0.029	0.035	0.035	0.010	9429728
Dissolved Cadmium (Cd)	mg/L	0.0000751	0.0000191	0.0000538	0.0000336	0.00111	0.0000050	9429728
Dissolved Chromium (Cr)	mg/L	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9429728
Dissolved Cobalt (Co)	mg/L	0.00280	0.00322	0.000893	0.00136	0.00385	0.0000050	9429728
Dissolved Copper (Cu)	mg/L	0.000626	0.000384	0.000856	0.000458	0.00208	0.000050	9429728
Dissolved Iron (Fe)	mg/L	0.0406	0.0448	0.0277	0.0491	0.0951	0.0010	9429728
Dissolved Lead (Pb)	mg/L	0.000712	0.000273	0.0000338	0.0000451	0.00453	0.0000050	9429728
Dissolved Lithium (Li)	mg/L	0.0140	0.0128	0.00942	0.00953	0.0128	0.00050	9429728
Dissolved Manganese (Mn)	mg/L	0.0929	0.119	0.759	0.928	0.103	0.000050	9429728
Dissolved Molybdenum (Mo)	mg/L	0.00179	0.00134	0.00270	0.00272	0.00197	0.000050	9429728
Dissolved Nickel (Ni)	mg/L	0.00976	0.00979	0.00486	0.00466	0.0125	0.000020	9429728
Dissolved Selenium (Se)	mg/L	0.00314	0.00337	0.00205	0.00202	0.00668	0.000040	9429728
Dissolved Silicon (Si)	mg/L	0.917	0.870	2.07	1.97	0.810	0.050	9429728
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9429728
Dissolved Strontium (Sr)	mg/L	0.465	0.493	0.459	0.521	0.527	0.000050	9429728
Dissolved Thallium (Tl)	mg/L	0.0000946	0.000147	0.0000060	0.0000081	0.000233	0.0000020	9429728
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9429728
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9429728
Dissolved Uranium (U)	mg/L	0.0273	0.0256	0.0180	0.0127	0.0293	0.0000020	9429728
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00056	0.00063	<0.00020	0.00020	9429728
Dissolved Zinc (Zn)	mg/L	0.0353	0.0171	0.0251	0.0172	0.333	0.00010	9429728
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00013	0.00015	0.00010	9429728
Dissolved Calcium (Ca)	mg/L	107	108	108	109	110	0.050	9427646
Dissolved Magnesium (Mg)	mg/L	17.8	17.5	16.3	16.6	17.6	0.050	9427646

RDL = Reportable Detection Limit

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VS3814	VS3815	VS3816	VS3817	VS3818		
Sampling Date		2019/05/21 11:20	2019/05/21 11:40	2019/05/21 12:00	2019/05/21 12:15	2019/05/21 14:30		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.76	7.51	7.27	7.46	6.85	0.050	9427646
Dissolved Sodium (Na)	mg/L	27.5	27.2	26.0	26.7	27.3	0.050	9427646
Dissolved Sulphur (S)	mg/L	89.5	88.3	80.0	83.4	88.0	3.0	9427646
RDL = Reportable Detection Limit								

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VS3819	VS3820	VS3821		
Sampling Date		2019/05/21 12:50	2019/05/21 13:10	2019/05/21 13:30		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	337	348	340	0.50	9427643
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00159	0.00584	0.00150	0.00050	9429728
Dissolved Antimony (Sb)	mg/L	0.0375	0.0284	0.00892	0.000020	9429728
Dissolved Arsenic (As)	mg/L	0.302	0.0319	0.00286	0.000020	9429728
Dissolved Barium (Ba)	mg/L	0.0901	0.0902	0.150	0.000020	9429728
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	0.000010	9429728
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9429728
Dissolved Boron (B)	mg/L	0.037	0.038	0.030	0.010	9429728
Dissolved Cadmium (Cd)	mg/L	0.000426	0.00358	0.000746	0.0000050	9429728
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9429728
Dissolved Cobalt (Co)	mg/L	0.0151	0.00151	0.0000499	0.0000050	9429728
Dissolved Copper (Cu)	mg/L	0.00122	0.00875	0.00388	0.000050	9429728
Dissolved Iron (Fe)	mg/L	0.0800	0.0011	0.0089	0.0010	9429728
Dissolved Lead (Pb)	mg/L	0.00155	0.00332	0.000138	0.0000050	9429728
Dissolved Lithium (Li)	mg/L	0.0135	0.0134	0.00956	0.00050	9429728
Dissolved Manganese (Mn)	mg/L	0.0753	0.0479	0.326	0.000050	9429728
Dissolved Molybdenum (Mo)	mg/L	0.00172	0.00191	0.00266	0.000050	9429728
Dissolved Nickel (Ni)	mg/L	0.0650	0.00945	0.00390	0.000020	9429728
Dissolved Selenium (Se)	mg/L	0.0154	0.0120	0.00475	0.000040	9429728
Dissolved Silicon (Si)	mg/L	0.984	0.880	1.94	0.050	9429728
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9429728
Dissolved Strontium (Sr)	mg/L	0.540	0.595	0.542	0.000050	9429728
Dissolved Thallium (Tl)	mg/L	0.000162	0.000614	0.0000317	0.0000020	9429728
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9429728
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9429728
Dissolved Uranium (U)	mg/L	0.165	0.0438	0.0232	0.0000020	9429728
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9429728
Dissolved Zinc (Zn)	mg/L	0.0878	0.230	0.0812	0.00010	9429728
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9429728
Dissolved Calcium (Ca)	mg/L	106	110	109	0.050	9427646
Dissolved Magnesium (Mg)	mg/L	17.7	18.0	16.5	0.050	9427646
RDL = Reportable Detection Limit						

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VS3819	VS3820	VS3821		
Sampling Date		2019/05/21 12:50	2019/05/21 13:10	2019/05/21 13:30		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.34	6.25	5.18	0.050	9427646
Dissolved Sodium (Na)	mg/L	28.0	27.6	26.6	0.050	9427646
Dissolved Sulphur (S)	mg/L	87.7	86.7	83.6	3.0	9427646
RDL = Reportable Detection Limit						

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VS3814	VS3815	VS3816	VS3817	VS3818		
Sampling Date		2019/05/21 11:20	2019/05/21 11:40	2019/05/21 12:00	2019/05/21 12:15	2019/05/21 14:30		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	348	339	341	344	348	0.50	9427218
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0119	0.00415	0.00222	0.00173	0.0146	0.00050	9429726
Total Antimony (Sb)	mg/L	0.00472	0.00354	0.00993	0.00580	0.0154	0.000020	9429726
Total Arsenic (As)	mg/L	0.0435	0.0411	0.0241	0.0226	0.0509	0.000020	9429726
Total Barium (Ba)	mg/L	0.0342	0.0472	0.106	0.137	0.0651	0.000020	9429726
Total Beryllium (Be)	mg/L	0.000011	<0.000010	<0.000010	0.000026	<0.000010	0.000010	9429726
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9429726
Total Boron (B)	mg/L	0.038	0.036	0.032	0.032	0.034	0.010	9429726
Total Cadmium (Cd)	mg/L	0.0000916	0.0000318	0.0000564	0.0000384	0.00213	0.0000050	9429726
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9429726
Total Cobalt (Co)	mg/L	0.00289	0.00332	0.000934	0.00135	0.00382	0.0000050	9429726
Total Copper (Cu)	mg/L	0.000932	0.000664	0.000863	0.000473	0.0114	0.000050	9429726
Total Iron (Fe)	mg/L	0.0997	0.0913	0.181	0.169	0.101	0.0010	9429726
Total Lead (Pb)	mg/L	0.00161	0.000729	0.000466	0.000341	0.00847	0.0000050	9429726
Total Lithium (Li)	mg/L	0.0130	0.0123	0.0104	0.00985	0.0121	0.00050	9429726
Total Manganese (Mn)	mg/L	0.0965	0.123	0.773	0.939	0.104	0.000050	9429726
Total Molybdenum (Mo)	mg/L	0.00178	0.00135	0.00267	0.00237	0.00198	0.000050	9429726
Total Nickel (Ni)	mg/L	0.00997	0.00995	0.00498	0.00457	0.0126	0.000020	9429726
Total Selenium (Se)	mg/L	0.00289	0.00343	0.00179	0.00215	0.00627	0.000040	9429726
Total Silicon (Si)	mg/L	1.01	0.921	2.08	2.03	0.855	0.050	9429726
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9429726
Total Strontium (Sr)	mg/L	0.485	0.494	0.470	0.532	0.534	0.000050	9429726
Total Thallium (Tl)	mg/L	0.0000935	0.000149	0.0000079	0.0000092	0.000240	0.0000020	9429726
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9429726
Total Titanium (Ti)	mg/L	0.00135	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9429726
Total Uranium (U)	mg/L	0.0283	0.0262	0.0182	0.0130	0.0263	0.0000020	9429726
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00061	0.00059	<0.00020	0.00020	9429726
Total Zinc (Zn)	mg/L	0.0323	0.0146	0.0220	0.0127	0.335	0.00010	9429726
Total Zirconium (Zr)	mg/L	0.00016	<0.00010	0.00011	0.00014	0.00013	0.00010	9429726
Total Calcium (Ca)	mg/L	110	107	109	110	111	0.050	9427650
Total Magnesium (Mg)	mg/L	18.0	17.5	16.5	16.6	17.4	0.050	9427650

RDL = Reportable Detection Limit

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VS3814	VS3815	VS3816	VS3817	VS3818		
Sampling Date		2019/05/21 11:20	2019/05/21 11:40	2019/05/21 12:00	2019/05/21 12:15	2019/05/21 14:30		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Potassium (K)	mg/L	7.94	7.54	7.27	7.47	6.92	0.050	9427650
Total Sodium (Na)	mg/L	27.4	26.6	26.2	26.6	26.9	0.050	9427650
Total Sulphur (S)	mg/L	92.6	88.3	81.5	84.6	88.9	3.0	9427650
RDL = Reportable Detection Limit								

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VS3819	VS3820	VS3821		
Sampling Date		2019/05/21 12:50	2019/05/21 13:10	2019/05/21 13:30		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	336	341	345	0.50	9427218
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00259	0.0127	0.0110	0.00050	9429726
Total Antimony (Sb)	mg/L	0.0399	0.0277	0.00897	0.000020	9429726
Total Arsenic (As)	mg/L	0.308	0.0313	0.00407	0.000020	9429726
Total Barium (Ba)	mg/L	0.0933	0.0886	0.151	0.000020	9429726
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000012	0.000010	9429726
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9429726
Total Boron (B)	mg/L	0.038	0.035	0.033	0.010	9429726
Total Cadmium (Cd)	mg/L	0.00115	0.00349	0.000766	0.0000050	9429726
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9429726
Total Cobalt (Co)	mg/L	0.0150	0.00145	0.0000683	0.0000050	9429726
Total Copper (Cu)	mg/L	0.00306	0.00876	0.00396	0.000050	9429726
Total Iron (Fe)	mg/L	0.147	0.0085	0.0638	0.0010	9429726
Total Lead (Pb)	mg/L	0.00388	0.00381	0.000892	0.0000050	9429726
Total Lithium (Li)	mg/L	0.0127	0.0129	0.00922	0.00050	9429726
Total Manganese (Mn)	mg/L	0.0754	0.0475	0.333	0.000050	9429726
Total Molybdenum (Mo)	mg/L	0.00173	0.00192	0.00272	0.000050	9429726
Total Nickel (Ni)	mg/L	0.0644	0.00936	0.00394	0.000020	9429726
Total Selenium (Se)	mg/L	0.0167	0.0117	0.00475	0.000040	9429726
Total Silicon (Si)	mg/L	1.03	0.924	2.07	0.050	9429726
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9429726
Total Strontium (Sr)	mg/L	0.553	0.594	0.560	0.000050	9429726
Total Thallium (Tl)	mg/L	0.000204	0.000616	0.0000301	0.0000020	9429726
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9429726
Total Titanium (Ti)	mg/L	<0.00050	0.00062	0.00050	0.00050	9429726
Total Uranium (U)	mg/L	0.168	0.0427	0.0230	0.0000020	9429726
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9429726
Total Zinc (Zn)	mg/L	0.159	0.224	0.0813	0.00010	9429726
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9429726
Total Calcium (Ca)	mg/L	106	107	111	0.050	9427650
Total Magnesium (Mg)	mg/L	17.4	17.6	16.5	0.050	9427650
RDL = Reportable Detection Limit						

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VS3819	VS3820	VS3821		
Sampling Date		2019/05/21 12:50	2019/05/21 13:10	2019/05/21 13:30		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	8.37	6.20	5.15	0.050	9427650
Total Sodium (Na)	mg/L	27.3	26.6	26.1	0.050	9427650
Total Sulphur (S)	mg/L	87.5	85.0	84.4	3.0	9427650
RDL = Reportable Detection Limit						

TEST SUMMARY

Maxxam ID: VS3814
Sample ID: TRIAL #1
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9430524	N/A	2019/05/24	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/27	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Carbon (DOC)	TECH	9431198	N/A	2019/05/27	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Sulphide (as H ₂ S)	CALC	9427217	N/A	2019/05/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9427218	N/A	2019/05/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9427643	N/A	2019/05/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9427646	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9427650	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9428767	N/A	2019/05/26	Fadia Mostafa
Nitrate and Nitrite - Low Level	CALC	9428028	N/A	2019/05/24	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9427658	N/A	2019/05/24	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa
Total Sulphide	SPEC	9428989	N/A	2019/05/24	Jennifer Mee

Maxxam ID: VS3814 Dup
Sample ID: TRIAL #1
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada

Maxxam ID: VS3815
Sample ID: TRIAL #2
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9430524	N/A	2019/05/24	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/27	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Carbon (DOC)	TECH	9431198	N/A	2019/05/27	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Sulphide (as H ₂ S)	CALC	9427217	N/A	2019/05/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9427218	N/A	2019/05/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9427643	N/A	2019/05/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9427646	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9427650	N/A	2019/05/28	Automated Statchk

TEST SUMMARY

Maxxam ID: VS3815
Sample ID: TRIAL #2
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9428767	N/A	2019/05/26	Fadia Mostafa
Nitrate and Nitrite - Low Level	CALC	9428028	N/A	2019/05/24	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9427658	N/A	2019/05/24	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa
Total Sulphide	SPEC	9428989	N/A	2019/05/24	Jennifer Mee

Maxxam ID: VS3816
Sample ID: TRIAL #3
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9430524	N/A	2019/05/24	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/31	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Carbon (DOC)	TECH	9431198	N/A	2019/05/27	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Sulphide (as H ₂ S)	CALC	9427217	N/A	2019/05/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9427218	N/A	2019/05/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9427643	N/A	2019/05/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9427646	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9427650	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9428767	N/A	2019/05/26	Fadia Mostafa
Nitrate and Nitrite - Low Level	CALC	9428028	N/A	2019/05/24	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9427658	N/A	2019/05/24	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa
Total Sulphide	SPEC	9428989	N/A	2019/05/24	Jennifer Mee

Maxxam ID: VS3817
Sample ID: TRIAL #4
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9430524	N/A	2019/05/24	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/31	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Carbon (DOC)	TECH	9431198	N/A	2019/05/27	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Sulphide (as H ₂ S)	CALC	9427217	N/A	2019/05/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9427218	N/A	2019/05/28	Automated Statchk

TEST SUMMARY

Maxxam ID: VS3817
Sample ID: TRIAL #4
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hardness (calculated as CaCO ₃)	CALC	9427643	N/A	2019/05/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9427646	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9427650	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9428767	N/A	2019/05/26	Fadia Mostafa
Nitrate and Nitrite - Low Level	CALC	9428028	N/A	2019/05/24	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9427658	N/A	2019/05/24	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa
Total Sulphide	SPEC	9428989	N/A	2019/05/24	Jennifer Mee

Maxxam ID: VS3817 Dup
Sample ID: TRIAL #4
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa

Maxxam ID: VS3818
Sample ID: TRIAL #5
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9430524	N/A	2019/05/24	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/27	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Carbon (DOC)	TECH	9431198	N/A	2019/05/27	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Sulphide (as H ₂ S)	CALC	9427217	N/A	2019/05/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9427218	N/A	2019/05/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9427643	N/A	2019/05/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9427646	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9427650	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9428767	N/A	2019/05/26	Fadia Mostafa
Nitrate and Nitrite - Low Level	CALC	9428028	N/A	2019/05/24	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9427658	N/A	2019/05/24	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa
Total Sulphide	SPEC	9428989	N/A	2019/05/24	Jennifer Mee

TEST SUMMARY

Maxxam ID: VS3819
Sample ID: TRIAL #6
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9430524	N/A	2019/05/24	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/27	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Carbon (DOC)	TECH	9431198	N/A	2019/05/28	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Sulphide (as H ₂ S)	CALC	9427217	N/A	2019/05/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9427218	N/A	2019/05/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9427643	N/A	2019/05/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9427646	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9427650	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9428767	N/A	2019/05/26	Fadia Mostafa
Nitrate and Nitrite - Low Level	CALC	9428028	N/A	2019/05/24	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9427658	N/A	2019/05/24	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa
Total Sulphide	SPEC	9428989	N/A	2019/05/24	Jennifer Mee

Maxxam ID: VS3819 Dup
Sample ID: TRIAL #6
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/27	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac

Maxxam ID: VS3820
Sample ID: TRIAL #7
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9430524	N/A	2019/05/24	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/27	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Carbon (DOC)	TECH	9431198	N/A	2019/05/27	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Sulphide (as H ₂ S)	CALC	9427217	N/A	2019/05/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9427218	N/A	2019/05/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9427643	N/A	2019/05/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9427646	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9427650	N/A	2019/05/28	Automated Statchk

TEST SUMMARY

Maxxam ID: VS3820
Sample ID: TRIAL #7
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9428767	N/A	2019/05/26	Fadia Mostafa
Nitrate and Nitrite - Low Level	CALC	9428028	N/A	2019/05/24	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9427658	N/A	2019/05/24	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa
Total Sulphide	SPEC	9428989	N/A	2019/05/24	Jennifer Mee

Maxxam ID: VS3821
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9430524	N/A	2019/05/24	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9434395	N/A	2019/05/27	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9435804	N/A	2019/05/28	Zafar Iqbal
Carbon (DOC)	TECH	9431198	N/A	2019/05/27	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9434406	N/A	2019/05/27	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9428708	N/A	2019/05/23	Meike Wege
Sulphide (as H ₂ S)	CALC	9427217	N/A	2019/05/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9427218	N/A	2019/05/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9427643	N/A	2019/05/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9427646	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9429728	N/A	2019/05/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9427650	N/A	2019/05/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9429726	N/A	2019/05/27	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9428767	N/A	2019/05/26	Fadia Mostafa
Nitrate and Nitrite - Low Level	CALC	9428028	N/A	2019/05/24	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9427658	N/A	2019/05/24	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9429256	N/A	2019/05/23	Fadia Mostafa
Total Sulphide	SPEC	9428989	N/A	2019/05/24	Jennifer Mee

Maxxam ID: VS3821 Dup
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/05/21
Shipped:
Received: 2019/05/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9429282	N/A	2019/05/24	Kathleen Dalton

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	13.7°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9428708	HCl Preserved Iron (Fe+2 Ferrous)	2019/05/23	89	80 - 120	100	90 - 110	<0.050	mg/L	NC	20
9428767	Total Ammonia (N)	2019/05/26	86	80 - 120	105	80 - 120	<0.0050	mg/L	7.2	20
9428989	Total Sulphide	2019/05/24			110	80 - 120	<0.0019	mg/L	9.2	20
9429256	Orthophosphate (P)	2019/05/23	NC	80 - 120	98	80 - 120	<0.0010	mg/L	1.7	20
9429282	Dissolved Nitrate (N)	2019/05/24	102	80 - 120	101	80 - 120	<0.0030	mg/L	1.7	20
9429282	Dissolved Nitrite (N)	2019/05/24	103	80 - 120	101	80 - 120	<0.0030	mg/L	0.82	20
9429726	Total Aluminum (Al)	2019/05/27	104	80 - 120	100	80 - 120	<0.00050	mg/L	5.2	20
9429726	Total Antimony (Sb)	2019/05/27	97	80 - 120	98	80 - 120	<0.000020	mg/L	0.28	20
9429726	Total Arsenic (As)	2019/05/27	101	80 - 120	98	80 - 120	<0.000020	mg/L	0.56	20
9429726	Total Barium (Ba)	2019/05/27	98	80 - 120	99	80 - 120	<0.000020	mg/L	0.40	20
9429726	Total Beryllium (Be)	2019/05/27	97	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
9429726	Total Bismuth (Bi)	2019/05/27	99	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9429726	Total Boron (B)	2019/05/27	98	80 - 120	99	80 - 120	<0.010	mg/L	0.50	20
9429726	Total Cadmium (Cd)	2019/05/27	98	80 - 120	101	80 - 120	<0.0000050	mg/L	7.9	20
9429726	Total Chromium (Cr)	2019/05/27	97	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9429726	Total Cobalt (Co)	2019/05/27	96	80 - 120	102	80 - 120	<0.0000050	mg/L	0.032	20
9429726	Total Copper (Cu)	2019/05/27	93	80 - 120	102	80 - 120	<0.000050	mg/L	0.00064	20
9429726	Total Iron (Fe)	2019/05/27	103	80 - 120	108	80 - 120	<0.0010	mg/L	0.43	20
9429726	Total Lead (Pb)	2019/05/27	102	80 - 120	104	80 - 120	<0.0000050	mg/L	0.28	20
9429726	Total Lithium (Li)	2019/05/27	97	80 - 120	101	80 - 120	<0.00050	mg/L	0.30	20
9429726	Total Manganese (Mn)	2019/05/27	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.46	20
9429726	Total Molybdenum (Mo)	2019/05/27	111	80 - 120	105	80 - 120	<0.000050	mg/L	0.16	20
9429726	Total Nickel (Ni)	2019/05/27	94	80 - 120	102	80 - 120	<0.000020	mg/L	0.17	20
9429726	Total Selenium (Se)	2019/05/27	98	80 - 120	95	80 - 120	<0.000040	mg/L	3.3	20
9429726	Total Silicon (Si)	2019/05/27	96	80 - 120	94	80 - 120	<0.050	mg/L	1.8	20
9429726	Total Silver (Ag)	2019/05/27	93	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9429726	Total Strontium (Sr)	2019/05/27	NC	80 - 120	100	80 - 120	<0.000050	mg/L	1.9	20
9429726	Total Thallium (Tl)	2019/05/27	101	80 - 120	103	80 - 120	<0.0000020	mg/L	1.3	20
9429726	Total Tin (Sn)	2019/05/27	99	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9429726	Total Titanium (Ti)	2019/05/27	105	80 - 120	106	80 - 120	<0.00050	mg/L	4.9	20
9429726	Total Uranium (U)	2019/05/27	103	80 - 120	106	80 - 120	<0.0000020	mg/L	0.36	20
9429726	Total Vanadium (V)	2019/05/27	100	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9429726	Total Zinc (Zn)	2019/05/27	93	80 - 120	102	80 - 120	<0.00010	mg/L	0.41	20
9429726	Total Zirconium (Zr)	2019/05/27	104	80 - 120	98	80 - 120	<0.00010	mg/L	3.9	20
9429728	Dissolved Aluminum (Al)	2019/05/27	111	80 - 120	103	80 - 120	<0.00050	mg/L	11	20
9429728	Dissolved Antimony (Sb)	2019/05/27	97	80 - 120	98	80 - 120	<0.000020	mg/L	0.11	20
9429728	Dissolved Arsenic (As)	2019/05/27	102	80 - 120	98	80 - 120	<0.000020	mg/L	1.0	20
9429728	Dissolved Barium (Ba)	2019/05/27	98	80 - 120	99	80 - 120	<0.000020	mg/L	0.13	20
9429728	Dissolved Beryllium (Be)	2019/05/27	100	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9429728	Dissolved Bismuth (Bi)	2019/05/27	99	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9429728	Dissolved Boron (B)	2019/05/27	101	80 - 120	103	80 - 120	<0.010	mg/L	7.3	20
9429728	Dissolved Cadmium (Cd)	2019/05/27	99	80 - 120	100	80 - 120	<0.0000050	mg/L	0.74	20
9429728	Dissolved Chromium (Cr)	2019/05/27	98	80 - 120	100	80 - 120	<0.00010	mg/L	12	20
9429728	Dissolved Cobalt (Co)	2019/05/27	96	80 - 120	100	80 - 120	<0.0000050	mg/L	0.29	20
9429728	Dissolved Copper (Cu)	2019/05/27	94	80 - 120	101	80 - 120	<0.000050	mg/L	1.7	20
9429728	Dissolved Iron (Fe)	2019/05/27	100	80 - 120	105	80 - 120	<0.0010	mg/L	0.79	20
9429728	Dissolved Lead (Pb)	2019/05/27	102	80 - 120	102	80 - 120	<0.0000050	mg/L	0.46	20
9429728	Dissolved Lithium (Li)	2019/05/27	105	80 - 120	103	80 - 120	<0.00050	mg/L	7.2	20
9429728	Dissolved Manganese (Mn)	2019/05/27	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.66	20
9429728	Dissolved Molybdenum (Mo)	2019/05/27	111	80 - 120	104	80 - 120	<0.000050	mg/L	0.089	20
9429728	Dissolved Nickel (Ni)	2019/05/27	95	80 - 120	100	80 - 120	<0.000020	mg/L	0.66	20
9429728	Dissolved Selenium (Se)	2019/05/27	100	80 - 120	95	80 - 120	<0.000040	mg/L	2.4	20
9429728	Dissolved Silicon (Si)	2019/05/27	89	80 - 120	89	80 - 120	<0.050	mg/L	1.1	20
9429728	Dissolved Silver (Ag)	2019/05/27	92	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9429728	Dissolved Strontium (Sr)	2019/05/27	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.21	20
9429728	Dissolved Thallium (Tl)	2019/05/27	102	80 - 120	102	80 - 120	<0.0000020	mg/L	3.8	20
9429728	Dissolved Tin (Sn)	2019/05/27	100	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9429728	Dissolved Titanium (Ti)	2019/05/27	104	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
9429728	Dissolved Uranium (U)	2019/05/27	103	80 - 120	104	80 - 120	<0.0000020	mg/L	0.018	20
9429728	Dissolved Vanadium (V)	2019/05/27	101	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9429728	Dissolved Zinc (Zn)	2019/05/27	97	80 - 120	100	80 - 120	<0.00010	mg/L	0.35	20
9429728	Dissolved Zirconium (Zr)	2019/05/27	104	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9430524	Acidity (pH 4.5)	2019/05/24					<1.0	mg/L	NC	20
9430524	Acidity (pH 8.3)	2019/05/24			94	80 - 120	<1.0	mg/L	12	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9431198	Dissolved Organic Carbon (C)	2019/05/27	90	80 - 120	110	80 - 120	<0.50	mg/L	4.8	20
9434395	Alkalinity (PP as CaCO ₃)	2019/05/27					<0.50	mg/L	NC	20
9434395	Alkalinity (Total as CaCO ₃)	2019/05/27			92	80 - 120	<0.50	mg/L	23 (1)	20
9434395	Bicarbonate (HCO ₃)	2019/05/27					<0.50	mg/L	23 (1)	20
9434395	Carbonate (CO ₃)	2019/05/27					<0.50	mg/L	NC	20
9434395	Hydroxide (OH)	2019/05/27					<0.50	mg/L	NC	20
9434406	Fluoride (F)	2019/05/27	101	80 - 120	100	80 - 120	<0.010	mg/L	1.5	20
9435804	Dissolved Chloride (Cl)	2019/05/28	NC	80 - 120	105	80 - 120	<0.50	mg/L	0.90	20
9435804	Dissolved Sulphate (SO ₄)	2019/05/28	NC	80 - 120	98	80 - 120	<0.50	mg/L	0.62	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



Harry (Peng) Liang, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

754

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required											
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses)											
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS											
Address:	530-1130 WEST PENDER ST	Address:	UNIT 3 151 INDUSTRIAL RD	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)											
	Vancouver, BC PC: V6E 4A4		Whitehorse, YK PC: V1A 2V3	Site Location:	Kudz Ze Kayah	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days											
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site #:		Date Required:											
Email:		Email:	agault@alexcoresource.com kpiewcove@contangostrategies.com	Sampled By:													
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA												LABORATORY USE ONLY CUSTODY SEAL Y / N Present Intact 7 7 7.7.5 4 4 9.8.10 COOLING MEDIA PRESENT Y / N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																	
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED		
1	Trial #1	21-May-19	11:20	Water	X	X	X	X	X	X	X	X	X	X			10
2	Trial #2	21-May-19	11:40	Water	X	X	X	X	X	X	X	X	X	X			10
3	Trial #3	21-May-19	12:00	Water	X	X	X	X	X	X	X	X	X	X			10
4	Trial #4	21-May-19	12:15	Water	X	X	X	X	X	X	X	X	X	X			10
5	Trial #5	21-May-19	14:30	Water	X	X	X	X	X	X	X	X	X	X			10
6	Trial #6	21-May-19	12:50	Water	X	X	X	X	X	X	X	X	X	X			10
7	Trial #7	21-May-19	13:10	Water	X	X	X	X	X	X	X	X	X	X			10
8	Trial #8	21-May-19	13:30	Water	X	X	X	X	X	X	X	X	X	X			10
9																	
10																	
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)							
		2019/05/21		13:00				2019/05/21		08:45							

21-May-19 15:00
Safiann Maiter
B938509

MO3 INS-0152



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1of1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/06/14
 Report #: R2737505
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B943649

Received: 2019/06/05, 13:11

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	8	N/A	2019/06/13	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level	8	N/A	2019/06/11	AB SOP-00005	SM 23 2320 B m
Chloride - Low Level	8	N/A	2019/06/13	AB SOP-00020	SM 23-4500-Cl-E m
Carbon (DOC) (2)	8	N/A	2019/06/10	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level	7	N/A	2019/06/11	AB SOP-00005	SM 23 4500-F C m
Fluoride - Low Level (1)	1	N/A	2019/06/13	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/06/07	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/06/09		Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	8	N/A	2019/06/11		Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/06/11		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/06/11		Auto Calc
Elements by ICPMS Low Level (dissolved)	5	N/A	2019/06/07	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (dissolved)	3	N/A	2019/06/10	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/06/11		Auto Calc
Elements by ICPMS Low Level (total)	4	N/A	2019/06/07	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	4	N/A	2019/06/10	CAL SOP-00265	EPA 6020 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/06/07	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite - Low Level	8	N/A	2019/06/11		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	8	N/A	2019/06/11		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	8	N/A	2019/06/10	AB SOP-00023	SM 23 4110 B m
Filter and HNO ₃ Preserve for Metals	8	N/A	2019/06/06		
Orthophosphate by Konelab (low level)	8	N/A	2019/06/07	AB SOP-00025	SM 23 4500-P A, F m
Total Sulphide	8	N/A	2019/06/09	AB SOP-00080	SM 23 4500 S ₂ -A D Fm
Sulphate - Low Level	8	N/A	2019/06/13	AB SOP-00018	SM 23 4500-SO ₄ E m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1of1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/06/14
Report #: R2737505
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B943649

Received: 2019/06/05, 13:11

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: smaiter@bvlabs.com

Phone# (403) 291-3077

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VV0841			VV0842			VV0843		
Sampling Date		2019/06/05 10:05			2019/06/05 10:20			2019/06/05 10:35		
COC Number		1of1			1of1			1of1		
	UNITS	TRIAL #1	RDL	QC Batch	TRIAL #2	RDL	QC Batch	TRIAL #3	RDL	QC Batch

Calculated Parameters

Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Dissolved Nitrate (NO3)	mg/L	11	0.013	9452412	6.6	0.013	9452412	5.8	0.013	9452412
Nitrate plus Nitrite (N)	mg/L	2.4	0.0042	9452428	1.6	0.0042	9452428	1.3	0.0042	9452428
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9452412	0.24	0.0099	9452412	<0.0099	0.0099	9452412
Sulphide (as H2S)	mg/L	<0.0020	0.0020	9452373	<0.0020	0.0020	9452373	<0.0020	0.0020	9452373

Misc. Inorganics

Fluoride (F)	mg/L	0.613	0.010	9459484	0.640	0.010	9464469	0.522	0.010	9459484
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9454373	<0.050	0.050	9454373	<0.050	0.050	9454373
Dissolved Organic Carbon (C)	mg/L	4.1	0.50	9456503	4.1	0.50	9456503	5.0	0.50	9456503
Acidity (pH 4.5)	mg/L	<1.0	1.0	9465314	<1.0	1.0	9465311	<1.0	1.0	9465311
Alkalinity (Total as CaCO3)	mg/L	66.2	0.50	9459482	76.4	0.50	9459482	90.7	0.50	9459482
Acidity (pH 8.3)	mg/L	5.3	1.0	9465314	4.8	1.0	9465311	7.7	1.0	9465311
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9459482	<0.50	0.50	9459482	<0.50	0.50	9459482
Bicarbonate (HCO3)	mg/L	80.8	0.50	9459482	93.2	0.50	9459482	111	0.50	9459482
Carbonate (CO3)	mg/L	<0.50	0.50	9459482	<0.50	0.50	9459482	<0.50	0.50	9459482
Hydroxide (OH)	mg/L	<0.50	0.50	9459482	<0.50	0.50	9459482	<0.50	0.50	9459482

Anions

Orthophosphate (P)	mg/L	1.2 (1)	0.10	9454655	1.1 (1)	0.10	9454655	0.24 (1)	0.020	9454655
Dissolved Sulphate (SO4)	mg/L	241 (1)	1.0	9464797	228 (1)	2.5	9464797	219 (1)	1.0	9464797
Total Sulphide	mg/L	<0.0019	0.0019	9457060	<0.0019	0.0019	9457060	<0.0019	0.0019	9457060
Dissolved Chloride (Cl)	mg/L	58	0.50	9464796	58	0.50	9464796	58	0.50	9464796

Nutrients

Total Ammonia (N)	mg/L	0.038	0.0050	9452901	1.3 (1)	0.025	9452901	0.080	0.0050	9452901
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9458905	0.073	0.0030	9458905	<0.0030	0.0030	9458905
Dissolved Nitrate (N)	mg/L	2.4	0.0030	9458905	1.5	0.0030	9458905	1.3	0.0030	9458905

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B943649

Report Date: 2019/06/14

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VV0844			VV0845		VV0846		
Sampling Date		2019/06/05 10:55			2019/06/05 12:40		2019/06/05 11:15		
COC Number		1of1			1of1		1of1		
	UNITS	TRIAL #4	RDL	QC Batch	TRIAL #5	QC Batch	TRIAL #6	RDL	QC Batch

Calculated Parameters

Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		ONSITE
Dissolved Nitrate (NO3)	mg/L	8.0	0.013	9452412	<0.013	9452412	0.038	0.013	9452412
Nitrate plus Nitrite (N)	mg/L	1.8	0.0042	9452428	<0.0042	9452428	0.62	0.0042	9452428
Dissolved Nitrite (NO2)	mg/L	0.016	0.0099	9452412	<0.0099	9452412	2.0	0.0099	9452412
Sulphide (as H2S)	mg/L	<0.0020	0.0020	9452373	<0.0020	9452373	0.046	0.0020	9452373

Misc. Inorganics

Fluoride (F)	mg/L	0.510	0.010	9459484	0.666	9459484	0.669	0.010	9459484
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9454373	0.13	9454373	<0.050	0.050	9454373
Dissolved Organic Carbon (C)	mg/L	5.4	0.50	9456503	5.4	9456503	4.3	0.50	9456503
Acidity (pH 4.5)	mg/L	<1.0	1.0	9465311	<1.0	9465314	<1.0	1.0	9465314
Alkalinity (Total as CaCO3)	mg/L	88.1	0.50	9459482	85.5	9459482	79.9	0.50	9459482
Acidity (pH 8.3)	mg/L	7.6	1.0	9465311	10.7	9465314	4.5	1.0	9465314
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9459482	<0.50	9459482	<0.50	0.50	9459482
Bicarbonate (HCO3)	mg/L	107	0.50	9459482	104	9459482	97.5	0.50	9459482
Carbonate (CO3)	mg/L	<0.50	0.50	9459482	<0.50	9459482	<0.50	0.50	9459482
Hydroxide (OH)	mg/L	<0.50	0.50	9459482	<0.50	9459482	<0.50	0.50	9459482

Anions

Orthophosphate (P)	mg/L	0.39 (1)	0.020	9454655	0.91 (1)	9454655	1.1 (1)	0.050	9454655
Dissolved Sulphate (SO4)	mg/L	217 (1)	1.0	9464797	241 (1)	9464797	242 (1)	1.0	9464797
Total Sulphide	mg/L	<0.0019	0.0019	9457060	<0.0019	9457060	0.044	0.0019	9457060
Dissolved Chloride (Cl)	mg/L	60	0.50	9464796	57	9464796	57	0.50	9464796

Nutrients

Total Ammonia (N)	mg/L	0.52 (1)	0.010	9452901	1.8 (1)	9452903	1.2 (1)	0.025	9452901
Dissolved Nitrite (N)	mg/L	0.0049	0.0030	9458905	<0.0030	9458905	0.61	0.0030	9458905
Dissolved Nitrate (N)	mg/L	1.8	0.0030	9458905	<0.0030	9458905	0.0086	0.0030	9458905

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
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BV Labs Job #: B943649

Report Date: 2019/06/14

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VV0847		VV0848		
Sampling Date		2019/06/05 11:30		2019/06/05 11:45		
COC Number		1of1		1of1		
	UNITS	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Filter and HNO ₃ Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE
Dissolved Nitrate (NO ₃)	mg/L	4.9	9452412	0.78	0.013	9452412
Nitrate plus Nitrite (N)	mg/L	1.1	9452428	0.18	0.0042	9452428
Dissolved Nitrite (NO ₂)	mg/L	<0.0099	9452412	<0.0099	0.0099	9452412
Sulphide (as H ₂ S)	mg/L	<0.0020	9452373	<0.0020	0.0020	9452373
Misc. Inorganics						
Fluoride (F)	mg/L	0.637	9459484	0.493	0.010	9459484
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	9454373	<0.050	0.050	9454373
Dissolved Organic Carbon (C)	mg/L	2.8	9456503	3.8	0.50	9456503
Acidity (pH 4.5)	mg/L	<1.0	9465314	<1.0	1.0	9465314
Alkalinity (Total as CaCO ₃)	mg/L	80.1	9459482	83.5	0.50	9459482
Acidity (pH 8.3)	mg/L	4.5	9465314	3.4	1.0	9465314
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	9459482	<0.50	0.50	9459482
Bicarbonate (HCO ₃)	mg/L	97.7	9459482	102	0.50	9459482
Carbonate (CO ₃)	mg/L	<0.50	9459482	<0.50	0.50	9459482
Hydroxide (OH)	mg/L	<0.50	9459482	<0.50	0.50	9459482
Anions						
Orthophosphate (P)	mg/L	0.012	9454655	0.0027	0.0010	9454655
Dissolved Sulphate (SO ₄)	mg/L	238 (1)	9464797	228 (1)	1.0	9464797
Total Sulphide	mg/L	<0.0019	9457060	<0.0019	0.0019	9457060
Dissolved Chloride (Cl)	mg/L	58	9464796	59	0.50	9464796
Nutrients						
Total Ammonia (N)	mg/L	0.024	9452901	0.037	0.0050	9452903
Dissolved Nitrite (N)	mg/L	<0.0030	9458905	<0.0030	0.0030	9458905
Dissolved Nitrate (N)	mg/L	1.1	9458905	0.18	0.0030	9458905
RDL = Reportable Detection Limit						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						



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BV Labs Job #: B943649
Report Date: 2019/06/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV0841	VV0842	VV0843	VV0844	VV0845		
Sampling Date		2019/06/05 10:05	2019/06/05 10:20	2019/06/05 10:35	2019/06/05 10:55	2019/06/05 12:40		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	338	340	333	336	342	0.50	9452386
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00125	0.00088	<0.00050	0.00072	0.00888	0.00050	9454208
Dissolved Antimony (Sb)	mg/L	0.00570	0.00440	0.00849	0.00528	0.00990	0.000020	9454208
Dissolved Arsenic (As)	mg/L	0.0443	0.0428	0.0149	0.0182	0.0529	0.000020	9454208
Dissolved Barium (Ba)	mg/L	0.0239	0.0362	0.107	0.111	0.0646	0.000020	9454208
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9454208
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9454208
Dissolved Boron (B)	mg/L	0.032	0.031	0.028	0.031	0.033	0.010	9454208
Dissolved Cadmium (Cd)	mg/L	0.000127	0.0000204	0.0000851	0.0000425	0.000955	0.0000050	9454208
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9454208
Dissolved Cobalt (Co)	mg/L	0.00263	0.00307	0.000687	0.00107	0.00387	0.0000050	9454208
Dissolved Copper (Cu)	mg/L	0.000746	0.000421	0.00103	0.000461	0.00403	0.000050	9454208
Dissolved Iron (Fe)	mg/L	0.0314	0.0384	0.0499	0.0272	0.152	0.0010	9454208
Dissolved Lead (Pb)	mg/L	0.000356	0.000146	0.0000389	0.0000174	0.00257	0.0000050	9454208
Dissolved Lithium (Li)	mg/L	0.0120	0.0111	0.00902	0.00866	0.0128	0.00050	9454208
Dissolved Manganese (Mn)	mg/L	0.108	0.136	0.936	1.01	0.118	0.000050	9454208
Dissolved Molybdenum (Mo)	mg/L	0.00183	0.00128	0.00268	0.00224	0.00199	0.000050	9454208
Dissolved Nickel (Ni)	mg/L	0.00958	0.00976	0.00467	0.00431	0.0125	0.000020	9454208
Dissolved Selenium (Se)	mg/L	0.00279	0.00295	0.00191	0.00173	0.00523	0.000040	9454208
Dissolved Silicon (Si)	mg/L	1.03	0.953	2.24	2.09	0.859	0.050	9454208
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9454208
Dissolved Strontium (Sr)	mg/L	0.517	0.535	0.493	0.555	0.566	0.000050	9454208
Dissolved Thallium (Tl)	mg/L	0.0000970	0.000138	0.0000062	0.0000087	0.000203	0.0000020	9454208
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9454208
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9454208
Dissolved Uranium (U)	mg/L	0.0268	0.0249	0.0163	0.0115	0.0320	0.0000020	9454208
Dissolved Vanadium (V)	mg/L	0.00021	<0.00020	0.00044	0.00058	0.00022	0.00020	9454208
Dissolved Zinc (Zn)	mg/L	0.0339	0.0202	0.0295	0.0155	0.279	0.00010	9454208
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00013	<0.00010	0.00017	0.00010	9454208
Dissolved Calcium (Ca)	mg/L	108	109	108	109	110	0.050	9452395
Dissolved Magnesium (Mg)	mg/L	16.3	16.5	15.2	15.4	16.4	0.050	9452395

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV0841	VV0842	VV0843	VV0844	VV0845		
Sampling Date		2019/06/05 10:05	2019/06/05 10:20	2019/06/05 10:35	2019/06/05 10:55	2019/06/05 12:40		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.63	7.54	7.18	7.36	6.86	0.050	9452395
Dissolved Sodium (Na)	mg/L	25.8	26.3	25.6	26.0	26.5	0.050	9452395
Dissolved Sulphur (S)	mg/L	88.5	87.2	79.2	81.9	87.1	3.0	9452395
RDL = Reportable Detection Limit								



BV Labs Job #: B943649
Report Date: 2019/06/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV0846	VV0847	VV0848		
Sampling Date		2019/06/05 11:15	2019/06/05 11:30	2019/06/05 11:45		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	332	343	339	0.50	9452386
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00059	0.00394	0.00053	0.00050	9454208
Dissolved Antimony (Sb)	mg/L	0.0342	0.0282	0.00780	0.000020	9454208
Dissolved Arsenic (As)	mg/L	0.270	0.0286	0.00244	0.000020	9454208
Dissolved Barium (Ba)	mg/L	0.0810	0.0922	0.154	0.000020	9454208
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9454208
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9454208
Dissolved Boron (B)	mg/L	0.035	0.034	0.031	0.010	9454208
Dissolved Cadmium (Cd)	mg/L	0.000177	0.00336	0.000716	0.0000050	9454208
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9454208
Dissolved Cobalt (Co)	mg/L	0.0136	0.00115	0.0000480	0.0000050	9454208
Dissolved Copper (Cu)	mg/L	0.000739	0.00817	0.00405	0.000050	9454208
Dissolved Iron (Fe)	mg/L	0.0384	0.0021	0.0031	0.0010	9454208
Dissolved Lead (Pb)	mg/L	0.000769	0.00266	0.0000603	0.0000050	9454208
Dissolved Lithium (Li)	mg/L	0.0129	0.0133	0.00890	0.00050	9454208
Dissolved Manganese (Mn)	mg/L	0.0843	0.0448	0.217	0.000050	9454208
Dissolved Molybdenum (Mo)	mg/L	0.00158	0.00192	0.00247	0.000050	9454208
Dissolved Nickel (Ni)	mg/L	0.0598	0.00926	0.00350	0.000020	9454208
Dissolved Selenium (Se)	mg/L	0.0151	0.0118	0.00423	0.000040	9454208
Dissolved Silicon (Si)	mg/L	1.04	0.907	2.07	0.050	9454208
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9454208
Dissolved Strontium (Sr)	mg/L	0.580	0.637	0.582	0.000050	9454208
Dissolved Thallium (Tl)	mg/L	0.000144	0.000685	0.0000278	0.0000020	9454208
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9454208
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9454208
Dissolved Uranium (U)	mg/L	0.147	0.0431	0.0212	0.0000020	9454208
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9454208
Dissolved Zinc (Zn)	mg/L	0.0609	0.204	0.0760	0.00010	9454208
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00012	<0.00010	0.00010	9454208
Dissolved Calcium (Ca)	mg/L	106	109	110	0.050	9452395
Dissolved Magnesium (Mg)	mg/L	16.4	16.9	15.8	0.050	9452395
RDL = Reportable Detection Limit						



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BV Labs Job #: B943649
Report Date: 2019/06/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV0846	VV0847	VV0848		
Sampling Date		2019/06/05 11:15	2019/06/05 11:30	2019/06/05 11:45		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.27	6.40	5.31	0.050	9452395
Dissolved Sodium (Na)	mg/L	27.1	27.0	26.6	0.050	9452395
Dissolved Sulphur (S)	mg/L	88.3	85.8	83.9	3.0	9452395
RDL = Reportable Detection Limit						



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BV Labs Job #: B943649
Report Date: 2019/06/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV0841	VV0842	VV0843	VV0844	VV0845		
Sampling Date		2019/06/05 10:05	2019/06/05 10:20	2019/06/05 10:35	2019/06/05 10:55	2019/06/05 12:40		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	341	344	338	340	345	0.50	9453076
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00232	0.00146	0.00183	0.00123	0.0132	0.00050	9454204
Total Antimony (Sb)	mg/L	0.00560	0.00442	0.00851	0.00532	0.0100	0.000020	9454204
Total Arsenic (As)	mg/L	0.0449	0.0435	0.0176	0.0198	0.0537	0.000020	9454204
Total Barium (Ba)	mg/L	0.0551	0.0396	0.110	0.115	0.0659	0.000020	9454204
Total Beryllium (Be)	mg/L	0.000041	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9454204
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9454204
Total Boron (B)	mg/L	0.034	0.032	0.029	0.030	0.030	0.010	9454204
Total Cadmium (Cd)	mg/L	0.000143	0.0000285	0.0000886	0.0000432	0.00114	0.0000050	9454204
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9454204
Total Cobalt (Co)	mg/L	0.00271	0.00309	0.000737	0.00112	0.00386	0.0000050	9454204
Total Copper (Cu)	mg/L	0.000959	0.000548	0.00113	0.000478	0.00712	0.000050	9454204
Total Iron (Fe)	mg/L	0.0821	0.0924	0.322	0.147	0.175	0.0010	9454204
Total Lead (Pb)	mg/L	0.00115	0.000421	0.000441	0.000115	0.00566	0.0000050	9454204
Total Lithium (Li)	mg/L	0.0116	0.0122	0.00958	0.00955	0.0120	0.00050	9454204
Total Manganese (Mn)	mg/L	0.110	0.137	0.959	1.10	0.120	0.000050	9454204
Total Molybdenum (Mo)	mg/L	0.00176	0.00132	0.00276	0.00221	0.00199	0.000050	9454204
Total Nickel (Ni)	mg/L	0.00990	0.0101	0.00473	0.00438	0.0128	0.000020	9454204
Total Selenium (Se)	mg/L	0.00327	0.00334	0.00229	0.00200	0.00496	0.000040	9454204
Total Silicon (Si)	mg/L	1.05	0.978	2.29	2.16	0.877	0.050	9454204
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9454204
Total Strontium (Sr)	mg/L	0.524	0.530	0.493	0.562	0.564	0.000050	9454204
Total Thallium (Tl)	mg/L	0.000103	0.000146	0.0000056	0.0000072	0.000207	0.0000020	9454204
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9454204
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9454204
Total Uranium (U)	mg/L	0.0281	0.0262	0.0167	0.0117	0.0297	0.0000020	9454204
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00049	0.00060	<0.00020	0.00020	9454204
Total Zinc (Zn)	mg/L	0.0347	0.0199	0.0298	0.0144	0.283	0.00010	9454204
Total Zirconium (Zr)	mg/L	0.00015	<0.00010	<0.00010	<0.00010	0.00018	0.00010	9454204
Total Calcium (Ca)	mg/L	109	110	109	110	111	0.050	9452400
Total Magnesium (Mg)	mg/L	16.8	17.1	16.1	16.0	16.6	0.050	9452400

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV0841	VV0842	VV0843	VV0844	VV0845		
Sampling Date		2019/06/05 10:05	2019/06/05 10:20	2019/06/05 10:35	2019/06/05 10:55	2019/06/05 12:40		
COC Number		1of1	1of1	1of1	1of1	1of1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Potassium (K)	mg/L	7.76	7.62	7.29	7.43	6.94	0.050	9452400
Total Sodium (Na)	mg/L	26.6	27.4	26.7	26.6	27.1	0.050	9452400
Total Sulphur (S)	mg/L	91.6	89.3	83.1	83.0	88.1	3.0	9452400
RDL = Reportable Detection Limit								



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BV Labs Job #: B943649
Report Date: 2019/06/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV0846	VV0847	VV0848		
Sampling Date		2019/06/05 11:15	2019/06/05 11:30	2019/06/05 11:45		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	336	345	341	0.50	9453076
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00226	0.00747	0.00681	0.00050	9454204
Total Antimony (Sb)	mg/L	0.0359	0.0285	0.00789	0.000020	9454204
Total Arsenic (As)	mg/L	0.281	0.0295	0.00340	0.000020	9454204
Total Barium (Ba)	mg/L	0.0961	0.0939	0.156	0.000020	9454204
Total Beryllium (Be)	mg/L	<0.000010	0.000019	0.000019	0.000010	9454204
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	0.0000050	9454204
Total Boron (B)	mg/L	0.028	0.030	0.026	0.010	9454204
Total Cadmium (Cd)	mg/L	0.000769	0.00348	0.000701	0.0000050	9454204
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9454204
Total Cobalt (Co)	mg/L	0.0139	0.00120	0.0000710	0.0000050	9454204
Total Copper (Cu)	mg/L	0.00249	0.00832	0.00425	0.000050	9454204
Total Iron (Fe)	mg/L	0.139	0.0064	0.0428	0.0010	9454204
Total Lead (Pb)	mg/L	0.00312	0.00307	0.000600	0.0000050	9454204
Total Lithium (Li)	mg/L	0.0127	0.0124	0.00934	0.00050	9454204
Total Manganese (Mn)	mg/L	0.0870	0.0455	0.223	0.000050	9454204
Total Molybdenum (Mo)	mg/L	0.00161	0.00194	0.00257	0.000050	9454204
Total Nickel (Ni)	mg/L	0.0611	0.00948	0.00362	0.000020	9454204
Total Selenium (Se)	mg/L	0.0160	0.0120	0.00427	0.000040	9454204
Total Silicon (Si)	mg/L	1.07	0.933	2.16	0.050	9454204
Total Silver (Ag)	mg/L	0.0000069	<0.0000050	<0.0000050	0.0000050	9454204
Total Strontium (Sr)	mg/L	0.582	0.650	0.599	0.000050	9454204
Total Thallium (Tl)	mg/L	0.000175	0.000685	0.0000281	0.0000020	9454204
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9454204
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00058	0.00050	9454204
Total Uranium (U)	mg/L	0.151	0.0432	0.0210	0.0000020	9454204
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9454204
Total Zinc (Zn)	mg/L	0.118	0.209	0.0766	0.00010	9454204
Total Zirconium (Zr)	mg/L	0.00015	<0.00010	0.00013	0.00010	9454204
Total Calcium (Ca)	mg/L	107	110	111	0.050	9452400
Total Magnesium (Mg)	mg/L	16.6	17.2	15.6	0.050	9452400
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV0846	VV0847	VV0848		
Sampling Date		2019/06/05 11:15	2019/06/05 11:30	2019/06/05 11:45		
COC Number		1of1	1of1	1of1		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	8.31	6.50	5.31	0.050	9452400
Total Sodium (Na)	mg/L	27.5	27.4	26.4	0.050	9452400
Total Sulphur (S)	mg/L	87.3	89.5	83.6	3.0	9452400
RDL = Reportable Detection Limit						



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	13.0°C
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Sample VV0841 [TRIAL #1] : Nitrogen (Nitrite - Nitrate) Low Level completed within 48h after laboratory receipt to a maximum of five days from sampling. Data are satisfactory for compliance purposes.

Sample VV0842 [TRIAL #2] : Nitrogen (Nitrite - Nitrate) Low Level completed within 48h after laboratory receipt to a maximum of five days from sampling. Data are satisfactory for compliance purposes.

Sample VV0843 [TRIAL #3] : Nitrogen (Nitrite - Nitrate) Low Level completed within 48h after laboratory receipt to a maximum of five days from sampling. Data are satisfactory for compliance purposes.

Sample VV0844 [TRIAL #4] : Nitrogen (Nitrite - Nitrate) Low Level completed within 48h after laboratory receipt to a maximum of five days from sampling. Data are satisfactory for compliance purposes.

Sample VV0845 [TRIAL #5] : Nitrogen (Nitrite - Nitrate) Low Level completed within 48h after laboratory receipt to a maximum of five days from sampling. Data are satisfactory for compliance purposes.

Sample VV0846 [TRIAL #6] : Nitrogen (Nitrite - Nitrate) Low Level completed within 48h after laboratory receipt to a maximum of five days from sampling. Data are satisfactory for compliance purposes.

Sample VV0847 [TRIAL #7] : Nitrogen (Nitrite - Nitrate) Low Level completed within 48h after laboratory receipt to a maximum of five days from sampling. Data are satisfactory for compliance purposes.

Sample VV0848 [TRIAL #8] : Nitrogen (Nitrite - Nitrate) Low Level completed within 48h after laboratory receipt to a maximum of five days from sampling. Data are satisfactory for compliance purposes.

Results relate only to the items tested.

BUREAU
VERITAS

BV Labs Job #: B943649

Report Date: 2019/06/14

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9452901	Total Ammonia (N)	2019/06/07	90	80 - 120	105	80 - 120	<0.0050	mg/L	6.7	20
9452903	Total Ammonia (N)	2019/06/07	84	80 - 120	107	80 - 120	<0.0050	mg/L	1.7	20
9454204	Total Aluminum (Al)	2019/06/07	102	80 - 120	95	80 - 120	<0.00050	mg/L	1.9	20
9454204	Total Antimony (Sb)	2019/06/07	96	80 - 120	99	80 - 120	<0.000020	mg/L	2.7	20
9454204	Total Arsenic (As)	2019/06/07	99	80 - 120	100	80 - 120	<0.000020	mg/L	0.19	20
9454204	Total Barium (Ba)	2019/06/07	97	80 - 120	101	80 - 120	<0.000020	mg/L	0.28	20
9454204	Total Beryllium (Be)	2019/06/07	101	80 - 120	105	80 - 120	<0.000010	mg/L	0.63	20
9454204	Total Bismuth (Bi)	2019/06/07	99	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9454204	Total Boron (B)	2019/06/07	85	80 - 120	83	80 - 120	<0.010	mg/L	1.6	20
9454204	Total Cadmium (Cd)	2019/06/07	99	80 - 120	102	80 - 120	<0.0000050	mg/L	2.3	20
9454204	Total Chromium (Cr)	2019/06/07	96	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9454204	Total Cobalt (Co)	2019/06/07	94	80 - 120	102	80 - 120	<0.0000050	mg/L	0.76	20
9454204	Total Copper (Cu)	2019/06/07	93	80 - 120	104	80 - 120	<0.000050	mg/L	1.9	20
9454204	Total Iron (Fe)	2019/06/07	100	80 - 120	106	80 - 120	<0.0010	mg/L	0.0077	20
9454204	Total Lead (Pb)	2019/06/07	99	80 - 120	104	80 - 120	<0.0000050	mg/L	2.4	20
9454204	Total Lithium (Li)	2019/06/07	99	80 - 120	97	80 - 120	<0.00050	mg/L	6.6	20
9454204	Total Manganese (Mn)	2019/06/07	NC	80 - 120	102	80 - 120	<0.000050	mg/L	1.1	20
9454204	Total Molybdenum (Mo)	2019/06/07	105	80 - 120	106	80 - 120	<0.000050	mg/L	0.42	20
9454204	Total Nickel (Ni)	2019/06/07	94	80 - 120	104	80 - 120	<0.000020	mg/L	0.46	20
9454204	Total Selenium (Se)	2019/06/07	97	80 - 120	96	80 - 120	<0.000040	mg/L	3.0	20
9454204	Total Silicon (Si)	2019/06/07	85	80 - 120	86	80 - 120	<0.050	mg/L	0.65	20
9454204	Total Silver (Ag)	2019/06/07	98	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9454204	Total Strontium (Sr)	2019/06/07	NC	80 - 120	101	80 - 120	<0.000050	mg/L	2.0	20
9454204	Total Thallium (Tl)	2019/06/07	102	80 - 120	106	80 - 120	<0.0000020	mg/L	1.6	20
9454204	Total Tin (Sn)	2019/06/07	97	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9454204	Total Titanium (Ti)	2019/06/07	100	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
9454204	Total Uranium (U)	2019/06/07	97	80 - 120	108	80 - 120	<0.0000020	mg/L	0.014	20
9454204	Total Vanadium (V)	2019/06/07	98	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9454204	Total Zinc (Zn)	2019/06/07	96	80 - 120	103	80 - 120	<0.00010	mg/L	0.057	20
9454204	Total Zirconium (Zr)	2019/06/07	102	80 - 120	98	80 - 120	<0.00010	mg/L	10	20
9454208	Dissolved Aluminum (Al)	2019/06/10	107	80 - 120	98	80 - 120	<0.00050	mg/L	10	20
9454208	Dissolved Antimony (Sb)	2019/06/10	99	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20

BUREAU
VERITAS

BV Labs Job #: B943649

Report Date: 2019/06/14

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9454208	Dissolved Arsenic (As)	2019/06/10	100	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9454208	Dissolved Barium (Ba)	2019/06/10	101	80 - 120	100	80 - 120	<0.000020	mg/L	9.7	20
9454208	Dissolved Beryllium (Be)	2019/06/10	107	80 - 120	107	80 - 120	<0.000010	mg/L	NC	20
9454208	Dissolved Bismuth (Bi)	2019/06/10	102	80 - 120	104	80 - 120	<0.0000050	mg/L	17	20
9454208	Dissolved Boron (B)	2019/06/10	91	80 - 120	90	80 - 120	<0.010	mg/L	NC	20
9454208	Dissolved Cadmium (Cd)	2019/06/10	102	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9454208	Dissolved Chromium (Cr)	2019/06/10	98	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9454208	Dissolved Cobalt (Co)	2019/06/10	98	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9454208	Dissolved Copper (Cu)	2019/06/10	97	80 - 120	100	80 - 120	<0.000050	mg/L	0.70	20
9454208	Dissolved Iron (Fe)	2019/06/10	104	80 - 120	105	80 - 120	<0.0010	mg/L	3.2	20
9454208	Dissolved Lead (Pb)	2019/06/10	100	80 - 120	102	80 - 120	<0.0000050	mg/L	18	20
9454208	Dissolved Lithium (Li)	2019/06/10	101	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9454208	Dissolved Manganese (Mn)	2019/06/10	101	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9454208	Dissolved Molybdenum (Mo)	2019/06/10	105	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9454208	Dissolved Nickel (Ni)	2019/06/10	97	80 - 120	100	80 - 120	<0.000020	mg/L	1.8	20
9454208	Dissolved Selenium (Se)	2019/06/10	100	80 - 120	97	80 - 120	<0.000040	mg/L	NC	20
9454208	Dissolved Silicon (Si)	2019/06/10	92	80 - 120	89	80 - 120	<0.050	mg/L	0.50	20
9454208	Dissolved Silver (Ag)	2019/06/10	98	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9454208	Dissolved Strontium (Sr)	2019/06/10	103	80 - 120	99	80 - 120	<0.000050	mg/L	6.7	20
9454208	Dissolved Thallium (Tl)	2019/06/10	104	80 - 120	104	80 - 120	<0.0000020	mg/L	NC	20
9454208	Dissolved Tin (Sn)	2019/06/10	99	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9454208	Dissolved Titanium (Ti)	2019/06/10	102	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9454208	Dissolved Uranium (U)	2019/06/10	101	80 - 120	105	80 - 120	<0.0000020	mg/L	NC	20
9454208	Dissolved Vanadium (V)	2019/06/10	99	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9454208	Dissolved Zinc (Zn)	2019/06/10	100	80 - 120	99	80 - 120	<0.00010	mg/L	0.49	20
9454208	Dissolved Zirconium (Zr)	2019/06/10	101	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9454373	HCl Preserved Iron (Fe+2 Ferrous)	2019/06/07	96	80 - 120	99	90 - 110	<0.050	mg/L	NC	20
9454655	Orthophosphate (P)	2019/06/07	NC	80 - 120	99	80 - 120	<0.0010	mg/L	6.8	20
9456503	Dissolved Organic Carbon (C)	2019/06/10	101	80 - 120	101	80 - 120	<0.50	mg/L	0.15	20
9457060	Total Sulphide	2019/06/09			82	80 - 120	<0.0019	mg/L	NC	20
9458905	Dissolved Nitrate (N)	2019/06/10	102	80 - 120	100	80 - 120	<0.0030	mg/L	0.074	20
9458905	Dissolved Nitrite (N)	2019/06/10	101	80 - 120	98	80 - 120	<0.0030	mg/L	NC	20



BUREAU
VERITAS

BV Labs Job #: B943649

Report Date: 2019/06/14

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9459482	Alkalinity (PP as CaCO ₃)	2019/06/11					<0.50	mg/L	NC	20
9459482	Alkalinity (Total as CaCO ₃)	2019/06/11			92	80 - 120	<0.50	mg/L	0.64	20
9459482	Bicarbonate (HCO ₃)	2019/06/11					<0.50	mg/L	0.64	20
9459482	Carbonate (CO ₃)	2019/06/11					<0.50	mg/L	NC	20
9459482	Hydroxide (OH)	2019/06/11					<0.50	mg/L	NC	20
9459484	Fluoride (F)	2019/06/11	93	80 - 120	90	80 - 120	<0.010	mg/L	0	20
9464469	Fluoride (F)	2019/06/13	102	80 - 120	98	80 - 120	<0.010	mg/L	5.6	20
9464796	Dissolved Chloride (Cl)	2019/06/13	NC	80 - 120	104	80 - 120	<0.50	mg/L	1.4	20
9464797	Dissolved Sulphate (SO ₄)	2019/06/13	NC	80 - 120	97	95 - 109	<0.50	mg/L	3.1	20
9465311	Acidity (pH 4.5)	2019/06/13					<1.0	mg/L	NC	20
9465311	Acidity (pH 8.3)	2019/06/13			101	80 - 120	<1.0	mg/L	8.2	20
9465314	Acidity (pH 4.5)	2019/06/13					<1.0	mg/L		
9465314	Acidity (pH 8.3)	2019/06/13			101	80 - 120	<1.0	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required													
Company Name: BMC MINERALS LTD.		Company Name: ALEXCO ENVIRONMENTAL GROUP		Quotation #: B60751		☒ Regular TAT 5 days (Most analyses)													
Contact Name:		Contact Name: Andrew Gault; Kristen Piecowye		P.O. #/ AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS													
Address: 530-1130 WEST PENDER ST		Address: UNIT 3 151 INDUSTRIAL RD		Project #: BMC-18-02		Rush TAT (Surcharges will be applied)													
Vancouver, BC PC: V6E 4A4		Whitehorse, YK PC: V1A 2V3		Site Location: Kudz Ze Kayah		☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days													
Phone:		Phone: (867) 668-6463		Site #:		Date Required:													
Email:		Email: agault@alexcoresource.com kpiewoye@contangostrategies.com		Sampled By:															
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:			
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA # OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE												LABORATORY USE ONLY CUSTODY SEAL: Y / N Present: ☐ Intact: ☐ COOLING MEDIA PRESENT: Y / N COMMENTS			
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix													# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1 Trial #1		05-Jun-19	10:05	Water	X	X	X	X	X	X	X	X	X	X	X	X	10		Received in Saskatoon By: <i>Safiann Maiter</i> JUN 05 2019 13:11 Temp: <i>10 / 16 / 13</i>
2 Trial #2		05-Jun-19	10:20	Water	X	X	X	X	X	X	X	X	X	X	X	X	10		
3 Trial #3		05-Jun-19	10:35	Water	X	X	X	X	X	X	X	X	X	X	X	X	10		
4 Trial #4		05-Jun-19	10:55	Water	X	X	X	X	X	X	X	X	X	X	X	X	10		
5 Trial #5		05-Jun-19	12:40	Water	X	X	X	X	X	X	X	X	X	X	X	X	10		
6 Trial #6		05-Jun-19	11:15	Water	X	X	X	X	X	X	X	X	X	X	X	X	10		
7 Trial #7		05-Jun-19	11:30	Water	X	X	X	X	X	X	X	X	X	X	X	X	10		
8 Trial #8		05-Jun-19	11:45	Water	X	X	X	X	X	X	X	X	X	X	X	X	10		
9																			
10																			
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)									
<i>[Signature]</i>		2019/06/05		13:11		<i>[Signature]</i>		2019/06/05		08:35									
05-Jun-19 13:11 Safiann Maiter  B943649																			

MO3 INS-0174



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/06/26
 Report #: R2743596
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B948046

Received: 2019/06/18, 13:11

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	8	N/A	2019/06/21	AB SOP-00005	SM 23 2310 B m
Alkalinity - Low Level	8	N/A	2019/06/22	AB SOP-00005	SM 23 2320 B m
Chloride - Low Level	8	N/A	2019/06/24	AB SOP-00020	SM 23-4500-Cl-E m
Carbon (DOC) (2)	8	N/A	2019/06/24	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level	8	N/A	2019/06/22	AB SOP-00005	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/06/20	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/06/24		Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	3	N/A	2019/06/24		Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	5	N/A	2019/06/25		Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/06/24		Auto Calc
Ion Balance (as Cations/Anions Ratio)	8	N/A	2019/06/24		Auto Calc
Ion Balance	8	N/A	2019/06/20		Auto Calc
Sum of cations, anions	8	N/A	2019/06/24		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/06/24		Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	8	N/A	2019/06/24	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	5	2019/06/24	2019/06/24	BBY7SOP-00003	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	3	N/A	2019/06/24		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total)	5	N/A	2019/06/25		Auto Calc
Elements by ICPMS Low Level (total) (1)	3	N/A	2019/06/23	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/06/20	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite - Low Level	8	N/A	2019/06/21		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	8	N/A	2019/06/21		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	8	N/A	2019/06/20	AB SOP-00023	SM 23 4110 B m
Orthophosphate by Konelab (low level)	8	N/A	2019/06/20	AB SOP-00025	SM 23 4500-P A, F m
Total Sulphide	8	N/A	2019/06/24	AB SOP-00080	SM 23 4500 S ₂ -A D Fm
Sulphate - Low Level	8	N/A	2019/06/24	AB SOP-00018	SM 23 4500-SO ₄ E m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/06/26
Report #: R2743596
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B948046

Received: 2019/06/18, 13:11

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: smaiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VX6016		VX6017			VX6018		
Sampling Date		2019/06/18 10:15		2019/06/18 10:30			2019/06/18 10:50		
COC Number		1 of 1		1 of 1			1 of 1		
	UNITS	TRAIL #1	RDL	TRAIL #2	RDL	QC Batch	TRAIL #3	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.5	N/A	9.0	N/A	9474313	7.7	N/A	9474313
Cation Sum	meq/L	8.2	N/A	8.2	N/A	9474313	7.9	N/A	9474313
Ion Balance	N/A	0.96	0.010	0.91	0.010	9479123	1.0	0.010	9479123
Ion Balance (% Difference)	%	1.9	N/A	4.6	N/A	9474311	1.3	N/A	9474311
Dissolved Nitrate (NO3)	mg/L	3.4	0.013	<0.013	0.013	9474127	<0.013	0.013	9474127
Nitrate plus Nitrite (N)	mg/L	1.3	0.0042	<0.0042	0.0042	9473982	<0.0042	0.0042	9473982
Dissolved Nitrite (NO2)	mg/L	1.6	0.0099	<0.0099	0.0099	9474127	<0.0099	0.0099	9474127
Sulphide (as H2S)	mg/L	<0.0020	0.0020	0.015	0.0020	9473687	0.0090	0.0020	9473687

Misc. Inorganics

Fluoride (F)	mg/L	0.625	0.010	0.635	0.010	9478704	0.515	0.010	9478704
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	0.079	0.050	9476584	0.18	0.050	9476584
Dissolved Organic Carbon (C)	mg/L	4.4	0.50	24	0.50	9477674	11	0.50	9477674
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	9476102	<1.0	1.0	9476102
Alkalinity (Total as CaCO3)	mg/L	79.4	0.50	108	0.50	9478701	73.9	0.50	9478701
Acidity (pH 8.3)	mg/L	6.0	1.0	8.3	1.0	9476102	8.7	1.0	9476102
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	9478701	<0.50	0.50	9478701
Bicarbonate (HCO3)	mg/L	96.9	0.50	132	0.50	9478701	90.1	0.50	9478701
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	9478701	<0.50	0.50	9478701
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	9478701	<0.50	0.50	9478701

Anions

Orthophosphate (P)	mg/L	1.1 (1)	0.10	1.1 (1)	0.050	9476243	0.0044	0.0010	9476243
Dissolved Sulphate (SO4)	mg/L	243 (1)	1.0	241 (1)	1.0	9480200	216 (1)	1.0	9480200
Total Sulphide	mg/L	<0.0019	0.0019	0.014	0.0019	9478140	0.0086	0.0019	9478140
Dissolved Chloride (Cl)	mg/L	60	0.50	60	0.50	9480199	61	0.50	9480199

Nutrients

Total Ammonia (N)	mg/L	0.12	0.0050	0.027	0.0050	9475333	0.067 (2)	0.0050	9475338
Dissolved Nitrite (N)	mg/L	0.48	0.0030	<0.0030	0.0030	9476688	<0.0030	0.0030	9476688
Dissolved Nitrate (N)	mg/L	0.78	0.0030	<0.0030	0.0030	9476688	<0.0030	0.0030	9476688

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

(2) Matrix spike exceeds acceptance limits for nh4, probable matrix interference.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VX6019		VX6020		VX6021		
Sampling Date		2019/06/18 11:15		2019/06/18 12:45		2019/06/18 11:20		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	TRAIL #4	RDL	TRAIL #5	RDL	TRAIL #6	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	7.5	N/A	7.8	N/A	7.9	N/A	9474313
Cation Sum	meq/L	8.2	N/A	8.1	N/A	8.2	N/A	9474313
Ion Balance	N/A	1.1	0.010	1.0	0.010	1.0	0.010	9479123
Ion Balance (% Difference)	%	4.8	N/A	1.7	N/A	1.7	N/A	9474311
Dissolved Nitrate (NO ₃)	mg/L	<0.013	0.013	<0.013	0.013	<0.013	0.013	9474127
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	<0.0042	0.0042	<0.0042	0.0042	9473982
Dissolved Nitrite (NO ₂)	mg/L	<0.0099	0.0099	<0.0099	0.0099	<0.0099	0.0099	9474127
Sulphide (as H ₂ S)	mg/L	0.072	0.0020	0.0070	0.0020	<0.0020	0.0020	9473687
Misc. Inorganics								
Fluoride (F)	mg/L	0.510	0.010	0.669	0.010	0.679	0.010	9478704
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.76	0.050	0.10	0.050	0.057	0.050	9476584
Dissolved Organic Carbon (C)	mg/L	29 (1)	2.5	25 (1)	2.5	13	0.50	9477674
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	9476102
Alkalinity (Total as CaCO ₃)	mg/L	61.6	0.50	56.7	0.50	63.3	0.50	9478701
Acidity (pH 8.3)	mg/L	9.1	1.0	17.3	1.0	7.8	1.0	9476102
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	9478701
Bicarbonate (HCO ₃)	mg/L	75.1	0.50	69.2	0.50	77.2	0.50	9478701
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	9478701
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	9478701
Anions								
Orthophosphate (P)	mg/L	0.083 (2)	0.0050	0.39 (2)	0.020	1.1 (2)	0.10	9476243
Dissolved Sulphate (SO ₄)	mg/L	214 (2)	1.0	238 (2)	1.0	237 (2)	1.0	9480200
Total Sulphide	mg/L	0.067	0.0019	0.0067	0.0019	<0.0019	0.0019	9478140
Dissolved Chloride (Cl)	mg/L	62	0.50	60	0.50	56	0.50	9480199
Nutrients								
Total Ammonia (N)	mg/L	0.080	0.0050	1.6 (2)	0.025	0.061	0.0050	9475338
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	<0.0030	0.0030	<0.0030	0.0030	9476688
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	<0.0030	0.0030	<0.0030	0.0030	9476688
RDL = Reportable Detection Limit								
N/A = Not Applicable								
(1) Detection limits raised due to sample matrix.								
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.								

BUREAU
VERITASBV Labs Job #: B948046
Report Date: 2019/06/26ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VX6022		VX6023		
Sampling Date		2019/06/18 11:30		2019/06/18 11:45		
COC Number		1 of 1		1 of 1		
	UNITS	TRAIL #7	QC Batch	TRAIL #8	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	8.5	9474313	8.2	N/A	9474313
Cation Sum	meq/L	8.2	9474313	8.0	N/A	9474313
Ion Balance	N/A	0.98	9479123	0.97	0.010	9479123
Ion Balance (% Difference)	%	1.2	9474311	1.7	N/A	9474311
Dissolved Nitrate (NO3)	mg/L	5.0	9474127	0.68	0.013	9474127
Nitrate plus Nitrite (N)	mg/L	1.1	9473982	0.15	0.0042	9473982
Dissolved Nitrite (NO2)	mg/L	<0.0099	9474127	<0.0099	0.0099	9474127
Sulphide (as H2S)	mg/L	<0.0020	9473687	<0.0020	0.0020	9473687
Misc. Inorganics						
Fluoride (F)	mg/L	0.641	9478704	0.493	0.010	9478704
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	9476584	<0.050	0.050	9476584
Dissolved Organic Carbon (C)	mg/L	3.0	9477674	4.0	0.50	9477674
Acidity (pH 4.5)	mg/L	<1.0	9476102	<1.0	1.0	9476102
Alkalinity (Total as CaCO3)	mg/L	85.5	9478701	88.2	0.50	9478701
Acidity (pH 8.3)	mg/L	2.9	9476102	5.6	1.0	9476102
Alkalinity (PP as CaCO3)	mg/L	<0.50	9478701	<0.50	0.50	9478701
Bicarbonate (HCO3)	mg/L	104	9478701	108	0.50	9478701
Carbonate (CO3)	mg/L	<0.50	9478701	<0.50	0.50	9478701
Hydroxide (OH)	mg/L	<0.50	9478701	<0.50	0.50	9478701
Anions						
Orthophosphate (P)	mg/L	0.010	9476243	0.0026	0.0010	9476243
Dissolved Sulphate (SO4)	mg/L	236 (1)	9480200	227 (1)	1.0	9480200
Total Sulphide	mg/L	<0.0019	9478140	<0.0019	0.0019	9478140
Dissolved Chloride (Cl)	mg/L	60	9480199	61	0.50	9480199
Nutrients						
Total Ammonia (N)	mg/L	0.017	9475333	0.093	0.0050	9475338
Dissolved Nitrite (N)	mg/L	<0.0030	9476688	<0.0030	0.0030	9476688
Dissolved Nitrate (N)	mg/L	1.1	9476688	0.15	0.0030	9476688
RDL = Reportable Detection Limit						
N/A = Not Applicable						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						



BUREAU
VERITAS

BV Labs Job #: B948046
Report Date: 2019/06/26

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VX6016	VX6017	VX6018		VX6019		
Sampling Date		2019/06/18 10:15	2019/06/18 10:30	2019/06/18 10:50		2019/06/18 11:15		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		
	UNITS	TRAIL #1	TRAIL #2	TRAIL #3	QC Batch	TRAIL #4	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	340	339	329	9474125	339	0.50	9474125
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00135	0.00134	0.00124	9482465	0.00722	0.00050	9480207
Dissolved Antimony (Sb)	mg/L	0.00791	0.00487	0.00762	9480207	0.00433	0.000020	9480207
Dissolved Arsenic (As)	mg/L	0.0471	0.0439	0.0101	9480207	0.0150	0.000020	9480207
Dissolved Barium (Ba)	mg/L	0.0224	0.0664	0.105	9480207	0.0770	0.000020	9480207
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9480207	<0.000010	0.000010	9480207
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9480207	<0.0000050	0.0000050	9480207
Dissolved Boron (B)	mg/L	0.038	0.039	0.033	9480207	0.031	0.010	9480207
Dissolved Cadmium (Cd)	mg/L	0.0000411	<0.0000050	0.0000287	9480207	<0.0000050	0.0000050	9480207
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	9480207	<0.00010	0.00010	9480207
Dissolved Cobalt (Co)	mg/L	0.00258	0.00221	0.000720	9480207	0.000945	0.0000050	9480207
Dissolved Copper (Cu)	mg/L	0.000496	0.000177	0.000336	9480207	0.000130	0.000050	9480207
Dissolved Iron (Fe)	mg/L	0.0194	0.0744	0.169	9480207	0.745	0.0010	9480207
Dissolved Lead (Pb)	mg/L	0.0000931	0.0000560	0.0000683	9480207	0.000132	0.0000050	9480207
Dissolved Lithium (Li)	mg/L	0.0104	0.00996	0.00713	9480207	0.00704	0.00050	9480207
Dissolved Manganese (Mn)	mg/L	0.112	0.145	0.999	9480207	1.28	0.000050	9480207
Dissolved Molybdenum (Mo)	mg/L	0.00186	0.00130	0.00277	9480207	0.00211	0.000050	9480207
Dissolved Nickel (Ni)	mg/L	0.0103	0.0102	0.00440	9480207	0.00376	0.000020	9480207
Dissolved Selenium (Se)	mg/L	0.00366	0.00215	0.00160	9480207	0.00176	0.000040	9480207
Dissolved Silicon (Si)	mg/L	0.916	0.871	1.98	9480207	2.03	0.050	9480207
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	9480207	<0.0000050	0.0000050	9480207
Dissolved Strontium (Sr)	mg/L	0.457	0.485	0.441	9480207	0.506	0.000050	9480207
Dissolved Thallium (Tl)	mg/L	0.000104	0.0000714	0.0000062	9480207	0.0000040	0.0000020	9480207
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9480207	<0.00020	0.00020	9480207
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9480207	<0.00050	0.00050	9480207
Dissolved Uranium (U)	mg/L	0.0231	0.0189	0.0136	9480207	0.00837	0.0000020	9480207
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00043	9480207	0.00045	0.00020	9480207
Dissolved Zinc (Zn)	mg/L	0.0375	0.0203	0.0266	9480207	0.0108	0.00010	9480207
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00011	9480207	0.00015	0.00010	9480207
Dissolved Calcium (Ca)	mg/L	106	106	105	9473912	107	0.050	9473912
Dissolved Magnesium (Mg)	mg/L	18.2	17.9	16.4	9473912	17.2	0.050	9473912

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VX6016	VX6017	VX6018		VX6019		
Sampling Date		2019/06/18 10:15	2019/06/18 10:30	2019/06/18 10:50		2019/06/18 11:15		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		
	UNITS	TRAIL #1	TRAIL #2	TRAIL #3	QC Batch	TRAIL #4	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.37	7.31	6.82	9473912	7.26	0.050	9473912
Dissolved Sodium (Na)	mg/L	27.8	27.5	26.3	9473912	27.4	0.050	9473912
Dissolved Sulphur (S)	mg/L	80.7	79.6	68.5	9473912	71.7	3.0	9473912
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B948046
Report Date: 2019/06/26ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		VX6020	VX6021	VX6022	VX6023		
Sampling Date		2019/06/18 12:45	2019/06/18 11:20	2019/06/18 11:30	2019/06/18 11:45		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRAIL #5	TRAIL #6	TRAIL #7	TRAIL #8	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	338	338	344	333	0.50	9474125
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0116	0.00311	0.00410	0.00162	0.00050	9480207
Dissolved Antimony (Sb)	mg/L	0.00855	0.0321	0.0265	0.00645	0.000020	9480207
Dissolved Arsenic (As)	mg/L	0.0471	0.249	0.0279	0.00228	0.000020	9480207
Dissolved Barium (Ba)	mg/L	0.0584	0.0340	0.0850	0.143	0.000020	9480207
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9480207
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9480207
Dissolved Boron (B)	mg/L	0.034	0.035	0.033	0.029	0.010	9480207
Dissolved Cadmium (Cd)	mg/L	0.000148	0.0000341	0.00329	0.000658	0.0000050	9480207
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9480207
Dissolved Cobalt (Co)	mg/L	0.00383	0.0122	0.00106	0.0000387	0.0000050	9480207
Dissolved Copper (Cu)	mg/L	0.00143	0.000226	0.00793	0.00424	0.000050	9480207
Dissolved Iron (Fe)	mg/L	0.118	0.0301	<0.0010	0.0030	0.0010	9480207
Dissolved Lead (Pb)	mg/L	0.00291	0.000260	0.00232	0.0000532	0.0000050	9480207
Dissolved Lithium (Li)	mg/L	0.00932	0.00996	0.00988	0.00672	0.00050	9480207
Dissolved Manganese (Mn)	mg/L	0.138	0.0972	0.0425	0.158	0.000050	9480207
Dissolved Molybdenum (Mo)	mg/L	0.00186	0.00145	0.00188	0.00220	0.000050	9480207
Dissolved Nickel (Ni)	mg/L	0.0128	0.0577	0.00935	0.00322	0.000020	9480207
Dissolved Selenium (Se)	mg/L	0.00486	0.00558	0.0128	0.00418	0.000040	9480207
Dissolved Silicon (Si)	mg/L	0.769	0.962	0.798	1.76	0.050	9480207
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9480207
Dissolved Strontium (Sr)	mg/L	0.510	0.526	0.579	0.515	0.000050	9480207
Dissolved Thallium (Tl)	mg/L	0.000162	0.0000422	0.000662	0.0000298	0.0000020	9480207
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9480207
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9480207
Dissolved Uranium (U)	mg/L	0.0281	0.127	0.0411	0.0174	0.0000020	9480207
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9480207
Dissolved Zinc (Zn)	mg/L	0.234	0.0605	0.199	0.0689	0.00010	9480207
Dissolved Zirconium (Zr)	mg/L	0.00015	<0.00010	<0.00010	<0.00010	0.00010	9480207
Dissolved Calcium (Ca)	mg/L	106	106	108	106	0.050	9473912
Dissolved Magnesium (Mg)	mg/L	17.8	17.5	18.0	16.6	0.050	9473912

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VX6020	VX6021	VX6022	VX6023		
Sampling Date		2019/06/18 12:45	2019/06/18 11:20	2019/06/18 11:30	2019/06/18 11:45		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRAIL #5	TRAIL #6	TRAIL #7	TRAIL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	6.53	8.03	6.24	5.07	0.050	9473912
Dissolved Sodium (Na)	mg/L	27.1	28.0	27.8	27.1	0.050	9473912
Dissolved Sulphur (S)	mg/L	78.2	76.6	74.9	72.1	3.0	9473912
RDL = Reportable Detection Limit							



BUREAU
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BV Labs Job #: B948046
Report Date: 2019/06/26

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VX6021	VX6022	VX6023		
Sampling Date		2019/06/18 11:20	2019/06/18 11:30	2019/06/18 11:45		
COC Number		1 of 1	1 of 1	1 of 1		
	UNITS	TRAIL #6	TRAIL #7	TRAIL #8	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	333	342	337	0.50	9473862
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.0137	0.0438	0.0195	0.00050	9479128
Total Antimony (Sb)	mg/L	0.0318	0.0265	0.00652	0.000020	9479128
Total Arsenic (As)	mg/L	0.256	0.0278	0.00293	0.000020	9479128
Total Barium (Ba)	mg/L	0.0840	0.0902	0.150	0.000020	9479128
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9479128
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9479128
Total Boron (B)	mg/L	0.039	0.043	0.034	0.010	9479128
Total Cadmium (Cd)	mg/L	0.000299	0.00319	0.000645	0.0000050	9479128
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9479128
Total Cobalt (Co)	mg/L	0.0114	0.00100	0.0000527	0.0000050	9479128
Total Copper (Cu)	mg/L	0.00151	0.00726	0.00390	0.000050	9479128
Total Iron (Fe)	mg/L	0.100	0.0041	0.0285	0.0010	9479128
Total Lead (Pb)	mg/L	0.00210	0.00275	0.000417	0.0000050	9479128
Total Lithium (Li)	mg/L	0.0123	0.0128	0.00840	0.00050	9479128
Total Manganese (Mn)	mg/L	0.0938	0.0416	0.156	0.000050	9479128
Total Molybdenum (Mo)	mg/L	0.00141	0.00179	0.00229	0.000050	9479128
Total Nickel (Ni)	mg/L	0.0526	0.00840	0.00298	0.000020	9479128
Total Selenium (Se)	mg/L	0.00721	0.0112	0.00366	0.000040	9479128
Total Silicon (Si)	mg/L	1.06	0.903	2.18	0.050	9479128
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9479128
Total Strontium (Sr)	mg/L	0.586	0.635	0.574	0.000050	9479128
Total Thallium (Tl)	mg/L	0.0000495	0.000672	0.0000291	0.0000020	9479128
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9479128
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9479128
Total Uranium (U)	mg/L	0.122	0.0420	0.0183	0.0000020	9479128
Total Vanadium (V)	mg/L	0.00022	<0.00020	<0.00020	0.00020	9479128
Total Zinc (Zn)	mg/L	0.0788	0.186	0.0637	0.00010	9479128
Total Zirconium (Zr)	mg/L	<0.00010	0.00018	0.00011	0.00010	9479128
Total Calcium (Ca)	mg/L	105	107	109	0.050	9473913
Total Magnesium (Mg)	mg/L	16.9	18.3	16.0	0.050	9473913
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VX6021	VX6022	VX6023		
Sampling Date		2019/06/18 11:20	2019/06/18 11:30	2019/06/18 11:45		
COC Number		1 of 1	1 of 1	1 of 1		
	UNITS	TRAIL #6	TRAIL #7	TRAIL #8	RDL	QC Batch
Total Potassium (K)	mg/L	8.09	6.46	5.25	0.050	9473913
Total Sodium (Na)	mg/L	26.3	26.5	25.3	0.050	9473913
Total Sulphur (S)	mg/L	83.2	82.6	77.8	3.0	9473913
RDL = Reportable Detection Limit						

BUREAU
VERITASBV Labs Job #: B948046
Report Date: 2019/06/26ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LL TOTAL METALS (DIGESTED) IN WATER**

BV Labs ID		VX6016	VX6017	VX6018	VX6019	VX6020		
Sampling Date		2019/06/18 10:15	2019/06/18 10:30	2019/06/18 10:50	2019/06/18 11:15	2019/06/18 12:45		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRAIL #1	TRAIL #2	TRAIL #3	TRAIL #4	TRAIL #5	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	356	351	346	347	352	0.50	9473862
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0054	0.0040	0.0068	0.0070	0.0224	0.0030	9480454
Total Antimony (Sb)	mg/L	0.00816	0.00492	0.00770	0.00427	0.00941	0.000020	9480454
Total Arsenic (As)	mg/L	0.0486	0.0468	0.0135	0.0197	0.0543	0.000020	9480454
Total Barium (Ba)	mg/L	0.124	0.0860	0.121	0.124	0.0647	0.000050	9480454
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9480454
Total Bismuth (Bi)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9480454
Total Boron (B)	mg/L	0.038	0.039	0.034	0.034	0.038	0.010	9480454
Total Cadmium (Cd)	mg/L	0.0000633	0.0000124	0.0000489	0.0000146	0.00119	0.0000050	9480454
Total Chromium (Cr)	mg/L	<0.00010	0.00013	<0.00010	0.00012	0.00014	0.00010	9480454
Total Cobalt (Co)	mg/L	0.00256	0.00217	0.000736	0.000922	0.00369	0.000010	9480454
Total Copper (Cu)	mg/L	0.00093	0.00048	0.00085	0.00039	0.00634	0.00010	9480454
Total Iron (Fe)	mg/L	0.0778	0.131	0.413	1.13	0.195	0.0050	9480454
Total Lead (Pb)	mg/L	0.000774	0.000315	0.000892	0.000660	0.0108	0.000020	9480454
Total Lithium (Li)	mg/L	0.0121	0.0123	0.00934	0.00950	0.0124	0.00050	9480454
Total Manganese (Mn)	mg/L	0.115	0.140	0.972	1.19	0.133	0.00010	9480454
Total Molybdenum (Mo)	mg/L	0.00198	0.00136	0.00283	0.00219	0.00198	0.000050	9480454
Total Nickel (Ni)	mg/L	0.0100	0.00996	0.00439	0.00375	0.0124	0.00010	9480454
Total Selenium (Se)	mg/L	0.00395	0.00239	0.00167	0.00121	0.00443	0.000040	9480454
Total Silicon (Si)	mg/L	1.08	0.997	2.37	2.43	1.07	0.050	9480454
Total Silver (Ag)	mg/L	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9480454
Total Strontium (Sr)	mg/L	0.512	0.525	0.490	0.559	0.580	0.000050	9480454
Total Thallium (Tl)	mg/L	0.000114	0.0000779	0.0000080	0.0000040	0.000180	0.0000020	9480454
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9480454
Total Titanium (Ti)	mg/L	<0.0020	<0.0020	<0.0020	0.0029	<0.0020	0.0020	9480454
Total Uranium (U)	mg/L	0.0284	0.0218	0.0149	0.00898	0.0321	0.0000050	9480454
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00036	<0.00020	0.00020	9480454
Total Zinc (Zn)	mg/L	0.0377	0.0211	0.0268	0.0108	0.233	0.0010	9480454
Total Zirconium (Zr)	mg/L	<0.00010	0.00011	0.00010	0.00014	0.00014	0.00010	9480454
Total Calcium (Ca)	mg/L	112	110	111	111	111	0.25	9473913
Total Magnesium (Mg)	mg/L	18.3	18.3	16.9	16.8	18.0	0.25	9473913

RDL = Reportable Detection Limit



LL TOTAL METALS (DIGESTED) IN WATER

BV Labs ID		VX6016	VX6017	VX6018	VX6019	VX6020		
Sampling Date		2019/06/18 10:15	2019/06/18 10:30	2019/06/18 10:50	2019/06/18 11:15	2019/06/18 12:45		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRAIL #1	TRAIL #2	TRAIL #3	TRAIL #4	TRAIL #5	RDL	QC Batch
Total Potassium (K)	mg/L	7.65	7.47	7.07	7.25	6.79	0.25	9473913
Total Sodium (Na)	mg/L	27.4	27.2	26.2	26.3	26.8	0.25	9473913
Total Sulphur (S)	mg/L	86.6	85.8	77.4	76.8	86.2	3.0	9473913
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B948046
Report Date: 2019/06/26

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VX6016
Sample ID: TRAIL #1
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9476102	N/A	2019/06/21	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9478701	N/A	2019/06/22	Ilonka Kovac
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Carbon (DOC)	TECH	9477674	N/A	2019/06/24	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9478704	N/A	2019/06/22	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Sulphide (as H ₂ S)	CALC	9473687	N/A	2019/06/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9473862	N/A	2019/06/25	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9474125	N/A	2019/06/24	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9479123	N/A	2019/06/24	Automated Statchk
Ion Balance	CALC	9474311	N/A	2019/06/20	Automated Statchk
Sum of cations, anions	CALC	9474313	N/A	2019/06/24	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9473912	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9482465	N/A	2019/06/25	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9480454	2019/06/24	2019/06/24	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9473913	N/A	2019/06/25	Automated Statchk
Ammonia-N Low Level (Preserved)	KONE/COL	9475333	N/A	2019/06/20	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9474127	N/A	2019/06/21	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9473982	N/A	2019/06/21	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9476243	N/A	2019/06/20	Tracy (Jing) Ling
Total Sulphide	SPEC	9478140	N/A	2019/06/24	Ife Olotu
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal

BV Labs ID: VX6016 Dup
Sample ID: TRAIL #1
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9480207	N/A	2019/06/24	Andrew An

BV Labs ID: VX6017
Sample ID: TRAIL #2
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9476102	N/A	2019/06/21	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9478701	N/A	2019/06/22	Ilonka Kovac
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Carbon (DOC)	TECH	9477674	N/A	2019/06/24	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9478704	N/A	2019/06/22	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Sulphide (as H ₂ S)	CALC	9473687	N/A	2019/06/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9473862	N/A	2019/06/25	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9474125	N/A	2019/06/24	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B948046
Report Date: 2019/06/26

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VX6017
Sample ID: TRAIL #2
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9479123	N/A	2019/06/24	Automated Statchk
Ion Balance	CALC	9474311	N/A	2019/06/20	Automated Statchk
Sum of cations, anions	CALC	9474313	N/A	2019/06/24	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9473912	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9482465	N/A	2019/06/25	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9480454	2019/06/24	2019/06/24	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9473913	N/A	2019/06/25	Report Automation Engine
Ammonia-N Low Level (Preserved)	KONE/COL	9475333	N/A	2019/06/20	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9474127	N/A	2019/06/21	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9473982	N/A	2019/06/21	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9476243	N/A	2019/06/20	Tracy (Jing) Ling
Total Sulphide	SPEC	9478140	N/A	2019/06/24	Ife Olotu
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal

BV Labs ID: VX6017 Dup
Sample ID: TRAIL #2
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal

BV Labs ID: VX6018
Sample ID: TRAIL #3
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9476102	N/A	2019/06/21	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9478701	N/A	2019/06/22	Ilonka Kovac
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Carbon (DOC)	TECH	9477674	N/A	2019/06/24	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9478704	N/A	2019/06/22	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Sulphide (as H ₂ S)	CALC	9473687	N/A	2019/06/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9473862	N/A	2019/06/25	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9474125	N/A	2019/06/24	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9479123	N/A	2019/06/24	Automated Statchk
Ion Balance	CALC	9474311	N/A	2019/06/20	Automated Statchk
Sum of cations, anions	CALC	9474313	N/A	2019/06/24	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9473912	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9482465	N/A	2019/06/25	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9480454	2019/06/24	2019/06/24	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9473913	N/A	2019/06/25	Automated Statchk
Ammonia-N Low Level (Preserved)	KONE/COL	9475338	N/A	2019/06/20	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9474127	N/A	2019/06/21	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B948046

Report Date: 2019/06/26

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VX6018
Sample ID: TRAIL #3
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9473982	N/A	2019/06/21	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9476243	N/A	2019/06/20	Tracy (Jing) Ling
Total Sulphide	SPEC	9478140	N/A	2019/06/24	Ife Olotu
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal

BV Labs ID: VX6018 Dup
Sample ID: TRAIL #3
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N Low Level (Preserved)	KONE/COL	9475338	N/A	2019/06/20	Tracy (Jing) Ling
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta

BV Labs ID: VX6019
Sample ID: TRAIL #4
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9476102	N/A	2019/06/21	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9478701	N/A	2019/06/22	Ilonka Kovac
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Carbon (DOC)	TECH	9477674	N/A	2019/06/24	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9478704	N/A	2019/06/22	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Sulphide (as H ₂ S)	CALC	9473687	N/A	2019/06/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9473862	N/A	2019/06/25	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9474125	N/A	2019/06/24	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9479123	N/A	2019/06/24	Automated Statchk
Ion Balance	CALC	9474311	N/A	2019/06/20	Automated Statchk
Sum of cations, anions	CALC	9474313	N/A	2019/06/24	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9473912	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9480207	N/A	2019/06/24	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9480454	2019/06/24	2019/06/24	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9473913	N/A	2019/06/25	Automated Statchk
Ammonia-N Low Level (Preserved)	KONE/COL	9475338	N/A	2019/06/20	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9474127	N/A	2019/06/21	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9473982	N/A	2019/06/21	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9476243	N/A	2019/06/20	Tracy (Jing) Ling
Total Sulphide	SPEC	9478140	N/A	2019/06/24	Ife Olotu
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal



BUREAU
VERITAS

BV Labs Job #: B948046

Report Date: 2019/06/26

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VX6020
Sample ID: TRAIL #5
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9476102	N/A	2019/06/21	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9478701	N/A	2019/06/22	Ilonka Kovac
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Carbon (DOC)	TECH	9477674	N/A	2019/06/24	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9478704	N/A	2019/06/22	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Sulphide (as H ₂ S)	CALC	9473687	N/A	2019/06/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9473862	N/A	2019/06/25	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9474125	N/A	2019/06/24	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9479123	N/A	2019/06/24	Report Automation Engine
Ion Balance	CALC	9474311	N/A	2019/06/20	Report Automation Engine
Sum of cations, anions	CALC	9474313	N/A	2019/06/24	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9473912	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9480207	N/A	2019/06/24	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9480454	2019/06/24	2019/06/24	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9473913	N/A	2019/06/25	Automated Statchk
Ammonia-N Low Level (Preserved)	KONE/COL	9475338	N/A	2019/06/20	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9474127	N/A	2019/06/21	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9473982	N/A	2019/06/21	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9476243	N/A	2019/06/20	Tracy (Jing) Ling
Total Sulphide	SPEC	9478140	N/A	2019/06/24	Ife Olotu
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal

BV Labs ID: VX6021
Sample ID: TRAIL #6
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9476102	N/A	2019/06/21	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9478701	N/A	2019/06/22	Ilonka Kovac
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Carbon (DOC)	TECH	9477674	N/A	2019/06/24	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9478704	N/A	2019/06/22	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Sulphide (as H ₂ S)	CALC	9473687	N/A	2019/06/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9473862	N/A	2019/06/24	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9474125	N/A	2019/06/24	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9479123	N/A	2019/06/24	Automated Statchk
Ion Balance	CALC	9474311	N/A	2019/06/20	Automated Statchk
Sum of cations, anions	CALC	9474313	N/A	2019/06/24	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9473912	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9480207	N/A	2019/06/24	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9473913	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9479128	N/A	2019/06/23	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9475338	N/A	2019/06/20	Tracy (Jing) Ling



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BV Labs Job #: B948046

Report Date: 2019/06/26

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VX6021
Sample ID: TRAIL #6
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate and Nitrite - Low Level	CALC	9474127	N/A	2019/06/21	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9473982	N/A	2019/06/21	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9476243	N/A	2019/06/20	Tracy (Jing) Ling
Total Sulphide	SPEC	9478140	N/A	2019/06/24	Ife Olotu
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal

BV Labs ID: VX6022
Sample ID: TRAIL #7
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9476102	N/A	2019/06/21	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9478701	N/A	2019/06/22	Ilonka Kovac
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Carbon (DOC)	TECH	9477674	N/A	2019/06/24	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9478704	N/A	2019/06/22	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Sulphide (as H ₂ S)	CALC	9473687	N/A	2019/06/24	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9473862	N/A	2019/06/24	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9474125	N/A	2019/06/24	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9479123	N/A	2019/06/24	Automated Statchk
Ion Balance	CALC	9474311	N/A	2019/06/20	Automated Statchk
Sum of cations, anions	CALC	9474313	N/A	2019/06/24	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9473912	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9480207	N/A	2019/06/24	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9473913	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9479128	N/A	2019/06/23	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9475333	N/A	2019/06/20	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9474127	N/A	2019/06/21	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9473982	N/A	2019/06/21	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9476243	N/A	2019/06/20	Tracy (Jing) Ling
Total Sulphide	SPEC	9478140	N/A	2019/06/24	Ife Olotu
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal

BV Labs ID: VX6023
Sample ID: TRAIL #8
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9476102	N/A	2019/06/21	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9478701	N/A	2019/06/22	Ilonka Kovac
Chloride - Low Level	KONE/COL	9480199	N/A	2019/06/24	Zafar Iqbal
Carbon (DOC)	TECH	9477674	N/A	2019/06/24	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9478704	N/A	2019/06/22	Ilonka Kovac



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BV Labs Job #: B948046
Report Date: 2019/06/26

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VX6023
Sample ID: TRAIL #8
Matrix: Water

Collected: 2019/06/18
Shipped:
Received: 2019/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ferrous Iron (Dissolved)	SPEC	9476584	N/A	2019/06/20	Meike Wege
Sulphide (as H ₂ S)	CALC	9473687	N/A	2019/06/24	Report Automation Engine
Hardness Total (calculated as CaCO ₃)	CALC	9473862	N/A	2019/06/24	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9474125	N/A	2019/06/24	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9479123	N/A	2019/06/24	Automated Statchk
Ion Balance	CALC	9474311	N/A	2019/06/20	Automated Statchk
Sum of cations, anions	CALC	9474313	N/A	2019/06/24	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9473912	N/A	2019/06/24	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9480207	N/A	2019/06/24	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9473913	N/A	2019/06/24	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9479128	N/A	2019/06/23	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9475338	N/A	2019/06/20	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9474127	N/A	2019/06/21	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9473982	N/A	2019/06/21	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9476688	N/A	2019/06/20	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9476243	N/A	2019/06/20	Tracy (Jing) Ling
Total Sulphide	SPEC	9478140	N/A	2019/06/24	Ife Olotu
Sulphate - Low Level	KONE/COL	9480200	N/A	2019/06/24	Zafar Iqbal



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.7°C
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Sample VX6016 [TRAIL #1] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VX6017 [TRAIL #2] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VX6018 [TRAIL #3] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VX6019 [TRAIL #4] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VX6020 [TRAIL #5] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

LL TOTAL METALS (DIGESTED) IN WATER Comments

Matrix Spike Elements by ICPMS Digested LL (total): RDL raised due to concentration over linear range, sample dilution required.

Sample VX6016, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VX6017, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VX6018, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.

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BV Labs Job #: B948046

Report Date: 2019/06/26

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9475333	Total Ammonia (N)	2019/06/20	78 (1)	80 - 120	102	80 - 120	<0.0050	mg/L	7.9	20
9475338	Total Ammonia (N)	2019/06/20	68 (1)	80 - 120	107	80 - 120	<0.0050	mg/L	6.8	20
9476102	Acidity (pH 4.5)	2019/06/21					<1.0	mg/L	NC	20
9476102	Acidity (pH 8.3)	2019/06/21			94	80 - 120	<1.0	mg/L	NC	20
9476243	Orthophosphate (P)	2019/06/20	104	80 - 120	111	80 - 120	<0.0010	mg/L	NC	20
9476584	HCl Preserved Iron (Fe+2 Ferrous)	2019/06/20	80	80 - 120	98	90 - 110	<0.050	mg/L	NC	20
9476688	Dissolved Nitrate (N)	2019/06/20	101	80 - 120	102	80 - 120	<0.0030	mg/L	NC	20
9476688	Dissolved Nitrite (N)	2019/06/20	100	80 - 120	100	80 - 120	<0.0030	mg/L	NC	20
9477674	Dissolved Organic Carbon (C)	2019/06/24	106	80 - 120	109	80 - 120	<0.50	mg/L	2.3	20
9478140	Total Sulphide	2019/06/24			99	80 - 120	<0.0019	mg/L	0	20
9478701	Alkalinity (PP as CaCO ₃)	2019/06/22					<0.50	mg/L	NC	20
9478701	Alkalinity (Total as CaCO ₃)	2019/06/22			94	80 - 120	<0.50	mg/L	3.6	20
9478701	Bicarbonate (HCO ₃)	2019/06/22					<0.50	mg/L	3.6	20
9478701	Carbonate (CO ₃)	2019/06/22					<0.50	mg/L	NC	20
9478701	Hydroxide (OH)	2019/06/22					<0.50	mg/L	NC	20
9478704	Fluoride (F)	2019/06/22	96	80 - 120	98	80 - 120	<0.010	mg/L	2.0	20
9479128	Total Aluminum (Al)	2019/06/23	97	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9479128	Total Antimony (Sb)	2019/06/23	94	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
9479128	Total Arsenic (As)	2019/06/23	96	80 - 120	102	80 - 120	0.000026, RDL=0.000020 (2)	mg/L	NC	20
9479128	Total Barium (Ba)	2019/06/23	96	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
9479128	Total Beryllium (Be)	2019/06/23	94	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9479128	Total Bismuth (Bi)	2019/06/23	100	80 - 120	107	80 - 120	<0.0000050	mg/L	NC	20
9479128	Total Boron (B)	2019/06/23	97	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
9479128	Total Cadmium (Cd)	2019/06/23	95	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9479128	Total Chromium (Cr)	2019/06/23	92	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9479128	Total Cobalt (Co)	2019/06/23	93	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9479128	Total Copper (Cu)	2019/06/23	93	80 - 120	96	80 - 120	<0.000050	mg/L	NC	20
9479128	Total Iron (Fe)	2019/06/23	97	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
9479128	Total Lead (Pb)	2019/06/23	100	80 - 120	107	80 - 120	<0.0000050	mg/L	NC	20
9479128	Total Lithium (Li)	2019/06/23	92	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9479128	Total Manganese (Mn)	2019/06/23	96	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20

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BV Labs Job #: B948046

Report Date: 2019/06/26

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9479128	Total Molybdenum (Mo)	2019/06/23	98	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9479128	Total Nickel (Ni)	2019/06/23	100	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9479128	Total Selenium (Se)	2019/06/23	97	80 - 120	102	80 - 120	<0.000040	mg/L	NC	20
9479128	Total Silicon (Si)	2019/06/23	94	80 - 120	100	80 - 120	<0.050	mg/L	NC	20
9479128	Total Silver (Ag)	2019/06/23	97	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9479128	Total Strontium (Sr)	2019/06/23	93	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9479128	Total Thallium (Tl)	2019/06/23	100	80 - 120	107	80 - 120	<0.0000020	mg/L	NC	20
9479128	Total Tin (Sn)	2019/06/23	95	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9479128	Total Titanium (Ti)	2019/06/23	98	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9479128	Total Uranium (U)	2019/06/23	100	80 - 120	107	80 - 120	<0.0000020	mg/L	NC	20
9479128	Total Vanadium (V)	2019/06/23	93	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9479128	Total Zinc (Zn)	2019/06/23	97	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9479128	Total Zirconium (Zr)	2019/06/23	95	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9480199	Dissolved Chloride (Cl)	2019/06/24	NC	80 - 120	104	80 - 120	<0.50	mg/L	2.9	20
9480200	Dissolved Sulphate (SO4)	2019/06/24	NC	80 - 120	101	80 - 120	<0.50	mg/L	0.44	20
9480207	Dissolved Aluminum (Al)	2019/06/24	98	80 - 120	98	80 - 120	<0.00050	mg/L		
9480207	Dissolved Antimony (Sb)	2019/06/24	NC	80 - 120	101	80 - 120	<0.000020	mg/L	1.2	20
9480207	Dissolved Arsenic (As)	2019/06/24	101	80 - 120	98	80 - 120	<0.000020	mg/L	0.35	20
9480207	Dissolved Barium (Ba)	2019/06/24	97	80 - 120	96	80 - 120	<0.000020	mg/L	0.74	20
9480207	Dissolved Beryllium (Be)	2019/06/24	95	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9480207	Dissolved Bismuth (Bi)	2019/06/24	92	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9480207	Dissolved Boron (B)	2019/06/24	106	80 - 120	109	80 - 120	<0.010	mg/L	0.19	20
9480207	Dissolved Cadmium (Cd)	2019/06/24	100	80 - 120	100	80 - 120	<0.0000050	mg/L	10	20
9480207	Dissolved Chromium (Cr)	2019/06/24	98	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9480207	Dissolved Cobalt (Co)	2019/06/24	101	80 - 120	101	80 - 120	<0.0000050	mg/L	1.8	20
9480207	Dissolved Copper (Cu)	2019/06/24	96	80 - 120	97	80 - 120	<0.000050	mg/L	7.2	20
9480207	Dissolved Iron (Fe)	2019/06/24	100	80 - 120	99	80 - 120	<0.0010	mg/L	0.73	20
9480207	Dissolved Lead (Pb)	2019/06/24	95	80 - 120	99	80 - 120	<0.0000050	mg/L	3.6	20
9480207	Dissolved Lithium (Li)	2019/06/24	91	80 - 120	97	80 - 120	<0.00050	mg/L	3.3	20
9480207	Dissolved Manganese (Mn)	2019/06/24	NC	80 - 120	99	80 - 120	<0.000050	mg/L	7.0	20
9480207	Dissolved Molybdenum (Mo)	2019/06/24	108	80 - 120	99	80 - 120	<0.000050	mg/L	3.8	20
9480207	Dissolved Nickel (Ni)	2019/06/24	97	80 - 120	100	80 - 120	<0.000020	mg/L	1.3	20

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BV Labs Job #: B948046

Report Date: 2019/06/26

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9480207	Dissolved Selenium (Se)	2019/06/24	108	80 - 120	103	80 - 120	<0.000040	mg/L	1.4	20
9480207	Dissolved Silicon (Si)	2019/06/24	93	80 - 120	92	80 - 120	<0.050	mg/L	2.9	20
9480207	Dissolved Silver (Ag)	2019/06/24	99	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9480207	Dissolved Strontium (Sr)	2019/06/24	NC	80 - 120	91	80 - 120	<0.000050	mg/L	0.48	20
9480207	Dissolved Thallium (Tl)	2019/06/24	97	80 - 120	99	80 - 120	<0.0000020	mg/L	0.096	20
9480207	Dissolved Tin (Sn)	2019/06/24	102	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9480207	Dissolved Titanium (Ti)	2019/06/24	101	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9480207	Dissolved Uranium (U)	2019/06/24	96	80 - 120	99	80 - 120	<0.0000020	mg/L	3.7	20
9480207	Dissolved Vanadium (V)	2019/06/24	100	80 - 120	96	80 - 120	<0.00020	mg/L	0.35	20
9480207	Dissolved Zinc (Zn)	2019/06/24	100	80 - 120	101	80 - 120	<0.00010	mg/L	3.7	20
9480207	Dissolved Zirconium (Zr)	2019/06/24	103	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9480454	Total Aluminum (Al)	2019/06/25	476 (1)	80 - 120	101	80 - 120	<0.0030	mg/L	7.7	20
9480454	Total Antimony (Sb)	2019/06/25	102	80 - 120	101	80 - 120	<0.000020	mg/L	0.46	20
9480454	Total Arsenic (As)	2019/06/25	105	80 - 120	101	80 - 120	<0.000020	mg/L	1.9	20
9480454	Total Barium (Ba)	2019/06/25	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.024	20
9480454	Total Beryllium (Be)	2019/06/25	99	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9480454	Total Bismuth (Bi)	2019/06/25	97	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9480454	Total Boron (B)	2019/06/25	NC	80 - 120	101	80 - 120	<0.010	mg/L	1.9	20
9480454	Total Cadmium (Cd)	2019/06/25	99	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9480454	Total Chromium (Cr)	2019/06/25	98	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9480454	Total Cobalt (Co)	2019/06/25	92	80 - 120	99	80 - 120	<0.000010	mg/L	3.0	20
9480454	Total Copper (Cu)	2019/06/25	88	80 - 120	93	80 - 120	<0.00010	mg/L	12	20
9480454	Total Iron (Fe)	2019/06/25	171 (1)	80 - 120	101	80 - 120	<0.0050	mg/L	8.2	20
9480454	Total Lead (Pb)	2019/06/25	96	80 - 120	97	80 - 120	<0.000020	mg/L	7.6	20
9480454	Total Lithium (Li)	2019/06/25	NC	80 - 120	98	80 - 120	<0.00050	mg/L	0.64	20
9480454	Total Manganese (Mn)	2019/06/25	95	80 - 120	96	80 - 120	<0.00010	mg/L	1.2	20
9480454	Total Molybdenum (Mo)	2019/06/25	NC	80 - 120	102	80 - 120	<0.000050	mg/L	1.4	20
9480454	Total Nickel (Ni)	2019/06/25	96	80 - 120	99	80 - 120	<0.00010	mg/L	4.6	20
9480454	Total Selenium (Se)	2019/06/25	104	80 - 120	99	80 - 120	<0.000040	mg/L	NC	20
9480454	Total Silicon (Si)	2019/06/25	160 (1)	80 - 120	101	80 - 120	<0.050	mg/L	14	20
9480454	Total Silver (Ag)	2019/06/25	71 (1)	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9480454	Total Strontium (Sr)	2019/06/25	NC	80 - 120	95	80 - 120	<0.000050	mg/L	1.3	20



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VERITAS

BV Labs Job #: B948046

Report Date: 2019/06/26

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9480454	Total Thallium (Tl)	2019/06/25	95	80 - 120	100	80 - 120	<0.0000020	mg/L	14	20
9480454	Total Tin (Sn)	2019/06/25	99	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9480454	Total Titanium (Ti)	2019/06/25	134 (1)	80 - 120	101	80 - 120	<0.0020	mg/L	NC	20
9480454	Total Uranium (U)	2019/06/25	101	80 - 120	101	80 - 120	<0.0000050	mg/L	1.1	20
9480454	Total Vanadium (V)	2019/06/25	103	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9480454	Total Zinc (Zn)	2019/06/25	99	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
9480454	Total Zirconium (Zr)	2019/06/25	NC	80 - 120	101	80 - 120	<0.00010	mg/L	12	20
9482465	Dissolved Aluminum (Al)	2019/06/25			101	80 - 120	<0.00050	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Method blank exceeds acceptance limits for As- $2 \times$ RDL acceptable for low level metals determination.



VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

741

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page ____ of ____

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days										
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:												
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02											
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah											
Email:		Email:	agault@alexcoresource.com kpiewcove@contangostrategies.com	Site #:												
				Sampled By:		Date Required:										
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL Y / N COOLER TEMPERATURES Present Intact COOLING MEDIA PRESENT Y / N COMMENTS										
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1	Trial #1	18-Jun-19	10:15	Water	X	X	X	X	X	X	X	X	X	X	10	
2	Trial #2	18-Jun-19	10:30	Water	X	X	X	X	X	X	X	X	X	X	10	
3	Trial #3	18-Jun-19	10:50	Water	X	X	X	X	X	X	X	X	X	X	10	
4	Trial #4	18-Jun-19	11:15	Water	X	X	X	X	X	X	X	X	X	X	10	
5	Trial #5	18-Jun-19	12:45	Water	X	X	X	X	X	X	X	X	X	X	10	
6	Trial #6	18-Jun-19	11:20	Water	X	X	X	X	X	X	X	X	X	X	10	
7	Trial #7	18-Jun-19	11:30	Water	X	X	X	X	X	X	X	X	X	X	10	
8	Trial #8	18-Jun-19	11:45	Water	X	X	X	X	X	X	X	X	X	X	10	
9																
10																
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)						
<i>[Signature]</i>		2019/06/18		13:00		<i>[Signature]</i>		2019/06/19		08:55						
18-Jun-19 13:11 Customer Solutions B948046 CCQ INS-0243																



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/07/11
 Report #: R2751237
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B953424

Received: 2019/07/03, 14:15

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	8	N/A	2019/07/08	AB SOP-00005	SM 23 2310 B m
Alkalinity - Low Level	5	N/A	2019/07/08	AB SOP-00005	SM 23 2320 B m
Alkalinity - Low Level	3	N/A	2019/07/10	AB SOP-00005	SM 23 2320 B m
Low level chloride/sulphate by AC	8	N/A	2019/07/09	AB SOP-00020 / AB SOP-0001	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	8	N/A	2019/07/08	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level	8	N/A	2019/07/08	AB SOP-00005	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/07/04	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/07/08	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	8	N/A	2019/07/09		Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/07/09		Auto Calc
Ion Balance (as Cations/Anions Ratio)	8	N/A	2019/07/09		Auto Calc
Ion Balance	8	N/A	2019/07/04		Auto Calc
Sum of cations, anions	8	N/A	2019/07/09		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/07/09		Auto Calc
Elements by ICPMS Low Level (dissolved)	8	N/A	2019/07/08	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/07/09		Auto Calc
Elements by ICPMS Low Level (total)	8	N/A	2019/07/09	CAL SOP-00265	EPA 6020 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/07/05	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite - Low Level	6	N/A	2019/07/09		Auto Calc
Nitrate and Nitrite - Low Level	2	N/A	2019/07/10		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	6	N/A	2019/07/09		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	2	N/A	2019/07/10		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	8	N/A	2019/07/06	AB SOP-00023	SM 23 4110 B m
Orthophosphate by Konelab (low level) (1)	8	N/A	2019/07/05	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	8	N/A	2019/07/08	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/07/11
Report #: R2751237
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B953424

Received: 2019/07/03, 14:15

accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: smaiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WA3865			WA3866		
Sampling Date		2019/07/03 10:35			2019/07/03 11:05		
COC Number		BBY FCD-00077/05			BBY FCD-00077/05		
	UNITS	TRIAL #1	RDL	QC Batch	TRIAL #2	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	8.2	N/A	9491970	8.1	N/A	9491970
Cation Sum	meq/L	8.3	N/A	9491970	8.4	N/A	9491970
Ion Balance	N/A	1.0	0.010	9497738	1.0	0.010	9497738
Ion Balance (% Difference)	%	0.55	N/A	9491969	1.3	N/A	9491969
Dissolved Nitrate (NO ₃)	mg/L	5.0	0.013	9492523	<0.013	0.013	9492523
Nitrate plus Nitrite (N)	mg/L	1.1	0.0042	9492524	<0.0042	0.0042	9492524
Dissolved Nitrite (NO ₂)	mg/L	0.012	0.0099	9492523	<0.0099	0.0099	9492523
Sulphide (as H ₂ S)	mg/L	<0.0020	0.0020	9492094	3.8	0.050	9492094
Misc. Inorganics							
Fluoride (F)	mg/L	0.621	0.010	9496221	0.600	0.010	9496221
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9492813	0.42	0.050	9492813
Dissolved Organic Carbon (C)	mg/L	3.3	0.50	9494193	4.9 (1)	2.5	9494193
Acidity (pH 4.5)	mg/L	<1.0	1.0	9496212	<1.0	1.0	9496212
Alkalinity (Total as CaCO ₃)	mg/L	81.6	0.50	9496218	93.9	0.50	9496218
Acidity (pH 8.3)	mg/L	4.7	1.0	9496212	8.0	1.0	9496212
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9496218	<0.50	0.50	9496218
Bicarbonate (HCO ₃)	mg/L	99.6	0.50	9496218	115	0.50	9496218
Carbonate (CO ₃)	mg/L	<0.50	0.50	9496218	<0.50	0.50	9496218
Hydroxide (OH)	mg/L	<0.50	0.50	9496218	<0.50	0.50	9496218
Anions							
Orthophosphate (P)	mg/L	1.1 (2)	0.010	9494919	1.1 (2)	0.010	9494924
Total Sulphide	mg/L	<0.0019	0.0019	9496964	3.6 (2)	0.048	9496964
Dissolved Chloride (Cl)	mg/L	57	0.50	9498397	59	0.50	9498397
Dissolved Sulphate (SO ₄)	mg/L	230 (2)	1.0	9498397	220 (2)	1.0	9498397
Nutrients							
Total Ammonia (N)	mg/L	0.21	0.0050	9493565	0.15	0.0050	9493565
Dissolved Nitrite (N)	mg/L	0.0037	0.0030	9494721	<0.0030	0.0030	9494721
Dissolved Nitrate (N)	mg/L	1.1	0.0030	9494721	<0.0030	0.0030	9494721
RDL = Reportable Detection Limit							
N/A = Not Applicable							
(1) Detection limits raised due to sample matrix.							
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.							

BUREAU
VERITASBV Labs Job #: B953424
Report Date: 2019/07/11ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WA3867		WA3868			WA3869		
Sampling Date		2019/07/03 11:25		2019/07/03 11:40			2019/07/03 13:55		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05			BBY FCD-00077/05		
	UNITS	TRIAL #3	RDL	TRIAL #4	RDL	QC Batch	TRIAL #5	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	7.9	N/A	8.3	N/A	9491970	8.2	N/A	9491970
Cation Sum	meq/L	8.2	N/A	8.1	N/A	9491970	8.4	N/A	9491970
Ion Balance	N/A	1.0	0.010	0.98	0.010	9497738	1.0	0.010	9497738
Ion Balance (% Difference)	%	1.7	N/A	1.0	N/A	9491969	1.5	N/A	9491969
Dissolved Nitrate (NO ₃)	mg/L	0.014	0.013	<0.013	0.013	9492523	<0.013	0.013	9492523
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	<0.0042	0.0042	9492524	0.0047	0.0042	9492524
Dissolved Nitrite (NO ₂)	mg/L	<0.0099	0.0099	<0.0099	0.0099	9492523	0.015	0.0099	9492523
Sulphide (as H ₂ S)	mg/L	0.20	0.0020	6.0	0.050	9492094	0.37	0.0080	9492094
Misc. Inorganics									
Fluoride (F)	mg/L	0.520	0.010	0.498	0.010	9496221	0.670	0.010	9496221
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	1.1	0.050	0.70	0.050	9492813	0.57	0.050	9492813
Dissolved Organic Carbon (C)	mg/L	5.0	0.50	7.6	0.50	9494193	16	0.50	9496947
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	9496212	<1.0	1.0	9496212
Alkalinity (Total as CaCO ₃)	mg/L	114	0.50	125	0.50	9496218	94.9	0.50	9496218
Acidity (pH 8.3)	mg/L	6.0	1.0	14.1	1.0	9496212	9.0	1.0	9496212
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	9496218	<0.50	0.50	9496218
Bicarbonate (HCO ₃)	mg/L	137	0.50	192	0.50	9496218	116	0.50	9496218
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	9496218	<0.50	0.50	9496218
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	9496218	<0.50	0.50	9496218
Anions									
Orthophosphate (P)	mg/L	0.076	0.0010	0.28	0.0010	9494919	0.53 (1)	0.010	9494919
Total Sulphide	mg/L	0.19	0.0019	5.6 (1)	0.048	9496964	0.34 (1)	0.0076	9496964
Dissolved Chloride (Cl)	mg/L	57	0.50	59	0.50	9498397	55	0.50	9498397
Dissolved Sulphate (SO ₄)	mg/L	190 (1)	1.0	170 (1)	1.0	9498397	220 (1)	1.0	9498397
Nutrients									
Total Ammonia (N)	mg/L	0.22	0.0050	0.20	0.0050	9493565	0.49	0.0050	9493565
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	<0.0030	0.0030	9494721	0.0047	0.0030	9495321
Dissolved Nitrate (N)	mg/L	0.0031	0.0030	<0.0030	0.0030	9494721	<0.0030	0.0030	9495321
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



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BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WA3870			WA3871		WA3872		
Sampling Date		2019/07/03 12:05			2019/07/03 12:20		2019/07/03 12:45		
COC Number		BBY FCD-00077/05			BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	TRIAL #6	RDL	QC Batch	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.1	N/A	9491970	8.4	9491970	7.9	N/A	9491970
Cation Sum	meq/L	8.2	N/A	9491970	8.3	9491970	8.1	N/A	9491970
Ion Balance	N/A	1.0	0.010	9497738	0.99	9497738	1.0	0.010	9497738
Ion Balance (% Difference)	%	0.74	N/A	9491969	0.37	9491969	1.5	N/A	9491969
Dissolved Nitrate (NO3)	mg/L	<0.013	0.013	9492523	5.1	9492523	0.58	0.013	9492523
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	9492524	1.1	9492524	0.13	0.0042	9492524
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9492523	<0.0099	9492523	<0.0099	0.0099	9492523
Sulphide (as H2S)	mg/L	1.5	0.020	9492094	<0.0020	9492094	<0.0020	0.0020	9492094

Misc. Inorganics

Fluoride (F)	mg/L	0.654	0.010	9496221	0.651	9496221	0.493	0.010	9496221
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.23	0.050	9492813	<0.050	9492813	<0.050	0.050	9492813
Dissolved Organic Carbon (C)	mg/L	4.7	0.50	9496947	1.8	9494193	2.7	0.50	9494193
Acidity (pH 4.5)	mg/L	<1.0	1.0	9496212	<1.0	9496212	<1.0	1.0	9496212
Alkalinity (Total as CaCO3)	mg/L	94.1	0.50	9496218	95.6	9496218	92.3	0.50	9496218
Acidity (pH 8.3)	mg/L	7.5	1.0	9496212	2.7	9496212	3.8	1.0	9496212
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9496218	<0.50	9496218	<0.50	0.50	9496218
Bicarbonate (HCO3)	mg/L	115	0.50	9496218	117	9496218	113	0.50	9496218
Carbonate (CO3)	mg/L	<0.50	0.50	9496218	<0.50	9496218	<0.50	0.50	9496218
Hydroxide (OH)	mg/L	<0.50	0.50	9496218	<0.50	9496218	<0.50	0.50	9496218

Anions

Orthophosphate (P)	mg/L	1.1 (1)	0.010	9494919	0.0050	9494919	0.0016	0.0010	9494919
Total Sulphide	mg/L	1.4 (1)	0.019	9496964	<0.0019	9496964	<0.0019	0.0019	9496964
Dissolved Chloride (Cl)	mg/L	56	0.50	9498397	59	9498397	59	0.50	9498397
Dissolved Sulphate (SO4)	mg/L	220 (1)	1.0	9498397	230 (1)	9498397	210 (1)	1.0	9498397

Nutrients

Total Ammonia (N)	mg/L	0.080	0.0050	9493565	<0.0050	9493565	<0.0050	0.0050	9493565
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9494721	<0.0030	9494721	<0.0030	0.0030	9495321
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	9494721	1.1	9494721	0.13	0.0030	9495321

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



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BV Labs Job #: B953424

Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA3865		WA3866	WA3867	WA3868		
Sampling Date		2019/07/03 10:35		2019/07/03 11:05	2019/07/03 11:25	2019/07/03 11:40		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	TRIAL #3	TRIAL #4	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	347	9492530	350	339	339	0.50	9492530
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00237	9492450	0.00625	0.00585	0.00761	0.00050	9492450
Dissolved Antimony (Sb)	mg/L	0.00976	9492450	0.000489	0.00269	0.000592	0.000020	9492450
Dissolved Arsenic (As)	mg/L	0.0514	9492450	0.0294	0.0211	0.0141	0.000020	9492450
Dissolved Barium (Ba)	mg/L	0.0125	9492433	0.0291	0.181	0.0758	0.000020	9492450
Dissolved Beryllium (Be)	mg/L	<0.000010	9492450	<0.000010	<0.000010	<0.000010	0.000010	9492450
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9492450	<0.0000050	<0.0000050	<0.0000050	0.0000050	9492450
Dissolved Boron (B)	mg/L	0.049	9492450	0.049	0.037	0.058	0.010	9492450
Dissolved Cadmium (Cd)	mg/L	0.0000310	9492450	<0.0000050	<0.0000050	<0.0000050	0.0000050	9492450
Dissolved Chromium (Cr)	mg/L	<0.00010	9492450	<0.00010	<0.00010	<0.00010	0.00010	9492450
Dissolved Cobalt (Co)	mg/L	0.00231	9492450	0.00232	0.000849	0.000308	0.0000050	9492450
Dissolved Copper (Cu)	mg/L	0.000591	9492450	0.000055	0.000127	<0.000050	0.000050	9492450
Dissolved Iron (Fe)	mg/L	0.0435	9492450	0.346	1.07	0.594	0.0010	9492450
Dissolved Lead (Pb)	mg/L	0.0000922	9492450	0.0000399	0.0000313	0.0000076	0.0000050	9492450
Dissolved Lithium (Li)	mg/L	0.00989	9492450	0.00997	0.00776	0.00699	0.00050	9492450
Dissolved Manganese (Mn)	mg/L	0.119	9492450	0.175	0.912	1.04	0.000050	9492450
Dissolved Molybdenum (Mo)	mg/L	0.00210	9492450	0.000452	0.00257	0.000130	0.000050	9492450
Dissolved Nickel (Ni)	mg/L	0.00954	9492450	0.00712	0.00363	0.00140	0.000020	9492450
Dissolved Selenium (Se)	mg/L	0.00318	9492450	0.0157	0.00303	0.00707	0.000040	9492450
Dissolved Silicon (Si)	mg/L	1.11	9492450	1.04	2.52	2.58	0.050	9492450
Dissolved Silver (Ag)	mg/L	<0.0000050	9492450	<0.0000050	<0.0000050	<0.0000050	0.0000050	9492450
Dissolved Strontium (Sr)	mg/L	0.454	9492450	0.342	0.501	0.490	0.000050	9492450
Dissolved Thallium (Tl)	mg/L	0.000131	9492450	0.0000037	<0.0000020	<0.0000020	0.0000020	9492450
Dissolved Tin (Sn)	mg/L	<0.00020	9492450	<0.00020	<0.00020	<0.00020	0.00020	9492450
Dissolved Titanium (Ti)	mg/L	<0.00050	9492450	<0.00050	<0.00050	<0.00050	0.00050	9492450
Dissolved Uranium (U)	mg/L	0.0264	9492450	0.0143	0.0134	0.00337	0.0000020	9492450
Dissolved Vanadium (V)	mg/L	0.00025	9492450	<0.00020	0.00044	0.00064	0.00020	9492450
Dissolved Zinc (Zn)	mg/L	0.0380	9492450	0.00180	0.00723	0.00070	0.00010	9492450
Dissolved Zirconium (Zr)	mg/L	<0.00010	9492450	<0.00010	0.00015	0.00036	0.00010	9492450
Dissolved Calcium (Ca)	mg/L	112	9492536	113	110	111	0.050	9492536
Dissolved Magnesium (Mg)	mg/L	16.6	9492536	16.8	15.6	15.3	0.050	9492536

RDL = Reportable Detection Limit



BUREAU
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BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA3865		WA3866	WA3867	WA3868		
Sampling Date		2019/07/03 10:35		2019/07/03 11:05	2019/07/03 11:25	2019/07/03 11:40		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	TRIAL #3	TRIAL #4	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.88	9492536	7.66	7.30	7.46	0.050	9492536
Dissolved Sodium (Na)	mg/L	26.3	9492536	26.3	25.8	25.5	0.050	9492536
Dissolved Sulphur (S)	mg/L	93.6	9492536	98.5	80.2	83.6	3.0	9492536

RDL = Reportable Detection Limit

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VERITASBV Labs Job #: B953424
Report Date: 2019/07/11ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA3869	WA3870	WA3871	WA3872		
Sampling Date		2019/07/03 13:55	2019/07/03 12:05	2019/07/03 12:20	2019/07/03 12:45		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #5	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	354	343	350	342	0.50	9492530
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.0110	0.00261	0.00514	0.00187	0.00050	9492450
Dissolved Antimony (Sb)	mg/L	0.00154	0.00256	0.0291	0.00646	0.000020	9492450
Dissolved Arsenic (As)	mg/L	0.0265	0.132	0.0272	0.00212	0.000020	9492450
Dissolved Barium (Ba)	mg/L	0.0669	0.0990	0.0935	0.157	0.000020	9492450
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9492450
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9492450
Dissolved Boron (B)	mg/L	0.016	0.035	0.056	0.032	0.010	9492450
Dissolved Cadmium (Cd)	mg/L	0.0000445	<0.0000050	0.00310	0.000533	0.0000050	9492450
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9492450
Dissolved Cobalt (Co)	mg/L	0.00353	0.00770	0.000873	0.0000333	0.0000050	9492450
Dissolved Copper (Cu)	mg/L	0.000689	0.000098	0.00725	0.00388	0.000050	9492450
Dissolved Iron (Fe)	mg/L	0.550	0.183	0.0024	0.0036	0.0010	9492450
Dissolved Lead (Pb)	mg/L	0.00135	0.0000478	0.00253	0.0000658	0.0000050	9492450
Dissolved Lithium (Li)	mg/L	0.0127	0.0108	0.00838	0.00787	0.00050	9492450
Dissolved Manganese (Mn)	mg/L	0.162	0.118	0.0407	0.0629	0.000050	9492450
Dissolved Molybdenum (Mo)	mg/L	0.00169	0.00118	0.00188	0.00234	0.000050	9492450
Dissolved Nickel (Ni)	mg/L	0.0119	0.0252	0.00859	0.00226	0.000020	9492450
Dissolved Selenium (Se)	mg/L	0.00504	0.0297	0.0134	0.00401	0.000040	9492450
Dissolved Silicon (Si)	mg/L	0.929	1.12	0.944	2.26	0.050	9492450
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9492450
Dissolved Strontium (Sr)	mg/L	0.586	0.539	0.664	0.597	0.000050	9492450
Dissolved Thallium (Tl)	mg/L	0.0000393	0.0000035	0.000755	0.0000248	0.0000020	9492450
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9492450
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9492450
Dissolved Uranium (U)	mg/L	0.0287	0.103	0.0462	0.0188	0.0000020	9492450
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9492450
Dissolved Zinc (Zn)	mg/L	0.0641	0.00303	0.176	0.0488	0.00010	9492450
Dissolved Zirconium (Zr)	mg/L	0.00021	<0.00010	<0.00010	<0.00010	0.00010	9492450
Dissolved Calcium (Ca)	mg/L	115	110	112	111	0.050	9492536
Dissolved Magnesium (Mg)	mg/L	16.3	16.5	17.1	15.7	0.050	9492536

RDL = Reportable Detection Limit



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BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA3869	WA3870	WA3871	WA3872		
Sampling Date		2019/07/03 13:55	2019/07/03 12:05	2019/07/03 12:20	2019/07/03 12:45		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #5	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	6.91	8.42	6.79	5.42	0.050	9492536
Dissolved Sodium (Na)	mg/L	26.1	26.6	26.3	25.7	0.050	9492536
Dissolved Sulphur (S)	mg/L	92.5	91.6	88.9	84.5	3.0	9492536
RDL = Reportable Detection Limit							



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BV Labs Job #: B953424

Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA3865		WA3866	WA3867	WA3868		
Sampling Date		2019/07/03 10:35		2019/07/03 11:05	2019/07/03 11:25	2019/07/03 11:40		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	TRIAL #3	TRIAL #4	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	346	9492527	353	339	341	0.50	9492527
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00375	9492454	0.00735	0.00414	0.00866	0.00050	9492454
Total Antimony (Sb)	mg/L	0.00980	9492454	0.000716	0.00321	0.000847	0.000020	9492454
Total Arsenic (As)	mg/L	0.0527	9492454	0.0292	0.0243	0.0145	0.000020	9492454
Total Barium (Ba)	mg/L	0.0207	9494257	0.138	0.264	0.275	0.000020	9492454
Total Beryllium (Be)	mg/L	<0.000010	9492454	<0.000010	<0.000010	<0.000010	0.000010	9492454
Total Bismuth (Bi)	mg/L	<0.0000050	9492454	<0.0000050	<0.0000050	<0.0000050	0.0000050	9492454
Total Boron (B)	mg/L	0.037	9492454	0.047	0.035	0.047	0.010	9492454
Total Cadmium (Cd)	mg/L	0.0000376	9492454	<0.0000050	0.0000066	<0.0000050	0.0000050	9492454
Total Chromium (Cr)	mg/L	<0.00010	9492454	<0.00010	<0.00010	0.00012	0.00010	9492454
Total Cobalt (Co)	mg/L	0.00232	9492454	0.00238	0.000969	0.000429	0.0000050	9492454
Total Copper (Cu)	mg/L	0.000668	9492454	0.000100	0.000177	0.000073	0.000050	9492454
Total Iron (Fe)	mg/L	0.0787	9492454	0.381	1.38	0.997	0.0010	9492454
Total Lead (Pb)	mg/L	0.000353	9492454	0.000180	0.000357	0.000216	0.0000050	9492454
Total Lithium (Li)	mg/L	0.0129	9492454	0.00980	0.00730	0.00883	0.00050	9492454
Total Manganese (Mn)	mg/L	0.118	9492454	0.176	0.967	1.10	0.000050	9492454
Total Molybdenum (Mo)	mg/L	0.00213	9492454	0.000769	0.00262	0.000456	0.000050	9492454
Total Nickel (Ni)	mg/L	0.00951	9492454	0.00750	0.00372	0.00152	0.000020	9492454
Total Selenium (Se)	mg/L	0.00418	9492454	0.0137	0.00283	0.00731	0.000040	9492454
Total Silicon (Si)	mg/L	1.09	9492454	1.03	2.51	2.64	0.050	9492454
Total Silver (Ag)	mg/L	<0.0000050	9492454	<0.0000050	<0.0000050	<0.0000050	0.0000050	9492454
Total Strontium (Sr)	mg/L	0.445	9492454	0.643	0.519	0.641	0.000050	9492454
Total Thallium (Tl)	mg/L	0.000127	9492454	0.0000221	<0.0000020	<0.0000020	0.0000020	9492454
Total Tin (Sn)	mg/L	<0.00020	9492454	<0.00020	<0.00020	<0.00020	0.00020	9492454
Total Titanium (Ti)	mg/L	<0.00050	9492454	<0.00050	<0.00050	<0.00050	0.00050	9492454
Total Uranium (U)	mg/L	0.0270	9492454	0.0138	0.0136	0.00347	0.0000020	9492454
Total Vanadium (V)	mg/L	0.00024	9492454	<0.00020	0.00056	0.00070	0.00020	9492454
Total Zinc (Zn)	mg/L	0.0392	9492454	0.00687	0.00983	0.00187	0.00010	9492454
Total Zirconium (Zr)	mg/L	<0.00010	9492454	<0.00010	0.00022	0.00035	0.00010	9492454
Total Calcium (Ca)	mg/L	111	9492539	113	110	111	0.050	9492539
Total Magnesium (Mg)	mg/L	16.7	9492539	17.0	15.8	15.5	0.050	9492539

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA3865		WA3866	WA3867	WA3868		
Sampling Date		2019/07/03 10:35		2019/07/03 11:05	2019/07/03 11:25	2019/07/03 11:40		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	TRIAL #3	TRIAL #4	RDL	QC Batch
Total Potassium (K)	mg/L	7.80	9492539	7.62	7.35	7.50	0.050	9492539
Total Sodium (Na)	mg/L	26.5	9492539	26.4	26.0	25.6	0.050	9492539
Total Sulphur (S)	mg/L	93.5	9492539	97.5	81.5	81.2	3.0	9492539
RDL = Reportable Detection Limit								



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BV Labs Job #: B953424

Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA3869	WA3870	WA3871	WA3872		
Sampling Date		2019/07/03 13:55	2019/07/03 12:05	2019/07/03 12:20	2019/07/03 12:45		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #5	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	356	344	352	345	0.50	9492527
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0186	0.00188	0.00427	0.0398	0.00050	9492454
Total Antimony (Sb)	mg/L	0.00316	0.00449	0.0296	0.00634	0.000020	9492454
Total Arsenic (As)	mg/L	0.0287	0.124	0.0281	0.00439	0.000020	9492454
Total Barium (Ba)	mg/L	0.0667	0.110	0.0933	0.159	0.000020	9492454
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9492454
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000446	0.0000050	9492454
Total Boron (B)	mg/L	0.045	0.041	0.045	0.033	0.010	9492454
Total Cadmium (Cd)	mg/L	0.000297	0.0000748	0.00320	0.000599	0.0000050	9492454
Total Chromium (Cr)	mg/L	0.00011	<0.00010	<0.00010	<0.00010	0.00010	9492454
Total Cobalt (Co)	mg/L	0.00357	0.00823	0.000893	0.000352	0.0000050	9492454
Total Copper (Cu)	mg/L	0.00207	0.000256	0.00733	0.00619	0.000050	9492454
Total Iron (Fe)	mg/L	0.576	0.190	0.0160	0.110	0.0010	9492454
Total Lead (Pb)	mg/L	0.00537	0.000494	0.00285	0.00557	0.0000050	9492454
Total Lithium (Li)	mg/L	0.0113	0.0110	0.0123	0.00821	0.00050	9492454
Total Manganese (Mn)	mg/L	0.164	0.118	0.0422	0.0877	0.000050	9492454
Total Molybdenum (Mo)	mg/L	0.00176	0.000813	0.00205	0.00239	0.000050	9492454
Total Nickel (Ni)	mg/L	0.0119	0.0325	0.00874	0.00284	0.000020	9492454
Total Selenium (Se)	mg/L	0.00486	0.0321	0.0132	0.00379	0.000040	9492454
Total Silicon (Si)	mg/L	0.949	1.16	0.974	2.65	0.050	9492454
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9492454
Total Strontium (Sr)	mg/L	0.596	0.559	0.662	0.598	0.000050	9492454
Total Thallium (Tl)	mg/L	0.000101	0.0000128	0.000752	0.0000308	0.0000020	9492454
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9492454
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00395	0.00050	9492454
Total Uranium (U)	mg/L	0.0222	0.101	0.0462	0.0193	0.0000020	9492454
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00085	0.00020	9492454
Total Zinc (Zn)	mg/L	0.162	0.0206	0.177	0.0683	0.00010	9492454
Total Zirconium (Zr)	mg/L	0.00018	<0.00010	<0.00010	0.00056	0.00010	9492454
Total Calcium (Ca)	mg/L	115	111	113	112	0.050	9492539
Total Magnesium (Mg)	mg/L	16.6	16.5	17.3	15.7	0.050	9492539

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA3869	WA3870	WA3871	WA3872		
Sampling Date		2019/07/03 13:55	2019/07/03 12:05	2019/07/03 12:20	2019/07/03 12:45		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #5	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	6.95	8.45	6.86	5.48	0.050	9492539
Total Sodium (Na)	mg/L	26.1	26.6	26.5	25.5	0.050	9492539
Total Sulphur (S)	mg/L	91.4	92.1	88.7	85.5	3.0	9492539
RDL = Reportable Detection Limit							



BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA3865
Sample ID: TRIAL #1
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9496212	N/A	2019/07/08	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9496218	N/A	2019/07/08	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9498397	N/A	2019/07/09	Zafar Iqbal
Carbon (DOC)	TECH	9494193	N/A	2019/07/08	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9496221	N/A	2019/07/08	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9492094	N/A	2019/07/08	Report Automation Engine
Hardness Total (calculated as CaCO ₃)	CALC	9492527	N/A	2019/07/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9492530	N/A	2019/07/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/09	Automated Statchk
Ion Balance	CALC	9491969	N/A	2019/07/04	Automated Statchk
Sum of cations, anions	CALC	9491970	N/A	2019/07/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9492536	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9492450	N/A	2019/07/08	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9492539	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9492454	N/A	2019/07/09	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9493565	N/A	2019/07/05	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9492523	N/A	2019/07/09	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9492524	N/A	2019/07/09	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9494721	N/A	2019/07/06	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9494919	N/A	2019/07/05	Wilson Au Yueng
Total Sulphide	SPEC	9496964	N/A	2019/07/08	Ife Olotu

BV Labs ID: WA3865 Dup
Sample ID: TRIAL #1
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria

BV Labs ID: WA3866
Sample ID: TRIAL #2
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9496212	N/A	2019/07/08	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9496218	N/A	2019/07/10	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9498397	N/A	2019/07/09	Zafar Iqbal
Carbon (DOC)	TECH	9494193	N/A	2019/07/08	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9496221	N/A	2019/07/08	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9492094	N/A	2019/07/08	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9492527	N/A	2019/07/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9492530	N/A	2019/07/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/09	Automated Statchk
Ion Balance	CALC	9491969	N/A	2019/07/04	Automated Statchk



BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA3866
Sample ID: TRIAL #2
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9491970	N/A	2019/07/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9492536	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9492450	N/A	2019/07/08	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9492539	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9492454	N/A	2019/07/09	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9493565	N/A	2019/07/05	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9492523	N/A	2019/07/09	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9492524	N/A	2019/07/09	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9494721	N/A	2019/07/06	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9494924	N/A	2019/07/05	Wilson Au Yueng
Total Sulphide	SPEC	9496964	N/A	2019/07/08	Ife Olotu

BV Labs ID: WA3867
Sample ID: TRIAL #3
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9496212	N/A	2019/07/08	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9496218	N/A	2019/07/10	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9498397	N/A	2019/07/09	Zafar Iqbal
Carbon (DOC)	TECH	9494193	N/A	2019/07/08	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9496221	N/A	2019/07/08	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9492094	N/A	2019/07/08	Report Automation Engine
Hardness Total (calculated as CaCO ₃)	CALC	9492527	N/A	2019/07/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9492530	N/A	2019/07/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/09	Automated Statchk
Ion Balance	CALC	9491969	N/A	2019/07/04	Automated Statchk
Sum of cations, anions	CALC	9491970	N/A	2019/07/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9492536	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9492450	N/A	2019/07/08	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9492539	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9492454	N/A	2019/07/09	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9493565	N/A	2019/07/05	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9492523	N/A	2019/07/09	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9492524	N/A	2019/07/09	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9494721	N/A	2019/07/06	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9494919	N/A	2019/07/05	Wilson Au Yueng
Total Sulphide	SPEC	9496964	N/A	2019/07/08	Ife Olotu

BV Labs ID: WA3867 Dup
Sample ID: TRIAL #3
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9494721	N/A	2019/07/06	Parniyan Roosta



BUREAU
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BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA3868
Sample ID: TRIAL #4
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9496212	N/A	2019/07/08	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9496218	N/A	2019/07/10	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9498397	N/A	2019/07/09	Zafar Iqbal
Carbon (DOC)	TECH	9494193	N/A	2019/07/08	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9496221	N/A	2019/07/08	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9492094	N/A	2019/07/08	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9492527	N/A	2019/07/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9492530	N/A	2019/07/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/09	Report Automation Engine
Ion Balance	CALC	9491969	N/A	2019/07/04	Report Automation Engine
Sum of cations, anions	CALC	9491970	N/A	2019/07/09	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9492536	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9492450	N/A	2019/07/08	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9492539	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9492454	N/A	2019/07/09	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9493565	N/A	2019/07/05	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9492523	N/A	2019/07/09	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9492524	N/A	2019/07/09	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9494721	N/A	2019/07/06	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9494919	N/A	2019/07/05	Wilson Au Yueng
Total Sulphide	SPEC	9496964	N/A	2019/07/08	Ife Olotu

BV Labs ID: WA3869
Sample ID: TRIAL #5
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9496212	N/A	2019/07/08	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9496218	N/A	2019/07/08	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9498397	N/A	2019/07/09	Zafar Iqbal
Carbon (DOC)	TECH	9496947	N/A	2019/07/08	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9496221	N/A	2019/07/08	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9492094	N/A	2019/07/08	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9492527	N/A	2019/07/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9492530	N/A	2019/07/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/09	Automated Statchk
Ion Balance	CALC	9491969	N/A	2019/07/04	Automated Statchk
Sum of cations, anions	CALC	9491970	N/A	2019/07/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9492536	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9492450	N/A	2019/07/08	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9492539	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9492454	N/A	2019/07/09	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9493565	N/A	2019/07/05	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9492523	N/A	2019/07/10	Automated Statchk



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VERITAS

BV Labs Job #: B953424

Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA3869

Sample ID: TRIAL #5

Matrix: Water

Collected: 2019/07/03

Shipped:

Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9492524	N/A	2019/07/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9495321	N/A	2019/07/06	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9494919	N/A	2019/07/05	Wilson Au Yueng
Total Sulphide	SPEC	9496964	N/A	2019/07/08	Ife Olotu

BV Labs ID: WA3869 Dup

Sample ID: TRIAL #5

Matrix: Water

Collected: 2019/07/03

Shipped:

Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbon (DOC)	TECH	9496947	N/A	2019/07/08	Kayla Ghanem
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9495321	N/A	2019/07/06	Kathleen Dalton

BV Labs ID: WA3870

Sample ID: TRIAL #6

Matrix: Water

Collected: 2019/07/03

Shipped:

Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9496212	N/A	2019/07/08	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9496218	N/A	2019/07/08	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9498397	N/A	2019/07/09	Zafar Iqbal
Carbon (DOC)	TECH	9496947	N/A	2019/07/08	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9496221	N/A	2019/07/08	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9492094	N/A	2019/07/08	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9492527	N/A	2019/07/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9492530	N/A	2019/07/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/09	Automated Statchk
Ion Balance	CALC	9491969	N/A	2019/07/04	Automated Statchk
Sum of cations, anions	CALC	9491970	N/A	2019/07/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9492536	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9492450	N/A	2019/07/08	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9492539	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9492454	N/A	2019/07/09	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9493565	N/A	2019/07/05	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9492523	N/A	2019/07/09	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9492524	N/A	2019/07/09	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9494721	N/A	2019/07/06	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9494919	N/A	2019/07/05	Wilson Au Yueng
Total Sulphide	SPEC	9496964	N/A	2019/07/08	Ife Olotu



BUREAU
VERITAS

BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA3871
Sample ID: TRIAL #7
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9496212	N/A	2019/07/08	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9496218	N/A	2019/07/08	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9498397	N/A	2019/07/09	Zafar Iqbal
Carbon (DOC)	TECH	9494193	N/A	2019/07/08	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9496221	N/A	2019/07/08	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9492094	N/A	2019/07/08	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9492527	N/A	2019/07/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9492530	N/A	2019/07/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/09	Automated Statchk
Ion Balance	CALC	9491969	N/A	2019/07/04	Automated Statchk
Sum of cations, anions	CALC	9491970	N/A	2019/07/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9492536	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9492450	N/A	2019/07/08	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9492539	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9492454	N/A	2019/07/09	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9493565	N/A	2019/07/05	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9492523	N/A	2019/07/09	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9492524	N/A	2019/07/09	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9494721	N/A	2019/07/06	Parniyan Roosta
Orthophosphate by Konelab (low level)	KONE/COL	9494919	N/A	2019/07/05	Wilson Au Yueng
Total Sulphide	SPEC	9496964	N/A	2019/07/08	Ife Olotu

BV Labs ID: WA3872
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9496212	N/A	2019/07/08	Ilonka Kovac
Alkalinity - Low Level	AT/ALK	9496218	N/A	2019/07/08	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9498397	N/A	2019/07/09	Zafar Iqbal
Carbon (DOC)	TECH	9494193	N/A	2019/07/08	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9496221	N/A	2019/07/08	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9492813	N/A	2019/07/04	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9492094	N/A	2019/07/08	Report Automation Engine
Hardness Total (calculated as CaCO ₃)	CALC	9492527	N/A	2019/07/09	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9492530	N/A	2019/07/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/09	Automated Statchk
Ion Balance	CALC	9491969	N/A	2019/07/04	Automated Statchk
Sum of cations, anions	CALC	9491970	N/A	2019/07/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9492536	N/A	2019/07/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9492450	N/A	2019/07/08	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9492539	N/A	2019/07/09	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9492454	N/A	2019/07/09	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9493565	N/A	2019/07/05	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9492523	N/A	2019/07/10	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA3872
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/07/03
Shipped:
Received: 2019/07/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9492524	N/A	2019/07/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9495321	N/A	2019/07/06	Kathleen Dalton
Orthophosphate by Konelab (low level)	KONE/COL	9494919	N/A	2019/07/05	Wilson Au Yueng
Total Sulphide	SPEC	9496964	N/A	2019/07/08	Ife Olotu



BUREAU
VERITAS

BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.0°C
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Sample WA3865, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample WA3865, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.

BUREAU
VERITAS

BV Labs Job #: B953424

Report Date: 2019/07/11

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9492450	Dissolved Aluminum (Al)	2019/07/08	81	80 - 120	83	80 - 120	<0.00050	mg/L	7.5	20
9492450	Dissolved Antimony (Sb)	2019/07/08	80	80 - 120	100	80 - 120	<0.000020	mg/L	14	20
9492450	Dissolved Arsenic (As)	2019/07/08	84	80 - 120	97	80 - 120	<0.000020	mg/L	0.72	20
9492450	Dissolved Barium (Ba)	2019/07/08	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.065	20
9492450	Dissolved Beryllium (Be)	2019/07/08	94	80 - 120	91	80 - 120	<0.000010	mg/L	NC	20
9492450	Dissolved Bismuth (Bi)	2019/07/08	83	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9492450	Dissolved Boron (B)	2019/07/05	NC	80 - 120	103	80 - 120	<0.010	mg/L		
9492450	Dissolved Cadmium (Cd)	2019/07/08	81	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9492450	Dissolved Chromium (Cr)	2019/07/08	82	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9492450	Dissolved Cobalt (Co)	2019/07/08	81	80 - 120	97	80 - 120	<0.0000050	mg/L	13	20
9492450	Dissolved Copper (Cu)	2019/07/08	88	80 - 120	99	80 - 120	<0.000050	mg/L	6.7	20
9492450	Dissolved Iron (Fe)	2019/07/08	93	80 - 120	106	80 - 120	<0.0010	mg/L	2.6	20
9492450	Dissolved Lead (Pb)	2019/07/08	82	80 - 120	100	80 - 120	<0.0000050	mg/L	13	20
9492450	Dissolved Lithium (Li)	2019/07/08	NC	80 - 120	82	80 - 120	<0.00050	mg/L	1.2	20
9492450	Dissolved Manganese (Mn)	2019/07/08	83	80 - 120	99	80 - 120	<0.000050	mg/L	0.099	20
9492450	Dissolved Molybdenum (Mo)	2019/07/08	NC	80 - 120	109	80 - 120	<0.000050	mg/L	19	20
9492450	Dissolved Nickel (Ni)	2019/07/08	78 (1)	80 - 120	98	80 - 120	<0.000020	mg/L	12	20
9492450	Dissolved Selenium (Se)	2019/07/08	82	80 - 120	92	80 - 120	<0.000040	mg/L	15	20
9492450	Dissolved Silicon (Si)	2019/07/08	83	80 - 120	82	80 - 120	<0.050	mg/L	2.1	20
9492450	Dissolved Silver (Ag)	2019/07/08	80	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9492450	Dissolved Strontium (Sr)	2019/07/08	NC	80 - 120	101	80 - 120	<0.000050	mg/L	1.4	20
9492450	Dissolved Thallium (Tl)	2019/07/08	85	80 - 120	104	80 - 120	<0.0000020	mg/L	NC	20
9492450	Dissolved Tin (Sn)	2019/07/08	88	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9492450	Dissolved Titanium (Ti)	2019/07/08	96	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9492450	Dissolved Uranium (U)	2019/07/08	96	80 - 120	107	80 - 120	<0.0000020	mg/L	4.1	20
9492450	Dissolved Vanadium (V)	2019/07/08	84	80 - 120	100	80 - 120	<0.00020	mg/L	2.7	20
9492450	Dissolved Zinc (Zn)	2019/07/08	74 (1)	80 - 120	99	80 - 120	<0.00010	mg/L	14	20
9492450	Dissolved Zirconium (Zr)	2019/07/08	96	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9492454	Total Aluminum (Al)	2019/07/10	114	80 - 120	116	80 - 120	<0.00050	mg/L	NC	20
9492454	Total Antimony (Sb)	2019/07/10	112	80 - 120	104	80 - 120	<0.000020	mg/L	NC	20
9492454	Total Arsenic (As)	2019/07/10	118	80 - 120	104	80 - 120	<0.000020	mg/L	NC	20
9492454	Total Barium (Ba)	2019/07/10	102	80 - 120	106	80 - 120	<0.000020	mg/L	NC	20

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VERITAS

BV Labs Job #: B953424

Report Date: 2019/07/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9492454	Total Beryllium (Be)	2019/07/10	90	80 - 120	109	80 - 120	<0.000010	mg/L	NC	20
9492454	Total Bismuth (Bi)	2019/07/10	104	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9492454	Total Boron (B)	2019/07/10	111	80 - 120	124 (1)	80 - 120	<0.010	mg/L	NC	20
9492454	Total Cadmium (Cd)	2019/07/10	108	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9492454	Total Chromium (Cr)	2019/07/10	118	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9492454	Total Cobalt (Co)	2019/07/10	115	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9492454	Total Copper (Cu)	2019/07/10	115	80 - 120	106	80 - 120	<0.000050	mg/L	NC	20
9492454	Total Iron (Fe)	2019/07/10	110	80 - 120	109	80 - 120	<0.0010	mg/L	NC	20
9492454	Total Lead (Pb)	2019/07/10	102	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9492454	Total Lithium (Li)	2019/07/10	104	80 - 120	117	80 - 120	<0.00050	mg/L	18	20
9492454	Total Manganese (Mn)	2019/07/10	118	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9492454	Total Molybdenum (Mo)	2019/07/10	106	80 - 120	108	80 - 120	<0.000050	mg/L	NC	20
9492454	Total Nickel (Ni)	2019/07/10	115	80 - 120	106	80 - 120	<0.000020	mg/L	NC	20
9492454	Total Selenium (Se)	2019/07/10	110	80 - 120	100	80 - 120	<0.000040	mg/L	NC	20
9492454	Total Silicon (Si)	2019/07/10	82	80 - 120	85	80 - 120	<0.050	mg/L	NC	20
9492454	Total Silver (Ag)	2019/07/10	98	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9492454	Total Strontium (Sr)	2019/07/10	119	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9492454	Total Thallium (Tl)	2019/07/10	103	80 - 120	107	80 - 120	<0.0000020	mg/L	NC	20
9492454	Total Tin (Sn)	2019/07/10	104	80 - 120	106	80 - 120	<0.00020	mg/L	NC	20
9492454	Total Titanium (Ti)	2019/07/10	113	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9492454	Total Uranium (U)	2019/07/10	111	80 - 120	108	80 - 120	<0.0000020	mg/L	NC	20
9492454	Total Vanadium (V)	2019/07/10	114	80 - 120	108	80 - 120	<0.00020	mg/L	NC	20
9492454	Total Zinc (Zn)	2019/07/10	118	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9492454	Total Zirconium (Zr)	2019/07/10	113	80 - 120	106	80 - 120	<0.00010	mg/L	NC	20
9492813	HCl Preserved Iron (Fe+2 Ferrous)	2019/07/04	97	80 - 120	98	90 - 110	<0.050	mg/L	NC	20
9493565	Total Ammonia (N)	2019/07/05	87	80 - 120	109	80 - 120	<0.0050	mg/L	NC	20
9494193	Dissolved Organic Carbon (C)	2019/07/08	100	80 - 120	106	80 - 120	<0.50	mg/L	3.5	20
9494233	Dissolved Barium (Ba)	2019/07/10	107	80 - 120	103	80 - 120	<0.000020	mg/L	0.11	20
9494257	Total Barium (Ba)	2019/07/10	113	80 - 120	102	80 - 120	<0.000020	mg/L	0.59	20
9494721	Dissolved Nitrate (N)	2019/07/06	102	80 - 120	100	80 - 120	<0.0030	mg/L	0.66	20
9494721	Dissolved Nitrite (N)	2019/07/06	102	80 - 120	99	80 - 120	<0.0030	mg/L	NC	20
9494919	Orthophosphate (P)	2019/07/05			97	80 - 120	<0.0010	mg/L		

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BV Labs Job #: B953424

Report Date: 2019/07/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9494924	Orthophosphate (P)	2019/07/05	91	80 - 120	95	80 - 120	<0.0010	mg/L	2.8	20
9495321	Dissolved Nitrate (N)	2019/07/06	101	80 - 120	100	80 - 120	<0.0030	mg/L	NC	20
9495321	Dissolved Nitrite (N)	2019/07/06	101	80 - 120	100	80 - 120	<0.0030	mg/L	11	20
9496212	Acidity (pH 4.5)	2019/07/08					<1.0	mg/L	NC	20
9496212	Acidity (pH 8.3)	2019/07/08			92	80 - 120	<1.0	mg/L	19	20
9496218	Alkalinity (PP as CaCO ₃)	2019/07/08					<0.50	mg/L	NC	20
9496218	Alkalinity (Total as CaCO ₃)	2019/07/08			100	80 - 120	<0.50	mg/L	6.2	20
9496218	Bicarbonate (HCO ₃)	2019/07/08					<0.50	mg/L	6.2	20
9496218	Carbonate (CO ₃)	2019/07/08					<0.50	mg/L	NC	20
9496218	Hydroxide (OH)	2019/07/08					<0.50	mg/L	NC	20
9496221	Fluoride (F)	2019/07/08	104	80 - 120	93	80 - 120	0.010, RDL=0.010 (2)	mg/L	0.59	20
9496947	Dissolved Organic Carbon (C)	2019/07/08	NC	80 - 120	106	80 - 120	<0.50	mg/L	1.4	20
9496964	Total Sulphide	2019/07/08			104	80 - 120	<0.0019	mg/L	3.0	20
9498397	Dissolved Chloride (Cl)	2019/07/09	NC	80 - 120	105	80 - 120	<0.50	mg/L	0.68	20
9498397	Dissolved Sulphate (SO ₄)	2019/07/09	NC	80 - 120	97	80 - 120	<0.50	mg/L	0.11	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Method blank <2X RDL.



BUREAU
VERITAS

BV Labs Job #: B953424
Report Date: 2019/07/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page ____ of ____

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS										
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days										
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02											
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah											
Email:		Email:	agault@alexcoresource.com kpiecowye@contangostrategies.com	Site #:												
				Sampled By:		Date Required:										
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL - Y / N Present Intact COOLING MEDIA PRESENT Y / N COMMENTS										
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1	Trial #1	03-Jul-19	10:35	Water	X	X	X	X	X	X	X	X	X	X	10	
2	Trial #2	03-Jul-19	11:05	Water	X	X	X	X	X	X	X	X	X	X	10	
3	Trial #3	03-Jul-19	11:25	Water	X	X	X	X	X	X	X	X	X	X	10	
4	Trial #4	03-Jul-19	11:40	Water	X	X	X	X	X	X	X	X	X	X	10	
5	Trial #5	03-Jul-19	12:55	Water	X	X	X	X	X	X	X	X	X	X	10	
6	Trial #6	03-Jul-19	12:05	Water	X	X	X	X	X	X	X	X	X	X	10	
7	Trial #7	03-Jul-19	12:20	Water	X	X	X	X	X	X	X	X	X	X	10	
8	Trial #8	03-Jul-19	12:45	Water	X	X	X	X	X	X	X	X	X	X	10	
9																
10																
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)									
<i>Kurt</i>		2019/07/03	14:15	<i>John Bank</i>		2019/07/04	09:25									

03-Jul-19 14:15
Safiann Maiter
B953424
SBZ INS-0177



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 10F1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/07/24
 Report #: R2757453
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B957621

Received: 2019/07/16, 15:00

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	8	N/A	2019/07/19	AB SOP-00005	SM 23 2310 B m
Alkalinity - Low Level	8	N/A	2019/07/19	AB SOP-00005	SM 23 2320 B m
Low level chloride/sulphate by AC	8	N/A	2019/07/23	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Carbon (DOC) (2)	8	N/A	2019/07/22	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level	8	N/A	2019/07/19	AB SOP-00005	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/07/18	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/07/22	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	8	N/A	2019/07/19		Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/07/19		Auto Calc
Ion Balance (as Cations/Anions Ratio)	8	N/A	2019/07/24		Auto Calc
Ion Balance	8	N/A	2019/07/18		Auto Calc
Sum of cations, anions	8	N/A	2019/07/19		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/07/19		Auto Calc
Elements by ICPMS Low Level (dissolved)	8	N/A	2019/07/19	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/07/19		Auto Calc
Elements by ICPMS Low Level (total)	8	N/A	2019/07/18	CAL SOP-00265	EPA 6020 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/07/18	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate and Nitrite - Low Level	8	N/A	2019/07/23		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	8	N/A	2019/07/23		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	8	N/A	2019/07/21	AB SOP-00023	SM 23 4110 B m
Orthophosphate by Konelab (low level) (1)	8	N/A	2019/07/20	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	8	N/A	2019/07/21	AB SOP-00080	SM 23 4500 S2-A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 10F1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/07/24
Report #: R2757453
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B957621

Received: 2019/07/16, 15:00

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WC6405	WC6406		WC6407		WC6408		
Sampling Date		2019/07/16 10:45	2019/07/16 11:10		2019/07/16 11:30		2019/07/16 11:45		
COC Number		1OF1	1OF1		1OF1		1OF1		
	UNITS	TRIAL # 1	TRIAL # 2	RDL	TRIAL # 3	RDL	TRIAL # 4	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.3	8.8	N/A	8.2	N/A	8.4	N/A	9511308
Cation Sum	meq/L	8.1	8.2	N/A	7.9	N/A	7.9	N/A	9511308
Ion Balance	N/A	0.98	0.93	0.010	0.96	0.010	0.94	0.010	9519636
Ion Balance (% Difference)	%	1.1	3.9	N/A	2.0	N/A	3.2	N/A	9511302
Dissolved Nitrate (NO3)	mg/L	5.3	<0.013	0.013	0.27	0.013	0.017	0.013	9510800
Nitrate plus Nitrite (N)	mg/L	1.2	<0.0042	0.0042	0.064	0.0042	<0.0042	0.0042	9510349
Dissolved Nitrite (NO2)	mg/L	<0.0099	<0.0099	0.0099	0.010	0.0099	<0.0099	0.0099	9510800
Sulphide (as H2S)	mg/L	0.0020	0.28	0.0020	0.0030	0.0020	2.8	0.020	9510255
Misc. Inorganics									
Fluoride (F)	mg/L	0.635	0.641	0.010	0.517	0.010	0.510	0.010	9514734
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.35	0.050	<0.050	0.050	0.75	0.050	9513350
Dissolved Organic Carbon (C)	mg/L	3.7	4.2	0.50	5.2	0.50	6.1	0.50	9514391
Acidity (pH 4.5)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9514642
Alkalinity (Total as CaCO3)	mg/L	76.2	94.0	0.50	113	0.50	139	0.50	9514721
Acidity (pH 8.3)	mg/L	4.8	11.5	1.0	6.7	1.0	9.5	1.0	9514642
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9514721
Bicarbonate (HCO3)	mg/L	93.0	115	0.50	138	0.50	170	0.50	9514721
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9514721
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9514721
Anions									
Orthophosphate (P)	mg/L	1.1 (1)	1.1 (1)	0.010	0.069	0.0010	0.38	0.0010	9516262
Total Sulphide	mg/L	0.0020	0.26	0.0019	0.0029	0.0019	2.6 (1)	0.019	9516354
Dissolved Chloride (Cl)	mg/L	60	62	0.50	61	0.50	63	0.50	9518474
Dissolved Sulphate (SO4)	mg/L	240 (1)	250 (1)	1.0	200 (1)	1.0	180 (1)	1.0	9518474
Nutrients									
Total Ammonia (N)	mg/L	0.0083	0.35	0.0050	0.33	0.0050	0.53 (1)	0.010	9512213
Dissolved Nitrite (N)	mg/L	<0.0030	<0.0030	0.0030	0.0030	0.0030	<0.0030	0.0030	9513090
Dissolved Nitrate (N)	mg/L	1.2	<0.0030	0.0030	0.061	0.0030	0.0039	0.0030	9513090
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WC6409		WC6410		WC6411	WC6412		
Sampling Date		2019/07/16 14:30		2019/07/16 12:30		2019/07/16 12:50	2019/07/16 13:15		
COC Number		1OF1		1OF1		1OF1	1OF1		
	UNITS	TRIAL # 5	RDL	TRIAL # 6	RDL	TRIAL # 7	TRIAL # 8	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.6	N/A	8.6	N/A	9.3	8.3	N/A	9511308
Cation Sum	meq/L	8.3	N/A	8.2	N/A	8.2	7.9	N/A	9511308
Ion Balance	N/A	0.96	0.010	0.96	0.010	0.88	0.94	0.010	9519636
Ion Balance (% Difference)	%	2.0	N/A	2.2	N/A	6.3	2.9	N/A	9511302
Dissolved Nitrate (NO3)	mg/L	<0.013	0.013	0.082	0.013	5.0	0.48	0.013	9510800
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	0.024	0.0042	1.1	0.11	0.0042	9510349
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	0.017	0.0099	<0.0099	<0.0099	0.0099	9510800
Sulphide (as H2S)	mg/L	0.32	0.0070	0.018	0.0020	0.020	<0.0020	0.0020	9510255

Misc. Inorganics

Fluoride (F)	mg/L	0.676	0.010	0.686	0.010	0.679	0.512	0.010	9514734
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.78	0.050	0.070	0.050	<0.050	<0.050	0.050	9513350
Dissolved Organic Carbon (C)	mg/L	11	0.50	3.9	0.50	2.6	3.0	0.50	9514391
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	9514642
Alkalinity (Total as CaCO3)	mg/L	93.9	0.50	89.6	0.50	119	88.3	0.50	9514721
Acidity (pH 8.3)	mg/L	14.5	1.0	5.6	1.0	1.5	2.4	1.0	9514642
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9514721
Bicarbonate (HCO3)	mg/L	115	0.50	109	0.50	146	108	0.50	9514721
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9514721
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9514721

Anions

Orthophosphate (P)	mg/L	0.49	0.0010	1.3 (1)	0.010	0.0069	0.0029	0.0010	9516262
Total Sulphide	mg/L	0.30 (1)	0.0067	0.017	0.0019	0.019	<0.0019	0.0019	9516354
Dissolved Chloride (Cl)	mg/L	57	0.50	60	0.50	61	64	0.50	9518474
Dissolved Sulphate (SO4)	mg/L	240 (1)	1.0	240 (1)	1.0	240 (1)	230 (1)	1.0	9518474

Nutrients

Total Ammonia (N)	mg/L	0.32	0.0050	0.13	0.0050	0.010	<0.0050	0.0050	9512213
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	0.0053	0.0030	<0.0030	<0.0030	0.0030	9513090
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	0.018	0.0030	1.1	0.11	0.0030	9513090

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
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BV Labs Job #: B957621
Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WC6405		WC6406		WC6407		
Sampling Date		2019/07/16 10:45		2019/07/16 11:10		2019/07/16 11:30		
COC Number		1OF1		1OF1		1OF1		
	UNITS	TRIAL # 1	QC Batch	TRIAL # 2	QC Batch	TRIAL # 3	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	336	9511070	338	9511070	323	0.50	9511070
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	<0.00050	9512445	0.00117	9512445	<0.00050	0.00050	9512445
Dissolved Antimony (Sb)	mg/L	0.0129	9512445	0.00105	9512445	0.00364	0.000020	9512445
Dissolved Arsenic (As)	mg/L	0.0544	9512445	0.0352	9512445	0.0112	0.000020	9512445
Dissolved Barium (Ba)	mg/L	0.00472	9512445	0.0888	9512445	0.0431	0.000020	9512445
Dissolved Beryllium (Be)	mg/L	<0.000010	9512445	<0.000010	9512445	<0.000010	0.000010	9512445
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9512445	<0.0000050	9512445	<0.0000050	0.0000050	9512445
Dissolved Boron (B)	mg/L	0.039	9512445	0.039	9512445	0.027	0.010	9512445
Dissolved Cadmium (Cd)	mg/L	0.0000833	9512445	<0.0000050	9512445	<0.0000050	0.0000050	9512445
Dissolved Chromium (Cr)	mg/L	<0.00010	9514398	<0.00010	9512445	<0.00010	0.00010	9512445
Dissolved Cobalt (Co)	mg/L	0.00180	9512445	0.00211	9512445	0.000575	0.0000050	9512445
Dissolved Copper (Cu)	mg/L	0.000681	9512445	<0.000050	9512445	0.000132	0.000050	9512445
Dissolved Iron (Fe)	mg/L	0.0504	9512445	0.288	9512445	0.0308	0.0010	9512445
Dissolved Lead (Pb)	mg/L	0.0000981	9512445	0.0000417	9512445	0.0000166	0.0000050	9512445
Dissolved Lithium (Li)	mg/L	0.0109	9512445	0.00869	9512445	0.00876	0.00050	9514398
Dissolved Manganese (Mn)	mg/L	0.125	9512445	0.193	9512445	0.962	0.000050	9512445
Dissolved Molybdenum (Mo)	mg/L	0.00210	9512445	0.000752	9512445	0.00213	0.000050	9512445
Dissolved Nickel (Ni)	mg/L	0.00949	9512445	0.00657	9512445	0.00311	0.000020	9512445
Dissolved Selenium (Se)	mg/L	0.00318	9512445	0.00441	9512445	0.00137	0.000040	9514398
Dissolved Silicon (Si)	mg/L	1.17	9512445	1.10	9512445	2.74	0.050	9512445
Dissolved Silver (Ag)	mg/L	<0.0000050	9512445	<0.0000050	9512445	<0.0000050	0.0000050	9512445
Dissolved Strontium (Sr)	mg/L	0.495	9512445	0.502	9512445	0.491	0.000050	9512445
Dissolved Thallium (Tl)	mg/L	0.000154	9512445	0.0000030	9512445	<0.0000020	0.0000020	9512445
Dissolved Tin (Sn)	mg/L	<0.00020	9512445	<0.00020	9512445	<0.00020	0.00020	9512445
Dissolved Titanium (Ti)	mg/L	<0.00050	9512445	<0.00050	9512445	<0.00050	0.00050	9512445
Dissolved Uranium (U)	mg/L	0.0269	9512445	0.0115	9512445	0.0111	0.0000020	9512445
Dissolved Vanadium (V)	mg/L	0.00026	9512445	<0.00020	9512445	0.00032	0.00020	9512445
Dissolved Zinc (Zn)	mg/L	0.0616	9512445	0.00497	9512445	0.00665	0.00010	9512445
Dissolved Zirconium (Zr)	mg/L	<0.00010	9512445	<0.00010	9512445	0.00014	0.00010	9512445
Dissolved Calcium (Ca)	mg/L	105	9511080	106	9511080	102	0.050	9511080
Dissolved Magnesium (Mg)	mg/L	18.0	9511080	17.6	9511080	16.5	0.050	9511080
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WC6405		WC6406		WC6407		
Sampling Date		2019/07/16 10:45		2019/07/16 11:10		2019/07/16 11:30		
COC Number		1OF1		1OF1		1OF1		
	UNITS	TRIAL # 1	QC Batch	TRIAL # 2	QC Batch	TRIAL # 3	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.81	9511080	7.50	9511080	7.22	0.050	9511080
Dissolved Sodium (Na)	mg/L	28.3	9511080	28.1	9511080	27.5	0.050	9511080
Dissolved Sulphur (S)	mg/L	93.1	9511080	89.9	9511080	79.6	3.0	9511080
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B957621
Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WC6408	WC6409	WC6410	WC6411	WC6412		
Sampling Date		2019/07/16 11:45	2019/07/16 14:30	2019/07/16 12:30	2019/07/16 12:50	2019/07/16 13:15		
COC Number		1OF1	1OF1	1OF1	1OF1	1OF1		
	UNITS	TRIAL # 4	TRIAL # 5	TRIAL # 6	TRIAL # 7	TRIAL # 8	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	324	343	336	338	326	0.50	9511070
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00310	0.0113	<0.00050	0.00262	<0.00050	0.00050	9512445
Dissolved Antimony (Sb)	mg/L	0.000518	0.00144	0.0121	0.0282	0.00588	0.000020	9512445
Dissolved Arsenic (As)	mg/L	0.0136	0.0246	0.193	0.0236	0.00219	0.000020	9512445
Dissolved Barium (Ba)	mg/L	0.152	0.0633	0.00372	0.0928	0.151	0.000020	9512445
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9512445
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9512445
Dissolved Boron (B)	mg/L	0.047	0.030	0.030	0.031	0.041	0.010	9512445
Dissolved Cadmium (Cd)	mg/L	<0.0000050	0.0000521	0.0000058	0.00289	0.000427	0.0000050	9512445
Dissolved Chromium (Cr)	mg/L	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9512445
Dissolved Cobalt (Co)	mg/L	0.000258	0.00342	0.00649	0.000707	0.0000439	0.0000050	9512445
Dissolved Copper (Cu)	mg/L	<0.000050	0.000561	0.000123	0.00631	0.00373	0.000050	9512445
Dissolved Iron (Fe)	mg/L	0.622	0.762	0.0623	0.0030	0.0088	0.0010	9512445
Dissolved Lead (Pb)	mg/L	0.0000098	0.00117	0.000144	0.00291	0.0000377	0.0000050	9512445
Dissolved Lithium (Li)	mg/L	0.00599	0.0141	0.00870	0.0103	0.00689	0.00050	9512445
Dissolved Manganese (Mn)	mg/L	1.25	0.191	0.143	0.0402	0.0290	0.000050	9512445
Dissolved Molybdenum (Mo)	mg/L	0.000162	0.00135	0.00101	0.00188	0.00242	0.000050	9512445
Dissolved Nickel (Ni)	mg/L	0.00116	0.0109	0.0281	0.00810	0.00178	0.000020	9512445
Dissolved Selenium (Se)	mg/L	0.00467	0.00414	0.00774	0.0119	0.00330	0.000040	9512445
Dissolved Silicon (Si)	mg/L	2.76	0.988	1.20	1.01	2.39	0.050	9512445
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9512445
Dissolved Strontium (Sr)	mg/L	0.594	0.614	0.280	0.678	0.621	0.000050	9512445
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000238	0.0000078	0.000789	0.0000229	0.0000020	9512445
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9512445
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9512445
Dissolved Uranium (U)	mg/L	0.00287	0.0253	0.0825	0.0459	0.0181	0.0000020	9512445
Dissolved Vanadium (V)	mg/L	0.00054	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9512445
Dissolved Zinc (Zn)	mg/L	0.00051	0.0525	0.0149	0.148	0.0431	0.00010	9512445
Dissolved Zirconium (Zr)	mg/L	0.00046	0.00017	<0.00010	<0.00010	<0.00010	0.00010	9512445
Dissolved Calcium (Ca)	mg/L	103	108	105	105	103	0.050	9511080
Dissolved Magnesium (Mg)	mg/L	16.3	17.7	17.9	18.3	16.6	0.050	9511080

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WC6408	WC6409	WC6410	WC6411	WC6412		
Sampling Date		2019/07/16 11:45	2019/07/16 14:30	2019/07/16 12:30	2019/07/16 12:50	2019/07/16 13:15		
COC Number		1OF1	1OF1	1OF1	1OF1	1OF1		
	UNITS	TRIAL # 4	TRIAL # 5	TRIAL # 6	TRIAL # 7	TRIAL # 8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.30	6.76	8.37	6.92	5.37	0.050	9511080
Dissolved Sodium (Na)	mg/L	27.5	28.0	29.2	28.5	27.7	0.050	9511080
Dissolved Sulphur (S)	mg/L	72.8	90.2	91.0	91.2	85.5	3.0	9511080
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B957621
Report Date: 2019/07/24ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WC6405		WC6406		WC6407		
Sampling Date		2019/07/16 10:45		2019/07/16 11:10		2019/07/16 11:30		
COC Number		1OF1		1OF1		1OF1		
	UNITS	TRIAL # 1	QC Batch	TRIAL # 2	QC Batch	TRIAL # 3	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	339	9510399	339	9510399	324	0.50	9510399
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00094	9510252	0.00160	9510252	<0.00050	0.00050	9510252
Total Antimony (Sb)	mg/L	0.0128	9510252	0.00113	9510252	0.00361	0.000020	9510252
Total Arsenic (As)	mg/L	0.0545	9510252	0.0358	9510252	0.0133	0.000020	9510252
Total Barium (Ba)	mg/L	0.00691	9510252	0.132	9510252	0.0511	0.000020	9510252
Total Beryllium (Be)	mg/L	<0.000010	9510252	<0.000010	9510252	<0.000010	0.000010	9510252
Total Bismuth (Bi)	mg/L	<0.0000050	9510252	<0.0000050	9510252	<0.0000050	0.0000050	9510252
Total Boron (B)	mg/L	0.042	9510252	0.043	9510252	0.025	0.010	9510252
Total Cadmium (Cd)	mg/L	0.0000857	9510252	0.0000052	9510252	<0.0000050	0.0000050	9510252
Total Chromium (Cr)	mg/L	<0.00010	9514405	<0.00010	9510252	<0.00010	0.00010	9510252
Total Cobalt (Co)	mg/L	0.00182	9510252	0.00217	9510252	0.000574	0.0000050	9510252
Total Copper (Cu)	mg/L	0.000858	9510252	0.000068	9510252	0.000178	0.000050	9510252
Total Iron (Fe)	mg/L	0.0559	9510252	0.303	9510252	0.254	0.0010	9510252
Total Lead (Pb)	mg/L	0.000517	9510252	0.000109	9510252	0.000184	0.0000050	9510252
Total Lithium (Li)	mg/L	0.00958	9510252	0.0128	9510252	0.00744	0.00050	9514405
Total Manganese (Mn)	mg/L	0.123	9510252	0.193	9510252	0.955	0.000050	9510252
Total Molybdenum (Mo)	mg/L	0.00218	9510252	0.000819	9510252	0.00215	0.000050	9510252
Total Nickel (Ni)	mg/L	0.00940	9510252	0.00648	9510252	0.00310	0.000020	9510252
Total Selenium (Se)	mg/L	0.00310	9510252	0.00760	9510252	0.00152	0.000040	9514405
Total Silicon (Si)	mg/L	1.18	9510252	1.09	9510252	2.79	0.050	9510252
Total Silver (Ag)	mg/L	<0.0000050	9510252	<0.0000050	9510252	<0.0000050	0.0000050	9510252
Total Strontium (Sr)	mg/L	0.488	9510252	0.597	9510252	0.499	0.000050	9510252
Total Thallium (Tl)	mg/L	0.000152	9510252	0.0000088	9510252	<0.0000020	0.0000020	9510252
Total Tin (Sn)	mg/L	<0.00020	9510252	<0.00020	9510252	<0.00020	0.00020	9510252
Total Titanium (Ti)	mg/L	<0.00050	9510252	<0.00050	9510252	<0.00050	0.00050	9510252
Total Uranium (U)	mg/L	0.0274	9510252	0.0118	9510252	0.0110	0.0000020	9510252
Total Vanadium (V)	mg/L	0.00029	9510252	<0.00020	9510252	0.00035	0.00020	9510252
Total Zinc (Zn)	mg/L	0.0618	9510252	0.00600	9510252	0.00699	0.00010	9510252
Total Zirconium (Zr)	mg/L	<0.00010	9510252	<0.00010	9510252	0.00016	0.00010	9510252
Total Calcium (Ca)	mg/L	106	9511083	106	9511083	103	0.050	9511083
Total Magnesium (Mg)	mg/L	18.0	9511083	18.0	9511083	16.3	0.050	9511083
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WC6405		WC6406		WC6407		
Sampling Date		2019/07/16 10:45		2019/07/16 11:10		2019/07/16 11:30		
COC Number		1OF1		1OF1		1OF1		
	UNITS	TRIAL # 1	QC Batch	TRIAL # 2	QC Batch	TRIAL # 3	RDL	QC Batch
Total Potassium (K)	mg/L	7.72	9511083	7.50	9511083	7.14	0.050	9511083
Total Sodium (Na)	mg/L	28.4	9511083	28.4	9511083	27.1	0.050	9511083
Total Sulphur (S)	mg/L	90.4	9511083	90.4	9511083	76.4	3.0	9511083
RDL = Reportable Detection Limit								



BUREAU
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BV Labs Job #: B957621
Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WC6408	WC6409	WC6410	WC6411	WC6412		
Sampling Date		2019/07/16 11:45	2019/07/16 14:30	2019/07/16 12:30	2019/07/16 12:50	2019/07/16 13:15		
COC Number		1OF1	1OF1	1OF1	1OF1	1OF1		
	UNITS	TRIAL # 4	TRIAL # 5	TRIAL # 6	TRIAL # 7	TRIAL # 8	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	326	345	334	335	325	0.50	9510399
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00706	0.0181	<0.00050	0.00296	0.00099	0.00050	9510252
Total Antimony (Sb)	mg/L	0.000632	0.00298	0.0130	0.0285	0.00578	0.000020	9510252
Total Arsenic (As)	mg/L	0.0130	0.0260	0.197	0.0247	0.00259	0.000020	9510252
Total Barium (Ba)	mg/L	0.161	0.0644	0.0183	0.0920	0.151	0.000020	9510252
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9510252
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9510252
Total Boron (B)	mg/L	0.033	0.038	0.032	0.038	0.033	0.010	9510252
Total Cadmium (Cd)	mg/L	<0.0000050	0.000183	0.0000470	0.00291	0.000407	0.0000050	9510252
Total Chromium (Cr)	mg/L	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9510252
Total Cobalt (Co)	mg/L	0.000314	0.00349	0.00707	0.000719	0.0000419	0.0000050	9510252
Total Copper (Cu)	mg/L	<0.000050	0.00181	0.000427	0.00639	0.00388	0.000050	9510252
Total Iron (Fe)	mg/L	0.718	0.778	0.144	0.0031	0.0163	0.0010	9510252
Total Lead (Pb)	mg/L	0.0000874	0.00406	0.000575	0.00318	0.000166	0.0000050	9510252
Total Lithium (Li)	mg/L	0.00985	0.0104	0.00786	0.0168	0.0101	0.00050	9510252
Total Manganese (Mn)	mg/L	1.28	0.192	0.141	0.0398	0.0307	0.000050	9510252
Total Molybdenum (Mo)	mg/L	0.000361	0.00127	0.00101	0.00192	0.00227	0.000050	9510252
Total Nickel (Ni)	mg/L	0.00139	0.0112	0.0321	0.00801	0.00185	0.000020	9510252
Total Selenium (Se)	mg/L	0.00813	0.00504	0.00892	0.0120	0.00347	0.000040	9510252
Total Silicon (Si)	mg/L	2.78	0.985	1.17	0.980	2.38	0.050	9510252
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9510252
Total Strontium (Sr)	mg/L	0.601	0.610	0.313	0.677	0.612	0.000050	9510252
Total Thallium (Tl)	mg/L	<0.0000020	0.0000804	0.0000146	0.000774	0.0000258	0.0000020	9510252
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9510252
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9510252
Total Uranium (U)	mg/L	0.00259	0.0210	0.0834	0.0452	0.0182	0.0000020	9510252
Total Vanadium (V)	mg/L	0.00065	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9510252
Total Zinc (Zn)	mg/L	0.00206	0.140	0.0216	0.147	0.0601	0.00010	9510252
Total Zirconium (Zr)	mg/L	0.00039	0.00016	<0.00010	<0.00010	<0.00010	0.00010	9510252
Total Calcium (Ca)	mg/L	103	109	104	104	103	0.050	9511083
Total Magnesium (Mg)	mg/L	16.5	17.6	17.9	18.3	16.5	0.050	9511083
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WC6408	WC6409	WC6410	WC6411	WC6412		
Sampling Date		2019/07/16 11:45	2019/07/16 14:30	2019/07/16 12:30	2019/07/16 12:50	2019/07/16 13:15		
COC Number		10F1	10F1	10F1	10F1	10F1		
	UNITS	TRIAL # 4	TRIAL # 5	TRIAL # 6	TRIAL # 7	TRIAL # 8	RDL	QC Batch
Total Potassium (K)	mg/L	7.42	6.85	8.32	6.88	5.35	0.050	9511083
Total Sodium (Na)	mg/L	27.7	28.4	29.0	28.7	27.7	0.050	9511083
Total Sulphur (S)	mg/L	74.4	90.5	88.6	88.6	83.8	3.0	9511083

RDL = Reportable Detection Limit



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BV Labs Job #: B957621
Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WC6405
Sample ID: TRIAL # 1
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9514642	N/A	2019/07/19	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9514721	N/A	2019/07/19	Kathleen Dalton
Low level chloride/sulphate by AC	KONE	9518474	N/A	2019/07/23	Zafar Iqbal
Carbon (DOC)	TECH	9514391	N/A	2019/07/22	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9514734	N/A	2019/07/19	Kathleen Dalton
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9510255	N/A	2019/07/22	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9510399	N/A	2019/07/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9511070	N/A	2019/07/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9519636	N/A	2019/07/24	Harry (Peng) Liang
Ion Balance	CALC	9511302	N/A	2019/07/18	Automated Statchk
Sum of cations, anions	CALC	9511308	N/A	2019/07/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9511080	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9512445	N/A	2019/07/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9511083	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9510252	N/A	2019/07/18	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9510800	N/A	2019/07/23	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9510349	N/A	2019/07/23	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9513090	N/A	2019/07/21	Ian Bullecer
Orthophosphate by Konelab (low level)	KONE/COL	9516262	N/A	2019/07/20	Margaret Hurst
Total Sulphide	SPEC	9516354	N/A	2019/07/21	Ife Olotu

BV Labs ID: WC6405 Dup
Sample ID: TRIAL # 1
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee

BV Labs ID: WC6406
Sample ID: TRIAL # 2
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9514642	N/A	2019/07/19	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9514721	N/A	2019/07/19	Kathleen Dalton
Low level chloride/sulphate by AC	KONE	9518474	N/A	2019/07/23	Zafar Iqbal
Carbon (DOC)	TECH	9514391	N/A	2019/07/22	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9514734	N/A	2019/07/19	Kathleen Dalton
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9510255	N/A	2019/07/22	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9510399	N/A	2019/07/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9511070	N/A	2019/07/19	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9519636	N/A	2019/07/24	Harry (Peng) Liang
Ion Balance	CALC	9511302	N/A	2019/07/18	Automated Statchk



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BV Labs Job #: B957621
Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WC6406
Sample ID: TRIAL # 2
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9511308	N/A	2019/07/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9511080	N/A	2019/07/19	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9512445	N/A	2019/07/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9511083	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9510252	N/A	2019/07/18	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9510800	N/A	2019/07/23	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9510349	N/A	2019/07/23	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9513090	N/A	2019/07/21	Ian Bullecer
Orthophosphate by Konelab (low level)	KONE/COL	9516262	N/A	2019/07/20	Margaret Hurst
Total Sulphide	SPEC	9516354	N/A	2019/07/21	Ife Olotu

BV Labs ID: WC6407
Sample ID: TRIAL # 3
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9514642	N/A	2019/07/19	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9514721	N/A	2019/07/19	Kathleen Dalton
Low level chloride/sulphate by AC	KONE	9518474	N/A	2019/07/23	Zafar Iqbal
Carbon (DOC)	TECH	9514391	N/A	2019/07/22	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9514734	N/A	2019/07/19	Kathleen Dalton
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9510255	N/A	2019/07/22	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9510399	N/A	2019/07/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9511070	N/A	2019/07/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9519636	N/A	2019/07/24	Harry (Peng) Liang
Ion Balance	CALC	9511302	N/A	2019/07/18	Automated Statchk
Sum of cations, anions	CALC	9511308	N/A	2019/07/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9511080	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9512445	N/A	2019/07/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9511083	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9510252	N/A	2019/07/18	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9510800	N/A	2019/07/23	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9510349	N/A	2019/07/23	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9513090	N/A	2019/07/21	Ian Bullecer
Orthophosphate by Konelab (low level)	KONE/COL	9516262	N/A	2019/07/20	Margaret Hurst
Total Sulphide	SPEC	9516354	N/A	2019/07/21	Ife Olotu

BV Labs ID: WC6408
Sample ID: TRIAL # 4
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9514642	N/A	2019/07/19	Kathleen Dalton



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BV Labs Job #: B957621

Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WC6408
Sample ID: TRIAL # 4
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9514721	N/A	2019/07/19	Kathleen Dalton
Low level chloride/sulphate by AC	KONE	9518474	N/A	2019/07/23	Zafar Iqbal
Carbon (DOC)	TECH	9514391	N/A	2019/07/22	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9514734	N/A	2019/07/19	Kathleen Dalton
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9510255	N/A	2019/07/22	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9510399	N/A	2019/07/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9511070	N/A	2019/07/19	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9519636	N/A	2019/07/24	Harry (Peng) Liang
Ion Balance	CALC	9511302	N/A	2019/07/18	Automated Statchk
Sum of cations, anions	CALC	9511308	N/A	2019/07/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9511080	N/A	2019/07/19	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9512445	N/A	2019/07/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9511083	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9510252	N/A	2019/07/18	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9510800	N/A	2019/07/23	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9510349	N/A	2019/07/23	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9513090	N/A	2019/07/21	Ian Bullecer
Orthophosphate by Konelab (low level)	KONE/COL	9516262	N/A	2019/07/20	Margaret Hurst
Total Sulphide	SPEC	9516354	N/A	2019/07/21	Ife Olotu

BV Labs ID: WC6409
Sample ID: TRIAL # 5
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9514642	N/A	2019/07/19	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9514721	N/A	2019/07/19	Kathleen Dalton
Low level chloride/sulphate by AC	KONE	9518474	N/A	2019/07/23	Zafar Iqbal
Carbon (DOC)	TECH	9514391	N/A	2019/07/22	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9514734	N/A	2019/07/19	Kathleen Dalton
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9510255	N/A	2019/07/22	Report Automation Engine
Hardness Total (calculated as CaCO ₃)	CALC	9510399	N/A	2019/07/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9511070	N/A	2019/07/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9519636	N/A	2019/07/24	Harry (Peng) Liang
Ion Balance	CALC	9511302	N/A	2019/07/18	Automated Statchk
Sum of cations, anions	CALC	9511308	N/A	2019/07/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9511080	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9512445	N/A	2019/07/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9511083	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9510252	N/A	2019/07/18	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9510800	N/A	2019/07/23	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9510349	N/A	2019/07/23	Automated Statchk



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BV Labs Job #: B957621

Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WC6409
Sample ID: TRIAL # 5
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9513090	N/A	2019/07/21	Ian Bullecer
Orthophosphate by Konelab (low level)	KONE/COL	9516262	N/A	2019/07/20	Margaret Hurst
Total Sulphide	SPEC	9516354	N/A	2019/07/21	Ife Olotu

BV Labs ID: WC6410
Sample ID: TRIAL # 6
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9514642	N/A	2019/07/19	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9514721	N/A	2019/07/19	Kathleen Dalton
Low level chloride/sulphate by AC	KONE	9518474	N/A	2019/07/23	Zafar Iqbal
Carbon (DOC)	TECH	9514391	N/A	2019/07/22	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9514734	N/A	2019/07/19	Kathleen Dalton
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9510255	N/A	2019/07/22	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9510399	N/A	2019/07/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9511070	N/A	2019/07/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9519636	N/A	2019/07/24	Harry (Peng) Liang
Ion Balance	CALC	9511302	N/A	2019/07/18	Report Automation Engine
Sum of cations, anions	CALC	9511308	N/A	2019/07/19	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9511080	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9512445	N/A	2019/07/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9511083	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9510252	N/A	2019/07/18	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9510800	N/A	2019/07/23	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9510349	N/A	2019/07/23	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9513090	N/A	2019/07/21	Ian Bullecer
Orthophosphate by Konelab (low level)	KONE/COL	9516262	N/A	2019/07/20	Margaret Hurst
Total Sulphide	SPEC	9516354	N/A	2019/07/21	Ife Olotu

BV Labs ID: WC6411
Sample ID: TRIAL # 7
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9514642	N/A	2019/07/19	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9514721	N/A	2019/07/19	Kathleen Dalton
Low level chloride/sulphate by AC	KONE	9518474	N/A	2019/07/23	Zafar Iqbal
Carbon (DOC)	TECH	9514391	N/A	2019/07/22	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9514734	N/A	2019/07/19	Kathleen Dalton
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9510255	N/A	2019/07/22	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9510399	N/A	2019/07/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9511070	N/A	2019/07/19	Automated Statchk



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BV Labs Job #: B957621

Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WC6411
Sample ID: TRIAL # 7
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9519636	N/A	2019/07/24	Harry (Peng) Liang
Ion Balance	CALC	9511302	N/A	2019/07/18	Automated Statchk
Sum of cations, anions	CALC	9511308	N/A	2019/07/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9511080	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9512445	N/A	2019/07/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9511083	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9510252	N/A	2019/07/18	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9510800	N/A	2019/07/23	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9510349	N/A	2019/07/23	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9513090	N/A	2019/07/21	Ian Bullecer
Orthophosphate by Konelab (low level)	KONE/COL	9516262	N/A	2019/07/20	Margaret Hurst
Total Sulphide	SPEC	9516354	N/A	2019/07/21	Ife Olotu

BV Labs ID: WC6412
Sample ID: TRIAL # 8
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9514642	N/A	2019/07/19	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9514721	N/A	2019/07/19	Kathleen Dalton
Low level chloride/sulphate by AC	KONE	9518474	N/A	2019/07/23	Zafar Iqbal
Carbon (DOC)	TECH	9514391	N/A	2019/07/22	Kayla Ghanem
Fluoride - Low Level	ISE/ISE	9514734	N/A	2019/07/19	Kathleen Dalton
Ferrous Iron (Dissolved)	SPEC	9513350	N/A	2019/07/18	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9510255	N/A	2019/07/22	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9510399	N/A	2019/07/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9511070	N/A	2019/07/19	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9519636	N/A	2019/07/24	Harry (Peng) Liang
Ion Balance	CALC	9511302	N/A	2019/07/18	Automated Statchk
Sum of cations, anions	CALC	9511308	N/A	2019/07/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9511080	N/A	2019/07/19	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9512445	N/A	2019/07/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9511083	N/A	2019/07/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9510252	N/A	2019/07/18	Paula Calzada
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling
Nitrate and Nitrite - Low Level	CALC	9510800	N/A	2019/07/23	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9510349	N/A	2019/07/23	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9513090	N/A	2019/07/21	Ian Bullecer
Orthophosphate by Konelab (low level)	KONE/COL	9516262	N/A	2019/07/20	Margaret Hurst
Total Sulphide	SPEC	9516354	N/A	2019/07/21	Ife Olotu



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BV Labs Job #: B957621
Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WC6412 Dup
Sample ID: TRIAL # 8
Matrix: Water

Collected: 2019/07/16
Shipped: 2019/07/16
Received: 2019/07/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N Low Level (Preserved)	KONE/COL	9512213	N/A	2019/07/18	Tracy (Jing) Ling



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	11.7°C
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Sample WC6405 [TRIAL # 1] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level.

Sample WC6406 [TRIAL # 2] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level.

Sample WC6407 [TRIAL # 3] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level.

Sample WC6408 [TRIAL # 4] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level.

Sample WC6409 [TRIAL # 5] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level.

Sample WC6410 [TRIAL # 6] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level.

Sample WC6411 [TRIAL # 7] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level.

Sample WC6412 [TRIAL # 8] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level.

Sample WC6405, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample WC6407, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample WC6405, Elements by ICPMS Low Level (total): Test repeated.

Sample WC6407, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.



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BV Labs Job #: B957621

Report Date: 2019/07/24

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9510252	Total Aluminum (Al)	2019/07/17	93	80 - 120	88	80 - 120	<0.00050	mg/L		
9510252	Total Antimony (Sb)	2019/07/17	102	80 - 120	93	80 - 120	<0.000020	mg/L		
9510252	Total Arsenic (As)	2019/07/17	104	80 - 120	101	80 - 120	<0.000020	mg/L		
9510252	Total Barium (Ba)	2019/07/17	54 (1)	80 - 120	91	80 - 120	<0.000020	mg/L		
9510252	Total Beryllium (Be)	2019/07/17	96	80 - 120	94	80 - 120	<0.000010	mg/L		
9510252	Total Bismuth (Bi)	2019/07/17	105	80 - 120	96	80 - 120	<0.0000050	mg/L		
9510252	Total Boron (B)	2019/07/17	100	80 - 120	101	80 - 120	<0.010	mg/L		
9510252	Total Cadmium (Cd)	2019/07/17	100	80 - 120	92	80 - 120	<0.0000050	mg/L		
9510252	Total Chromium (Cr)	2019/07/17	110	80 - 120	110	80 - 120	<0.00010	mg/L		
9510252	Total Cobalt (Co)	2019/07/17	107	80 - 120	110	80 - 120	<0.0000050	mg/L		
9510252	Total Copper (Cu)	2019/07/17	106	80 - 120	109	80 - 120	<0.000050	mg/L		
9510252	Total Iron (Fe)	2019/07/17	106	80 - 120	99	80 - 120	<0.0010	mg/L		
9510252	Total Lead (Pb)	2019/07/17	103	80 - 120	94	80 - 120	<0.0000050	mg/L		
9510252	Total Lithium (Li)	2019/07/17	109	80 - 120	92	80 - 120	<0.00050	mg/L		
9510252	Total Manganese (Mn)	2019/07/17	81	80 - 120	112	80 - 120	<0.000050	mg/L		
9510252	Total Molybdenum (Mo)	2019/07/17	80	80 - 120	95	80 - 120	<0.000050	mg/L		
9510252	Total Nickel (Ni)	2019/07/17	104	80 - 120	109	80 - 120	<0.000020	mg/L		
9510252	Total Selenium (Se)	2019/07/17	98	80 - 120	88	80 - 120	<0.000040	mg/L		
9510252	Total Silicon (Si)	2019/07/17	84	80 - 120	77 (1)	80 - 120	<0.050	mg/L		
9510252	Total Silver (Ag)	2019/07/17	100	80 - 120	94	80 - 120	<0.0000050	mg/L		
9510252	Total Strontium (Sr)	2019/07/17	NC	80 - 120	112	80 - 120	<0.000050	mg/L		
9510252	Total Thallium (Tl)	2019/07/17	105	80 - 120	96	80 - 120	<0.0000020	mg/L		
9510252	Total Tin (Sn)	2019/07/17	100	80 - 120	92	80 - 120	<0.00020	mg/L		
9510252	Total Titanium (Ti)	2019/07/17	110	80 - 120	107	80 - 120	<0.00050	mg/L		
9510252	Total Uranium (U)	2019/07/17	112	80 - 120	105	80 - 120	<0.0000020	mg/L		
9510252	Total Vanadium (V)	2019/07/17	110	80 - 120	111	80 - 120	<0.00020	mg/L		
9510252	Total Zinc (Zn)	2019/07/17	108	80 - 120	115	80 - 120	<0.00010	mg/L	15	20
9510252	Total Zirconium (Zr)	2019/07/17	106	80 - 120	105	80 - 120	<0.00010	mg/L		
9512213	Total Ammonia (N)	2019/07/18	91	80 - 120	107	80 - 120	<0.0050	mg/L	NC	20
9512445	Dissolved Aluminum (Al)	2019/07/19	90	80 - 120	91	80 - 120	<0.00050	mg/L	NC	20
9512445	Dissolved Antimony (Sb)	2019/07/19	98	80 - 120	91	80 - 120	<0.000020	mg/L	NC	20
9512445	Dissolved Arsenic (As)	2019/07/19	99	80 - 120	92	80 - 120	<0.000020	mg/L	NC	20

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BV Labs Job #: B957621

Report Date: 2019/07/24

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9512445	Dissolved Barium (Ba)	2019/07/19	97	80 - 120	90	80 - 120	<0.000020	mg/L	1.3	20
9512445	Dissolved Beryllium (Be)	2019/07/19	81	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9512445	Dissolved Bismuth (Bi)	2019/07/19	101	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9512445	Dissolved Boron (B)	2019/07/19	102	80 - 120	103	80 - 120	<0.010	mg/L	0.39	20
9512445	Dissolved Cadmium (Cd)	2019/07/19	98	80 - 120	89	80 - 120	<0.0000050	mg/L	NC	20
9512445	Dissolved Chromium (Cr)	2019/07/19	99	80 - 120	95	80 - 120	<0.00010	mg/L	NC	20
9512445	Dissolved Cobalt (Co)	2019/07/19	97	80 - 120	93	80 - 120	<0.0000050	mg/L	NC	20
9512445	Dissolved Copper (Cu)	2019/07/19	96	80 - 120	92	80 - 120	<0.000050	mg/L	NC	20
9512445	Dissolved Iron (Fe)	2019/07/19	104	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20
9512445	Dissolved Lead (Pb)	2019/07/19	99	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9512445	Dissolved Lithium (Li)	2019/07/19	85	80 - 120	83	80 - 120	<0.00050	mg/L	NC	20
9512445	Dissolved Manganese (Mn)	2019/07/19	101	80 - 120	98	80 - 120	<0.000050	mg/L	13	20
9512445	Dissolved Molybdenum (Mo)	2019/07/19	104	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9512445	Dissolved Nickel (Ni)	2019/07/19	96	80 - 120	92	80 - 120	<0.000020	mg/L	NC	20
9512445	Dissolved Selenium (Se)	2019/07/19	95	80 - 120	87	80 - 120	<0.000040	mg/L	NC	20
9512445	Dissolved Silicon (Si)	2019/07/19	82	80 - 120	77 (1)	80 - 120	<0.050	mg/L	NC	20
9512445	Dissolved Silver (Ag)	2019/07/19	91	80 - 120	89	80 - 120	<0.0000050	mg/L	NC	20
9512445	Dissolved Strontium (Sr)	2019/07/19	106	80 - 120	102	80 - 120	<0.000050	mg/L	3.3	20
9512445	Dissolved Thallium (Tl)	2019/07/19	101	80 - 120	95	80 - 120	<0.0000020	mg/L	NC	20
9512445	Dissolved Tin (Sn)	2019/07/19	97	80 - 120	89	80 - 120	<0.00020	mg/L	NC	20
9512445	Dissolved Titanium (Ti)	2019/07/19	99	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9512445	Dissolved Uranium (U)	2019/07/19	109	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9512445	Dissolved Vanadium (V)	2019/07/19	99	80 - 120	95	80 - 120	<0.00020	mg/L	NC	20
9512445	Dissolved Zinc (Zn)	2019/07/19	110	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9512445	Dissolved Zirconium (Zr)	2019/07/19	103	80 - 120	93	80 - 120	<0.00010	mg/L	NC	20
9513090	Dissolved Nitrate (N)	2019/07/21	101	80 - 120	100	80 - 120	<0.0030	mg/L	1.3	20
9513090	Dissolved Nitrite (N)	2019/07/21	100	80 - 120	100	80 - 120	<0.0030	mg/L	0.20	20
9513350	HCl Preserved Iron (Fe+2 Ferrous)	2019/07/18	98	80 - 120	98	90 - 110	<0.050	mg/L	NC	20
9514391	Dissolved Organic Carbon (C)	2019/07/22	NC	80 - 120	100	80 - 120	<0.50	mg/L	1.5	20
9514398	Dissolved Chromium (Cr)	2019/07/19	108	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9514398	Dissolved Lithium (Li)	2019/07/19	91	80 - 120	93	80 - 120	<0.00050	mg/L	NC	20
9514398	Dissolved Selenium (Se)	2019/07/19	102	80 - 120	86	80 - 120	<0.000040	mg/L	NC	20



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BV Labs Job #: B957621

Report Date: 2019/07/24

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9514405	Total Chromium (Cr)	2019/07/23	99	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9514405	Total Lithium (Li)	2019/07/23	77 (1)	80 - 120	77 (1)	80 - 120	<0.00050	mg/L	NC	20
9514405	Total Selenium (Se)	2019/07/23	93	80 - 120	85	80 - 120	<0.000040	mg/L	NC	20
9514642	Acidity (pH 4.5)	2019/07/19					<1.0	mg/L	NC	20
9514642	Acidity (pH 8.3)	2019/07/19			93	80 - 120	<1.0	mg/L	14	20
9514721	Alkalinity (PP as CaCO ₃)	2019/07/19					<0.50	mg/L	1.8	20
9514721	Alkalinity (Total as CaCO ₃)	2019/07/19			103	80 - 120	<0.50	mg/L	4.6	20
9514721	Bicarbonate (HCO ₃)	2019/07/19					<0.50	mg/L	11	20
9514721	Carbonate (CO ₃)	2019/07/19					<0.50	mg/L	1.8	20
9514721	Hydroxide (OH)	2019/07/19					<0.50	mg/L	NC	20
9514734	Fluoride (F)	2019/07/19	92	N/A	91	N/A	<0.010	mg/L	1.7	20
9516262	Orthophosphate (P)	2019/07/20			103	80 - 120	0.0014, RDL=0.0010	mg/L		
9516354	Total Sulphide	2019/07/21			110	80 - 120	<0.0019	mg/L	NC	20
9518474	Dissolved Chloride (Cl)	2019/07/23	NC	80 - 120	103	80 - 120	<0.50	mg/L	0.55	20
9518474	Dissolved Sulphate (SO ₄)	2019/07/23	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.98	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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BV Labs Job #: B957621
Report Date: 2019/07/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

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BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

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Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required													
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses)													
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS													
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)													
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah	☐ Same Day	☐ 2 Days												
Email:		Email:	agault@alexcoenv.com kpiewcowa@contangostrategies.com	Site #:		☐ 1 Day	☐ 3 Days												
				Sampled By:		Date Required:													
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:			
☐ BC CSR Soil ☐ CCME (Specify) ☐ Drinking Water		☐ BC CSR Water ☐ Other (Specify) ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) <u>USE SCENARIO # 12485</u>		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA												LABORATORY USE ONLY CUSTODY SEAL Y/N COOLER TEMPERATURES Present Intact COOLING MEDIA PRESENT Y/N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE			
1	Trial #1	16-Jul-19	10:45	Water	X	X	X	X	X	X	X	X	X	X		10			
2	Trial #2	16-Jul-19	11:10	Water	X	X	X	X	X	X	X	X	X	X		10			
3	Trial #3	16-Jul-19	11:30	Water	X	X	X	X	X	X	X	X	X	X		10			
4	Trial #4	16-Jul-19	11:45	Water	X	X	X	X	X	X	X	X	X	X		10			
5	Trial #5	16-Jul-19	14:30	Water	X	X	X	X	X	X	X	X	X	X		10			
6	Trial #6	16-Jul-19	12:30	Water	X	X	X	X	X	X	X	X	X	X		10			
7	Trial #7	16-Jul-19	12:50	Water	X	X	X	X	X	X	X	X	X	X		10			
8	Trial #8	16-Jul-19	13:15	Water	X	X	X	X	X	X	X	X	X	X		10			
9																			
10																			
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)												
		2019/07/16	14:58			2019/07/17	08:44												

16-Jul-19 15:44

Safiann Maiter



B957621

MO3

INS-0197



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/08/21
 Report #: R2770372
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B966389

Received: 2019/08/12, 14:00

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	6	N/A	2019/08/15	AB SOP-00005	SM 23 2310 B m
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	2	N/A	2019/08/16	AB SOP-00005	SM 23 2310 B m
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	8	N/A	2019/08/14	AB SOP-00005	SM 23 2320 B m
Chloride/Sulphate by Auto Colourimetry	8	N/A	2019/08/16	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (1)	8	N/A	2019/08/15	AB SOP-00087	MMCW 119 1996 m
Fluoride	8	N/A	2019/08/14	AB SOP-00005	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/08/13	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/08/16	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (2)	8	N/A	2019/08/16	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/08/16	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/08/16	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	8	N/A	2019/08/15	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/08/16	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	7	N/A	2019/08/15	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	1	N/A	2019/08/19	CAL SOP-00265	EPA 6020 m
Ammonia-N (Total)	8	N/A	2019/08/14	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite	8	N/A	2019/08/16		Auto Calc
Nitrate + Nitrite-N (calculated)	8	N/A	2019/08/16		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	8	N/A	2019/08/14	AB SOP-00023	SM 23 4110 B m
pH @25°C (3)	8	N/A	2019/08/14	AB SOP-00005	SM 23 4500-H+B m
Orthophosphate by Konelab (4)	8	N/A	2019/08/13	AB SOP-00025	SM 23 4500-P A,F m
Total Sulphide	8	N/A	2019/08/16	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/08/21
Report #: R2770372
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B966389

Received: 2019/08/12, 14:00

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(3) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.

(4) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WH0246	WH0247		WH0248		WH0249		
Sampling Date		2019/08/12 10:30	2019/08/12 10:45		2019/08/12 11:00		2019/08/12 11:15		
COC Number		1 of 1	1 of 1		1 of 1		1 of 1		
	UNITS	TRIAL #1	TRIAL #2	RDL	TRIAL #3	RDL	TRIAL #4	RDL	QC Batch
Calculated Parameters									
Dissolved Nitrate (NO3)	mg/L	5.6	1.5	0.044	1.5	0.044	0.57	0.044	9545406
Nitrate plus Nitrite (N)	mg/L	1.3	0.34	0.014	0.33	0.014	0.13	0.014	9545407
Dissolved Nitrite (NO2)	mg/L	<0.033	<0.033	0.033	<0.033	0.033	<0.033	0.033	9545406
Sulphide (as H2S)	mg/L	<0.0020	<0.0020	0.0020	<0.0020	0.0020	0.0040	0.0020	9545601
Misc. Inorganics									
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	<0.050	0.050	<0.050	0.050	0.056	0.050	9546136
Dissolved Organic Carbon (C)	mg/L	3.4	4.0	0.50	4.9	0.50	6.3	0.50	9547768
pH	pH	7.59	7.18	N/A	7.44	N/A	7.41	N/A	9547296
Acidity (pH 4.5)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9549449
Acidity (pH 8.3)	mg/L	5.1	10.2	1.0	6.6	1.0	15.3	1.0	9549449
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9547294
Alkalinity (Total as CaCO3)	mg/L	76	89	1.0	100	1.0	130	1.0	9547294
Bicarbonate (HCO3)	mg/L	92	110	1.0	120	1.0	160	1.0	9547294
Carbonate (CO3)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9547294
Dissolved Fluoride (F)	mg/L	0.64	0.64	0.050	0.52	0.050	0.52	0.050	9547297
Hydroxide (OH)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9547294
Total Sulphide	mg/L	<0.0018	<0.0018	0.0018	<0.0018	0.0018	0.0033	0.0018	9550817
Dissolved Chloride (Cl)	mg/L	58	58	1.0	59	1.0	60	1.0	9551030
Dissolved Sulphate (SO4)	mg/L	240 (1)	240 (1)	2.0	200 (1)	2.0	200	1.0	9551030
Nutrients									
Total Ammonia (N)	mg/L	0.058	0.24	0.015	0.070	0.015	0.73	0.015	9547766
Orthophosphate (P)	mg/L	1.1 (1)	1.2 (1)	0.015	0.041	0.0030	0.32	0.0030	9546062
Dissolved Nitrite (N)	mg/L	<0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	9546261
Dissolved Nitrate (N)	mg/L	1.3	0.34	0.010	0.33	0.010	0.13	0.010	9546261
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WH0250		WH0251			WH0252	WH0253		
Sampling Date		2019/08/12 13:00		2019/08/12 11:30			2019/08/12 11:45	2019/08/12 12:00		
COC Number		1 of 1		1 of 1			1 of 1	1 of 1		
	UNITS	TRIAL #5	RDL	TRIAL #6	RDL	QC Batch	TRIAL #7	TRIAL #8	RDL	QC Batch

Calculated Parameters

Dissolved Nitrate (NO3)	mg/L	<0.044	0.044	1.4	0.044	9545406	5.3	0.46	0.044	9545406
Nitrate plus Nitrite (N)	mg/L	<0.014	0.014	0.31	0.014	9545407	1.2	0.10	0.014	9545407
Dissolved Nitrite (NO2)	mg/L	<0.033	0.033	<0.033	0.033	9545406	<0.033	<0.033	0.033	9545406
Sulphide (as H2S)	mg/L	0.066	0.0020	<0.0020	0.0020	9545601	<0.0020	<0.0020	0.0020	9545601

Misc. Inorganics

HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.26	0.050	0.068	0.050	9546136	<0.050	<0.050	0.050	9546136
Dissolved Organic Carbon (C)	mg/L	6.3	0.50	3.8	0.50	9547768	2.5	3.1	0.50	9548991
pH	pH	7.23	N/A	7.36	N/A	9547296	7.87	7.70	N/A	9547296
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	9549449	<1.0	<1.0	1.0	9549449
Acidity (pH 8.3)	mg/L	15.2	1.0	7.3	1.0	9549449	3.1	4.8	1.0	9549449

Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	<1.0	1.0	9547294	<1.0	<1.0	1.0	9547294
Alkalinity (Total as CaCO3)	mg/L	100	1.0	92	1.0	9547294	84	86	1.0	9547294
Bicarbonate (HCO3)	mg/L	120	1.0	110	1.0	9547294	100	100	1.0	9547294
Carbonate (CO3)	mg/L	<1.0	1.0	<1.0	1.0	9547294	<1.0	<1.0	1.0	9547294
Dissolved Fluoride (F)	mg/L	0.69	0.050	0.69	0.050	9547297	0.68	0.50	0.050	9547297
Hydroxide (OH)	mg/L	<1.0	1.0	<1.0	1.0	9547294	<1.0	<1.0	1.0	9547294
Total Sulphide	mg/L	0.063	0.0018	<0.0018	0.0018	9550817	<0.0018	<0.0018	0.0018	9550817
Dissolved Chloride (Cl)	mg/L	55	1.0	57	1.0	9551030	58	59	1.0	9551030
Dissolved Sulphate (SO4)	mg/L	230 (1)	2.0	230 (1)	2.0	9551030	240 (1)	220 (1)	2.0	9551030

Nutrients

Total Ammonia (N)	mg/L	0.83	0.015	0.16	0.015	9547766	0.085	0.086	0.015	9547766
Orthophosphate (P)	mg/L	0.49	0.0030	1.2 (1)	0.015	9546062	0.0052	<0.0030	0.0030	9546062
Dissolved Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	9546261	<0.010	<0.010	0.010	9546261
Dissolved Nitrate (N)	mg/L	<0.010	0.010	0.31	0.010	9546261	1.2	0.096	0.010	9546261

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

BUREAU
VERITASBV Labs Job #: B966389
Report Date: 2019/08/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WH0246	WH0247	WH0248		WH0249		
Sampling Date		2019/08/12 10:30	2019/08/12 10:45	2019/08/12 11:00		2019/08/12 11:15		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	QC Batch	TRIAL #4	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	328	341	328	9545752	328	0.50	9545752
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	<0.00050	<0.00050	0.00096	9545840	0.00732	0.00050	9545840
Dissolved Antimony (Sb)	mg/L	0.0144	0.00191	0.00268	9545840	0.00137	0.000020	9545840
Dissolved Arsenic (As)	mg/L	0.0539	0.0402	0.00792	9545840	0.0133	0.000020	9545840
Dissolved Barium (Ba)	mg/L	0.0435	0.00958	0.137	9545840	0.0990	0.000020	9545840
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9545840	<0.000010	0.000010	9545840
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9545840	<0.0000050	0.0000050	9545840
Dissolved Boron (B)	mg/L	<0.010	0.044	0.033	9545840	0.036	0.010	9553293
Dissolved Cadmium (Cd)	mg/L	0.000835	<0.0000050	0.0000313	9545840	<0.0000050	0.0000050	9545840
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	9545840	<0.00010	0.00010	9545840
Dissolved Cobalt (Co)	mg/L	0.000561	0.00118	0.000240	9545840	0.000290	0.0000050	9545840
Dissolved Copper (Cu)	mg/L	0.00168	0.000077	0.000447	9545840	0.000126	0.000050	9545840
Dissolved Iron (Fe)	mg/L	0.0072	0.0101	0.0343	9545840	0.0432	0.0010	9545840
Dissolved Lead (Pb)	mg/L	0.0000675	0.0000120	0.0000159	9545840	0.0000259	0.0000050	9545840
Dissolved Lithium (Li)	mg/L	0.0112	0.0108	0.00832	9545840	0.00885	0.00050	9545840
Dissolved Manganese (Mn)	mg/L	0.0896	0.174	0.870	9545840	1.17	0.000050	9545840
Dissolved Molybdenum (Mo)	mg/L	0.00205	0.000690	0.00195	9545840	0.000787	0.000050	9545840
Dissolved Nickel (Ni)	mg/L	0.00865	0.00583	0.00268	9545840	0.00169	0.000020	9545840
Dissolved Selenium (Se)	mg/L	0.00451	0.00143	0.000877	9545840	0.000726	0.000040	9545840
Dissolved Silicon (Si)	mg/L	1.21	1.03	2.77	9545840	2.71	0.050	9545840
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	9545840	<0.0000050	0.0000050	9545840
Dissolved Strontium (Sr)	mg/L	0.510	0.367	0.505	9545840	0.573	0.000050	9545840
Dissolved Thallium (Tl)	mg/L	0.000182	0.0000177	<0.0000020	9545840	<0.0000020	0.0000020	9545840
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9545840	<0.00020	0.00020	9545840
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9545840	<0.00050	0.00050	9545840
Dissolved Uranium (U)	mg/L	0.0249	0.00881	0.00918	9545840	0.00348	0.0000020	9545840
Dissolved Vanadium (V)	mg/L	0.00027	<0.00020	<0.00020	9545840	0.00055	0.00020	9545840
Dissolved Zinc (Zn)	mg/L	0.0977	0.00865	0.0134	9545840	0.00746	0.00010	9545840
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00015	9545840	0.00017	0.00010	9545840
Dissolved Calcium (Ca)	mg/L	103	108	105	9545753	105	0.050	9545753
Dissolved Magnesium (Mg)	mg/L	17.3	17.1	15.8	9545753	15.9	0.050	9545753

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH0246	WH0247	WH0248		WH0249		
Sampling Date		2019/08/12 10:30	2019/08/12 10:45	2019/08/12 11:00		2019/08/12 11:15		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	QC Batch	TRIAL #4	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.71	7.37	7.05	9545753	7.29	0.050	9545753
Dissolved Sodium (Na)	mg/L	26.3	25.4	24.9	9545753	25.2	0.050	9545753
Dissolved Sulphur (S)	mg/L	92.2	87.7	78.2	9545753	67.6	3.0	9545753
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B966389
Report Date: 2019/08/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WH0250		WH0251	WH0252	WH0253		
Sampling Date		2019/08/12 13:00		2019/08/12 11:30	2019/08/12 11:45	2019/08/12 12:00		
COC Number		1 of 1		1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #5	QC Batch	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	355	9545752	336	335	328	0.50	9545752
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	<0.00050	9553293	<0.00050	0.00493	<0.00050	0.00050	9545840
Dissolved Antimony (Sb)	mg/L	0.000492	9553293	0.0340	0.0274	0.00496	0.000020	9545840
Dissolved Arsenic (As)	mg/L	0.0252	9553293	0.227	0.0213	0.00197	0.000020	9545840
Dissolved Barium (Ba)	mg/L	0.0549	9553293	0.0511	0.0969	0.155	0.000020	9545840
Dissolved Beryllium (Be)	mg/L	<0.000010	9553293	<0.000010	<0.000010	<0.000010	0.000010	9545840
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9553293	<0.0000050	<0.0000050	<0.0000050	0.0000050	9545840
Dissolved Boron (B)	mg/L	0.046	9553293	0.016	0.029	0.019	0.010	9545840
Dissolved Cadmium (Cd)	mg/L	0.0000254	9553293	0.00160	0.00269	0.000243	0.0000050	9545840
Dissolved Chromium (Cr)	mg/L	<0.00010	9553293	<0.00010	<0.00010	<0.00010	0.00010	9545840
Dissolved Cobalt (Co)	mg/L	0.00320	9553293	0.00570	0.000450	0.0000309	0.0000050	9545840
Dissolved Copper (Cu)	mg/L	0.000375	9553293	0.00388	0.00546	0.00331	0.000050	9545840
Dissolved Iron (Fe)	mg/L	0.210	9553293	0.0062	<0.0010	<0.0010	0.0010	9545840
Dissolved Lead (Pb)	mg/L	0.000417	9553293	0.000946	0.00216	0.0000196	0.0000050	9545840
Dissolved Lithium (Li)	mg/L	0.00843	9553293	0.0119	0.0124	0.00592	0.00050	9545840
Dissolved Manganese (Mn)	mg/L	0.221	9553293	0.142	0.0356	0.00532	0.000050	9545840
Dissolved Molybdenum (Mo)	mg/L	0.00109	9545840	0.00106	0.00186	0.00219	0.000050	9545840
Dissolved Nickel (Ni)	mg/L	0.0102	9553293	0.0291	0.00713	0.000980	0.000020	9545840
Dissolved Selenium (Se)	mg/L	0.00377	9553293	0.00993	0.0120	0.00286	0.000040	9545840
Dissolved Silicon (Si)	mg/L	0.981	9553293	1.18	0.946	2.41	0.050	9545840
Dissolved Silver (Ag)	mg/L	<0.0000050	9553293	<0.0000050	<0.0000050	<0.0000050	0.0000050	9545840
Dissolved Strontium (Sr)	mg/L	0.567	9553293	0.467	0.664	0.602	0.000050	9545840
Dissolved Thallium (Tl)	mg/L	0.0000109	9553293	0.000124	0.000824	0.0000201	0.0000020	9545840
Dissolved Tin (Sn)	mg/L	<0.00020	9553293	<0.00020	<0.00020	<0.00020	0.00020	9545840
Dissolved Titanium (Ti)	mg/L	<0.00050	9553293	<0.00050	<0.00050	<0.00050	0.00050	9545840
Dissolved Uranium (U)	mg/L	0.0182	9553293	0.0844	0.0408	0.0155	0.0000020	9545840
Dissolved Vanadium (V)	mg/L	<0.00020	9553293	<0.00020	<0.00020	<0.00020	0.00020	9545840
Dissolved Zinc (Zn)	mg/L	0.00669	9553293	0.190	0.122	0.0292	0.00010	9545840
Dissolved Zirconium (Zr)	mg/L	0.00018	9553293	<0.00010	<0.00010	<0.00010	0.00010	9545840
Dissolved Calcium (Ca)	mg/L	114	9545753	107	106	106	0.050	9545753
Dissolved Magnesium (Mg)	mg/L	16.9	9545753	16.4	17.2	15.7	0.050	9545753

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH0250		WH0251	WH0252	WH0253		
Sampling Date		2019/08/12 13:00		2019/08/12 11:30	2019/08/12 11:45	2019/08/12 12:00		
COC Number		1 of 1		1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #5	QC Batch	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	6.75	9545753	8.06	6.97	5.30	0.050	9545753
Dissolved Sodium (Na)	mg/L	26.1	9545753	25.2	25.3	24.9	0.050	9545753
Dissolved Sulphur (S)	mg/L	90.4	9545753	85.3	87.1	82.2	3.0	9545753
RDL = Reportable Detection Limit								



BV Labs Job #: B966389
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH0246	WH0247	WH0248		WH0249		
Sampling Date		2019/08/12 10:30	2019/08/12 10:45	2019/08/12 11:00		2019/08/12 11:15		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	QC Batch	TRIAL #4	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	340	340	321	9545589	324	0.50	9545589
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	<0.00050	<0.00050	0.00233	9545842	0.0120	0.00050	9545842
Total Antimony (Sb)	mg/L	0.0143	0.00195	0.00242	9545842	0.00135	0.000020	9545842
Total Arsenic (As)	mg/L	0.0532	0.0402	0.00960	9545842	0.0157	0.000020	9545842
Total Barium (Ba)	mg/L	0.0514	0.0197	0.137	9545842	0.101	0.000020	9545842
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9545842	<0.000010	0.000010	9545842
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9545842	<0.0000050	0.0000050	9545842
Total Boron (B)	mg/L	0.041	0.038	0.021	9545842	0.030	0.010	9553295
Total Cadmium (Cd)	mg/L	0.000832	0.0000081	0.0000324	9545842	0.0000067	0.0000050	9545842
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	9545842	<0.00010	0.00010	9545842
Total Cobalt (Co)	mg/L	0.000576	0.00125	0.000220	9545842	0.000312	0.0000050	9545842
Total Copper (Cu)	mg/L	0.00179	0.000125	0.000441	9545842	0.000141	0.000050	9545842
Total Iron (Fe)	mg/L	0.0162	0.119	0.210	9545842	0.537	0.0010	9545842
Total Lead (Pb)	mg/L	0.000241	0.000130	0.000143	9545842	0.000554	0.0000050	9545842
Total Lithium (Li)	mg/L	0.0123	0.0138	0.00788	9545842	0.00832	0.00050	9545842
Total Manganese (Mn)	mg/L	0.0905	0.175	0.868	9545842	1.17	0.000050	9545842
Total Molybdenum (Mo)	mg/L	0.00207	0.000848	0.00185	9545842	0.000654	0.000050	9545842
Total Nickel (Ni)	mg/L	0.00875	0.00573	0.00265	9545842	0.00166	0.000020	9545842
Total Selenium (Se)	mg/L	0.00409	0.00135	0.000986	9545842	0.000666	0.000040	9545842
Total Silicon (Si)	mg/L	1.12	1.04	2.73	9545842	2.72	0.050	9545842
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	9545842	<0.0000050	0.0000050	9545842
Total Strontium (Sr)	mg/L	0.512	0.389	0.504	9545842	0.570	0.000050	9545842
Total Thallium (Tl)	mg/L	0.000191	0.0000128	<0.0000020	9545842	<0.0000020	0.0000020	9545842
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9545842	<0.00020	0.00020	9545842
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9545842	<0.00050	0.00050	9545842
Total Uranium (U)	mg/L	0.0253	0.00908	0.00892	9545842	0.00353	0.0000020	9545842
Total Vanadium (V)	mg/L	0.00030	<0.00020	<0.00020	9545842	0.00057	0.00020	9545842
Total Zinc (Zn)	mg/L	0.100	0.00927	0.0128	9545842	0.00720	0.00010	9545842
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00018	9545842	0.00032	0.00010	9545842
Total Calcium (Ca)	mg/L	107	109	103	9545755	104	0.050	9545755
Total Magnesium (Mg)	mg/L	17.4	16.8	15.4	9545755	15.5	0.050	9545755
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH0246	WH0247	WH0248		WH0249		
Sampling Date		2019/08/12 10:30	2019/08/12 10:45	2019/08/12 11:00		2019/08/12 11:15		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	QC Batch	TRIAL #4	RDL	QC Batch
Total Potassium (K)	mg/L	7.74	7.36	7.01	9545755	7.21	0.050	9545755
Total Sodium (Na)	mg/L	26.2	25.1	24.3	9545755	24.7	0.050	9545755
Total Sulphur (S)	mg/L	91.9	86.9	74.9	9545755	65.9	3.0	9545755
RDL = Reportable Detection Limit								



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BV Labs Job #: B966389

Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH0250		WH0251	WH0252	WH0253		
Sampling Date		2019/08/12 13:00		2019/08/12 11:30	2019/08/12 11:45	2019/08/12 12:00		
COC Number		1 of 1		1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #5	QC Batch	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	356	9545589	336	336	325	0.50	9545589
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00626	9553295	0.00414	0.00340	0.00681	0.00050	9545842
Total Antimony (Sb)	mg/L	0.00201	9553295	0.0336	0.0278	0.00493	0.000020	9545842
Total Arsenic (As)	mg/L	0.0292	9553295	0.220	0.0213	0.00208	0.000020	9545842
Total Barium (Ba)	mg/L	0.0593	9553295	0.0531	0.0971	0.155	0.000020	9545842
Total Beryllium (Be)	mg/L	<0.000010	9553295	<0.000010	<0.000010	<0.000010	0.000010	9545842
Total Bismuth (Bi)	mg/L	<0.0000050	9553295	<0.0000050	<0.0000050	<0.0000050	0.0000050	9545842
Total Boron (B)	mg/L	0.036	9553295	0.038	0.058	0.032	0.010	9545842
Total Cadmium (Cd)	mg/L	0.000163	9553295	0.00157	0.00276	0.000278	0.0000050	9545842
Total Chromium (Cr)	mg/L	<0.00010	9553295	<0.00010	<0.00010	<0.00010	0.00010	9545842
Total Cobalt (Co)	mg/L	0.00324	9553295	0.00661	0.000447	0.0000392	0.0000050	9545842
Total Copper (Cu)	mg/L	0.00181	9553295	0.00374	0.00548	0.00331	0.000050	9545842
Total Iron (Fe)	mg/L	0.627	9553295	0.0594	0.0012	0.0074	0.0010	9545842
Total Lead (Pb)	mg/L	0.00396	9553295	0.00226	0.00238	0.000106	0.0000050	9545842
Total Lithium (Li)	mg/L	0.00937	9553295	0.0136	0.0115	0.00962	0.00050	9545842
Total Manganese (Mn)	mg/L	0.220	9553295	0.148	0.0357	0.00740	0.000050	9545842
Total Molybdenum (Mo)	mg/L	0.00120	9553295	0.00115	0.00174	0.00190	0.000050	9545842
Total Nickel (Ni)	mg/L	0.0104	9553295	0.0294	0.00713	0.000969	0.000020	9545842
Total Selenium (Se)	mg/L	0.00313	9553295	0.0101	0.0122	0.00287	0.000040	9545842
Total Silicon (Si)	mg/L	0.950	9553295	1.15	0.947	2.39	0.050	9545842
Total Silver (Ag)	mg/L	<0.0000050	9553295	<0.0000050	<0.0000050	<0.0000050	0.0000050	9545842
Total Strontium (Sr)	mg/L	0.558	9553295	0.474	0.668	0.605	0.000050	9545842
Total Thallium (Tl)	mg/L	0.0000448	9553295	0.000120	0.000856	0.0000221	0.0000020	9545842
Total Tin (Sn)	mg/L	<0.00020	9553295	<0.00020	<0.00020	<0.00020	0.00020	9545842
Total Titanium (Ti)	mg/L	<0.00050	9553295	<0.00050	<0.00050	<0.00050	0.00050	9545842
Total Uranium (U)	mg/L	0.0188	9553295	0.0857	0.0417	0.0150	0.0000020	9545842
Total Vanadium (V)	mg/L	<0.00020	9553295	<0.00020	<0.00020	<0.00020	0.00020	9545842
Total Zinc (Zn)	mg/L	0.0900	9553295	0.188	0.123	0.0296	0.00010	9545842
Total Zirconium (Zr)	mg/L	0.00019	9553295	<0.00010	<0.00010	<0.00010	0.00010	9545842
Total Calcium (Ca)	mg/L	114	9545755	107	106	104	0.050	9545755
Total Magnesium (Mg)	mg/L	17.0	9545755	16.5	17.3	15.5	0.050	9545755

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH0250		WH0251	WH0252	WH0253		
Sampling Date		2019/08/12 13:00		2019/08/12 11:30	2019/08/12 11:45	2019/08/12 12:00		
COC Number		1 of 1		1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #5	QC Batch	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	6.72	9545755	8.09	7.03	5.31	0.050	9545755
Total Sodium (Na)	mg/L	26.3	9545755	25.3	25.3	24.5	0.050	9545755
Total Sulphur (S)	mg/L	89.2	9545755	86.6	87.7	82.6	3.0	9545755
RDL = Reportable Detection Limit								



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BV Labs Job #: B966389

Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH0246

Sample ID: TRIAL #1

Matrix: Water

Collected: 2019/08/12

Shipped:

Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/15	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal
Carbon (DOC)	TECH	9547768	N/A	2019/08/15	Kayla Ghanem
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9545601	N/A	2019/08/16	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9545589	N/A	2019/08/16	Ghayasuddin Khan
Hardness (calculated as CaCO ₃)	CALC	9545752	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9545753	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9545840	N/A	2019/08/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9545755	N/A	2019/08/16	Ghayasuddin Khan
Elements by ICPMS Low Level (total)	ICP/CRCM	9545842	N/A	2019/08/15	Paula Calzada
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa
Nitrate and Nitrite	CALC	9545406	N/A	2019/08/16	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9545407	N/A	2019/08/16	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu

BV Labs ID: WH0246 Dup

Sample ID: TRIAL #1

Matrix: Water

Collected: 2019/08/12

Shipped:

Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9545840	N/A	2019/08/15	Paula Calzada
Elements by ICPMS Low Level (total)	ICP/CRCM	9545842	N/A	2019/08/15	Paula Calzada
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu

BV Labs ID: WH0247

Sample ID: TRIAL #2

Matrix: Water

Collected: 2019/08/12

Shipped:

Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/15	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal
Carbon (DOC)	TECH	9547768	N/A	2019/08/15	Kayla Ghanem
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9545601	N/A	2019/08/16	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9545589	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9545752	N/A	2019/08/16	Automated Statchk



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BV Labs Job #: B966389

Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH0247

Sample ID: TRIAL #2

Matrix: Water

Collected: 2019/08/12

Shipped:

Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9545753	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9545840	N/A	2019/08/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9545755	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9545842	N/A	2019/08/15	Paula Calzada
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa
Nitrate and Nitrite	CALC	9545406	N/A	2019/08/16	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9545407	N/A	2019/08/16	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu

BV Labs ID: WH0248

Sample ID: TRIAL #3

Matrix: Water

Collected: 2019/08/12

Shipped:

Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/16	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal
Carbon (DOC)	TECH	9547768	N/A	2019/08/15	Kayla Ghanem
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9545601	N/A	2019/08/16	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9545589	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9545752	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9545753	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9545840	N/A	2019/08/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9545755	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9545842	N/A	2019/08/15	Paula Calzada
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa
Nitrate and Nitrite	CALC	9545406	N/A	2019/08/16	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9545407	N/A	2019/08/16	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu

BV Labs ID: WH0248 Dup

Sample ID: TRIAL #3

Matrix: Water

Collected: 2019/08/12

Shipped:

Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/16	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac



BV Labs Job #: B966389
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH0248 Dup
Sample ID: TRIAL #3
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac

BV Labs ID: WH0249
Sample ID: TRIAL #4
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/15	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal
Carbon (DOC)	TECH	9547768	N/A	2019/08/15	Kayla Ghanem
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9545601	N/A	2019/08/16	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9545589	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9545752	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9545753	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9545840	N/A	2019/08/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9545755	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9545842	N/A	2019/08/15	Paula Calzada
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa
Nitrate and Nitrite	CALC	9545406	N/A	2019/08/16	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9545407	N/A	2019/08/16	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu

BV Labs ID: WH0249 Dup
Sample ID: TRIAL #4
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa

BV Labs ID: WH0250
Sample ID: TRIAL #5
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/15	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal
Carbon (DOC)	TECH	9547768	N/A	2019/08/15	Kayla Ghanem
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria



BUREAU
VERITAS

BV Labs Job #: B966389
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH0250
Sample ID: TRIAL #5
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphide (as H ₂ S)	CALC	9545601	N/A	2019/08/16	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9545589	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9545752	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9545753	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9545755	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa
Nitrate and Nitrite	CALC	9545406	N/A	2019/08/16	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9545407	N/A	2019/08/16	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu

BV Labs ID: WH0251
Sample ID: TRIAL #6
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/16	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal
Carbon (DOC)	TECH	9547768	N/A	2019/08/15	Kayla Ghanem
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9545601	N/A	2019/08/16	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9545589	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9545752	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9545753	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9545840	N/A	2019/08/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9545755	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9545842	N/A	2019/08/15	Paula Calzada
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa
Nitrate and Nitrite	CALC	9545406	N/A	2019/08/16	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9545407	N/A	2019/08/16	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu



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BV Labs Job #: B966389
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH0251 Dup
Sample ID: TRIAL #6
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer

BV Labs ID: WH0252
Sample ID: TRIAL #7
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/15	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal
Carbon (DOC)	TECH	9548991	N/A	2019/08/15	Kayla Ghanem
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9545601	N/A	2019/08/16	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9545589	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9545752	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9545753	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9545840	N/A	2019/08/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9545755	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9545842	N/A	2019/08/15	Paula Calzada
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa
Nitrate and Nitrite	CALC	9545406	N/A	2019/08/16	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9545407	N/A	2019/08/16	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu

BV Labs ID: WH0253
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9549449	N/A	2019/08/15	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9547294	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal
Carbon (DOC)	TECH	9548991	N/A	2019/08/15	Kayla Ghanem
Fluoride	AT	9547297	N/A	2019/08/14	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9546136	N/A	2019/08/13	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9545601	N/A	2019/08/16	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9545589	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9545752	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9545753	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9545840	N/A	2019/08/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9545755	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9545842	N/A	2019/08/15	Paula Calzada



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BV Labs Job #: B966389
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH0253
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N (Total)	KONE	9547766	N/A	2019/08/14	Fadia Mostafa
Nitrate and Nitrite	CALC	9545406	N/A	2019/08/16	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9545407	N/A	2019/08/16	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9546261	N/A	2019/08/14	Ian Bullecer
pH @25°C	AT/ALK	9547296	N/A	2019/08/14	Ilonka Kovac
Orthophosphate by Konelab	KONE	9546062	N/A	2019/08/13	Zafar Iqbal
Total Sulphide	SPEC	9550817	N/A	2019/08/16	Ife Olotu

BV Labs ID: WH0253 Dup
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/08/12
Shipped:
Received: 2019/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride/Sulphate by Auto Colourimetry	KONE	9551030	N/A	2019/08/16	Zafar Iqbal



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.0°C
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Sample WH0249, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample WH0250, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample WH0249, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.



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BV Labs Job #: B966389

Report Date: 2019/08/21

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9545840	Dissolved Aluminum (Al)	2019/08/15	92	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
9545840	Dissolved Antimony (Sb)	2019/08/15	93	80 - 120	100	80 - 120	<0.000020	mg/L	1.6	20
9545840	Dissolved Arsenic (As)	2019/08/15	90	80 - 120	95	80 - 120	<0.000020	mg/L	1.2	20
9545840	Dissolved Barium (Ba)	2019/08/15	94	80 - 120	100	80 - 120	<0.000020	mg/L	1.4	20
9545840	Dissolved Beryllium (Be)	2019/08/15	96	80 - 120	110	80 - 120	<0.000010	mg/L	NC	20
9545840	Dissolved Bismuth (Bi)	2019/08/15	90	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9545840	Dissolved Boron (B)	2019/08/15	84	80 - 120	93	80 - 120	<0.010	mg/L	NC	20
9545840	Dissolved Cadmium (Cd)	2019/08/15	91	80 - 120	98	80 - 120	<0.0000050	mg/L	3.5	20
9545840	Dissolved Chromium (Cr)	2019/08/15	91	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9545840	Dissolved Cobalt (Co)	2019/08/15	89	80 - 120	95	80 - 120	<0.0000050	mg/L	3.5	20
9545840	Dissolved Copper (Cu)	2019/08/15	86	80 - 120	95	80 - 120	<0.000050	mg/L	0.63	20
9545840	Dissolved Iron (Fe)	2019/08/15	98	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
9545840	Dissolved Lead (Pb)	2019/08/15	93	80 - 120	97	80 - 120	<0.0000050	mg/L	4.1	20
9545840	Dissolved Lithium (Li)	2019/08/15	106	80 - 120	80	80 - 120	<0.00050	mg/L	17	20
9545840	Dissolved Manganese (Mn)	2019/08/15	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.89	20
9545840	Dissolved Molybdenum (Mo)	2019/08/15	106	80 - 120	97	80 - 120	<0.000050	mg/L	3.3	20
9545840	Dissolved Nickel (Ni)	2019/08/15	86	80 - 120	95	80 - 120	<0.000020	mg/L	2.0	20
9545840	Dissolved Selenium (Se)	2019/08/15	92	80 - 120	92	80 - 120	<0.000040	mg/L	15	20
9545840	Dissolved Silicon (Si)	2019/08/15	75 (1)	80 - 120	74 (1)	80 - 120	<0.050	mg/L	1.6	20
9545840	Dissolved Silver (Ag)	2019/08/15	84	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9545840	Dissolved Strontium (Sr)	2019/08/15	NC	80 - 120	100	80 - 120	<0.000050	mg/L	1.4	20
9545840	Dissolved Thallium (Tl)	2019/08/15	96	80 - 120	100	80 - 120	<0.0000020	mg/L	0.062	20
9545840	Dissolved Tin (Sn)	2019/08/15	96	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9545840	Dissolved Titanium (Ti)	2019/08/15	94	80 - 120	96	80 - 120	<0.00050	mg/L	NC	20
9545840	Dissolved Uranium (U)	2019/08/15	102	80 - 120	101	80 - 120	<0.0000020	mg/L	0.53	20
9545840	Dissolved Vanadium (V)	2019/08/15	95	80 - 120	98	80 - 120	<0.00020	mg/L	5.1	20
9545840	Dissolved Zinc (Zn)	2019/08/15	88	80 - 120	100	80 - 120	<0.00010	mg/L	1.1	20
9545840	Dissolved Zirconium (Zr)	2019/08/15	101	80 - 120	106	80 - 120	<0.00010	mg/L	NC	20
9545842	Total Aluminum (Al)	2019/08/15	102	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9545842	Total Antimony (Sb)	2019/08/15	85	80 - 120	98	80 - 120	<0.000020	mg/L	0.53	20
9545842	Total Arsenic (As)	2019/08/15	87	80 - 120	94	80 - 120	<0.000020	mg/L	1.7	20
9545842	Total Barium (Ba)	2019/08/15	91	80 - 120	98	80 - 120	<0.000020	mg/L	0.44	20

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BV Labs Job #: B966389

Report Date: 2019/08/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9545842	Total Beryllium (Be)	2019/08/15	89	80 - 120	87	80 - 120	<0.000010	mg/L	NC	20
9545842	Total Bismuth (Bi)	2019/08/15	88	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9545842	Total Boron (B)	2019/08/15	79 (1)	80 - 120	82	80 - 120	<0.010	mg/L	1.7	20
9545842	Total Cadmium (Cd)	2019/08/15	87	80 - 120	96	80 - 120	<0.0000050	mg/L	1.9	20
9545842	Total Chromium (Cr)	2019/08/15	87	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9545842	Total Cobalt (Co)	2019/08/15	85	80 - 120	96	80 - 120	<0.0000050	mg/L	4.7	20
9545842	Total Copper (Cu)	2019/08/15	82	80 - 120	94	80 - 120	<0.000050	mg/L	1.4	20
9545842	Total Iron (Fe)	2019/08/15	116	80 - 120	105	80 - 120	<0.0010	mg/L	5.3	20
9545842	Total Lead (Pb)	2019/08/15	90	80 - 120	97	80 - 120	<0.0000050	mg/L	4.4	20
9545842	Total Lithium (Li)	2019/08/15	77 (1)	80 - 120	81	80 - 120	<0.00050	mg/L	0.82	20
9545842	Total Manganese (Mn)	2019/08/15	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.33	20
9545842	Total Molybdenum (Mo)	2019/08/15	97	80 - 120	96	80 - 120	<0.000050	mg/L	6.7	20
9545842	Total Nickel (Ni)	2019/08/15	82	80 - 120	94	80 - 120	<0.000020	mg/L	0.56	20
9545842	Total Selenium (Se)	2019/08/15	109	80 - 120	91	80 - 120	<0.000040	mg/L	3.9	20
9545842	Total Silicon (Si)	2019/08/15	84	80 - 120	77 (1)	80 - 120	<0.050	mg/L	0.78	20
9545842	Total Silver (Ag)	2019/08/15	98	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
9545842	Total Strontium (Sr)	2019/08/15	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.48	20
9545842	Total Thallium (Tl)	2019/08/15	94	80 - 120	99	80 - 120	<0.0000020	mg/L	1.0	20
9545842	Total Tin (Sn)	2019/08/15	93	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9545842	Total Titanium (Ti)	2019/08/15	92	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9545842	Total Uranium (U)	2019/08/15	99	80 - 120	99	80 - 120	<0.0000020	mg/L	1.6	20
9545842	Total Vanadium (V)	2019/08/15	90	80 - 120	97	80 - 120	<0.00020	mg/L	0.17	20
9545842	Total Zinc (Zn)	2019/08/15	83	80 - 120	99	80 - 120	<0.00010	mg/L	0.44	20
9545842	Total Zirconium (Zr)	2019/08/15	99	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9546062	Orthophosphate (P)	2019/08/13	NC	80 - 120	104	80 - 120	<0.0030	mg/L	7.2	20
9546136	HCl Preserved Iron (Fe+2 Ferrous)	2019/08/13	101	80 - 120	99	90 - 110	<0.050	mg/L	NC	20
9546261	Dissolved Nitrate (N)	2019/08/14	99	80 - 120	99	80 - 120	<0.010	mg/L	3.4	20
9546261	Dissolved Nitrite (N)	2019/08/14	99	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9547294	Alkalinity (PP as CaCO3)	2019/08/14					<1.0	mg/L	NC	20
9547294	Alkalinity (Total as CaCO3)	2019/08/14			93	80 - 120	<1.0	mg/L	1.0	20
9547294	Bicarbonate (HCO3)	2019/08/14					<1.0	mg/L	1.0	20
9547294	Carbonate (CO3)	2019/08/14					<1.0	mg/L	NC	20



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BV Labs Job #: B966389

Report Date: 2019/08/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9547294	Hydroxide (OH)	2019/08/14					<1.0	mg/L	NC	20
9547296	pH	2019/08/14			100	97 - 103			0.19	N/A
9547297	Dissolved Fluoride (F)	2019/08/14	103	80 - 120	94	80 - 120	<0.050	mg/L	0.93	20
9547766	Total Ammonia (N)	2019/08/14	101	80 - 120	108	80 - 120	<0.015	mg/L	0.47	20
9547768	Dissolved Organic Carbon (C)	2019/08/15	101	80 - 120	102	80 - 120	<0.50	mg/L	1.4	20
9548991	Dissolved Organic Carbon (C)	2019/08/15	94	80 - 120	102	80 - 120	<0.50	mg/L	0.28	20
9549449	Acidity (pH 4.5)	2019/08/16					<1.0	mg/L	NC	20
9549449	Acidity (pH 8.3)	2019/08/16			94	80 - 120	<1.0	mg/L	9.9	20
9550817	Total Sulphide	2019/08/16	114	80 - 120	109	80 - 120	<0.0018	mg/L	NC	20
9551030	Dissolved Chloride (Cl)	2019/08/16	NC	80 - 120	101	80 - 120	<1.0	mg/L	0.16	20
9551030	Dissolved Sulphate (SO4)	2019/08/16	NC	80 - 120	97	80 - 120	<1.0	mg/L	0.81	20
9553293	Dissolved Aluminum (Al)	2019/08/19	95	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9553293	Dissolved Antimony (Sb)	2019/08/19	97	80 - 120	93	80 - 120	<0.000020	mg/L	14	20
9553293	Dissolved Arsenic (As)	2019/08/19	98	80 - 120	93	80 - 120	<0.000020	mg/L	4.4	20
9553293	Dissolved Barium (Ba)	2019/08/19	94	80 - 120	92	80 - 120	<0.000020	mg/L	0.53	20
9553293	Dissolved Beryllium (Be)	2019/08/19	120	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9553293	Dissolved Bismuth (Bi)	2019/08/19	98	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
9553293	Dissolved Boron (B)	2019/08/19	103	80 - 120	104	80 - 120	<0.010	mg/L	NC	20
9553293	Dissolved Cadmium (Cd)	2019/08/19	101	80 - 120	91	80 - 120	<0.0000050	mg/L	NC	20
9553293	Dissolved Chromium (Cr)	2019/08/19	98	80 - 120	94	80 - 120	<0.00010	mg/L	NC	20
9553293	Dissolved Cobalt (Co)	2019/08/19	97	80 - 120	93	80 - 120	<0.0000050	mg/L	0.021	20
9553293	Dissolved Copper (Cu)	2019/08/19	98	80 - 120	94	80 - 120	<0.000050	mg/L	4.4	20
9553293	Dissolved Iron (Fe)	2019/08/19	101	80 - 120	98	80 - 120	<0.0010	mg/L	0.32	20
9553293	Dissolved Lead (Pb)	2019/08/19	100	80 - 120	93	80 - 120	<0.0000050	mg/L	NC	20
9553293	Dissolved Lithium (Li)	2019/08/19	98	80 - 120	97	80 - 120	<0.00050	mg/L	12	20
9553293	Dissolved Manganese (Mn)	2019/08/19	98	80 - 120	92	80 - 120	<0.000050	mg/L	1.5	20
9553293	Dissolved Nickel (Ni)	2019/08/19	97	80 - 120	92	80 - 120	<0.000020	mg/L	8.0	20
9553293	Dissolved Selenium (Se)	2019/08/19	101	80 - 120	88	80 - 120	<0.000040	mg/L	8.3	20
9553293	Dissolved Silicon (Si)	2019/08/19	77 (1)	80 - 120	72 (1)	80 - 120	<0.050	mg/L	0.83	20
9553293	Dissolved Silver (Ag)	2019/08/19	97	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
9553293	Dissolved Strontium (Sr)	2019/08/19	97	80 - 120	95	80 - 120	<0.000050	mg/L	2.6	20
9553293	Dissolved Thallium (Tl)	2019/08/19	102	80 - 120	96	80 - 120	<0.0000020	mg/L	NC	20

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BV Labs Job #: B966389

Report Date: 2019/08/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9553293	Dissolved Tin (Sn)	2019/08/19	95	80 - 120	90	80 - 120	<0.00020	mg/L	NC	20
9553293	Dissolved Titanium (Ti)	2019/08/19	101	80 - 120	95	80 - 120	<0.00050	mg/L	NC	20
9553293	Dissolved Uranium (U)	2019/08/19	111	80 - 120	100	80 - 120	<0.0000020	mg/L	0.65	20
9553293	Dissolved Vanadium (V)	2019/08/19	99	80 - 120	95	80 - 120	<0.00020	mg/L	NC	20
9553293	Dissolved Zinc (Zn)	2019/08/19	104	80 - 120	92	80 - 120	<0.00010	mg/L	6.8	20
9553293	Dissolved Zirconium (Zr)	2019/08/19	101	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9553295	Total Aluminum (Al)	2019/08/19	101	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
9553295	Total Antimony (Sb)	2019/08/19	94	80 - 120	93	80 - 120	<0.000020	mg/L	7.1	20
9553295	Total Arsenic (As)	2019/08/19	95	80 - 120	97	80 - 120	<0.000020	mg/L	16	20
9553295	Total Barium (Ba)	2019/08/19	91	80 - 120	94	80 - 120	<0.000020	mg/L	1.2	20
9553295	Total Beryllium (Be)	2019/08/19	102	80 - 120	112	80 - 120	<0.000010	mg/L	NC	20
9553295	Total Bismuth (Bi)	2019/08/19	98	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9553295	Total Boron (B)	2019/08/19	124 (1)	80 - 120	121 (1)	80 - 120	<0.010	mg/L	20	20
9553295	Total Cadmium (Cd)	2019/08/19	97	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9553295	Total Chromium (Cr)	2019/08/19	94	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9553295	Total Cobalt (Co)	2019/08/19	93	80 - 120	102	80 - 120	<0.0000050	mg/L	2.5	20
9553295	Total Copper (Cu)	2019/08/19	94	80 - 120	102	80 - 120	<0.000050	mg/L	3.7	20
9553295	Total Iron (Fe)	2019/08/19	100	80 - 120	106	80 - 120	<0.0010	mg/L	0.81	20
9553295	Total Lead (Pb)	2019/08/19	99	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9553295	Total Lithium (Li)	2019/08/19	89	80 - 120	101	80 - 120	<0.00050	mg/L	18	20
9553295	Total Manganese (Mn)	2019/08/19	93	80 - 120	101	80 - 120	<0.000050	mg/L	0.90	20
9553295	Total Molybdenum (Mo)	2019/08/19	93	80 - 120	93	80 - 120	<0.000050	mg/L	17	20
9553295	Total Nickel (Ni)	2019/08/19	94	80 - 120	101	80 - 120	<0.000020	mg/L	1.0	20
9553295	Total Selenium (Se)	2019/08/19	98	80 - 120	95	80 - 120	<0.000040	mg/L	8.0	20
9553295	Total Silicon (Si)	2019/08/19	75 (1)	80 - 120	79 (1)	80 - 120	<0.050	mg/L	0.26	20
9553295	Total Silver (Ag)	2019/08/19	91	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
9553295	Total Strontium (Sr)	2019/08/19	95	80 - 120	97	80 - 120	<0.000050	mg/L	0.76	20
9553295	Total Thallium (Tl)	2019/08/19	100	80 - 120	106	80 - 120	<0.0000020	mg/L	NC	20
9553295	Total Tin (Sn)	2019/08/19	93	80 - 120	93	80 - 120	<0.00020	mg/L	NC	20
9553295	Total Titanium (Ti)	2019/08/19	93	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9553295	Total Uranium (U)	2019/08/19	110	80 - 120	116	80 - 120	<0.0000020	mg/L	20	20
9553295	Total Vanadium (V)	2019/08/19	95	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20



BUREAU
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BV Labs Job #: B966389

Report Date: 2019/08/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9553295	Total Zinc (Zn)	2019/08/19	101	80 - 120	100	80 - 120	<0.00010	mg/L	4.9	20
9553295	Total Zirconium (Zr)	2019/08/19	92	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
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BV Labs Job #: B966389
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required											
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS											
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days											
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02												
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah												
Email:		Email:	agault@alexcoenv.com kpiecowye@contangostrategies.com	Site #:													
				Sampled By:		Date Required:											
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA												LABORATORY USE ONLY CUSTODY SEAL Y/N COOLER TEMPERATURES Present Intact COOLING MEDIA PRESENT Y/N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																	
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	
1	Trial #1	12-Aug-19	10:30	Water	X	X	X	X	X	X	X	X	X	X	9		
2	Trial #2	12-Aug-19	10:45	Water	X	X	X	X	X	X	X	X	X	X	9		Received in Saskatoon
3	Trial #3	12-Aug-19	11:00	Water	X	X	X	X	X	X	X	X	X	X	9		By: <i>[Signature]</i>
4	Trial #4	12-Aug-19	11:15	Water	X	X	X	X	X	X	X	X	X	X	9		CSN AUG 12 2019 14:00
5	Trial #5	12-Aug-19	13:00	Water	X	X	X	X	X	X	X	X	X	X	9		
6	Trial #6	12-Aug-19	11:30	Water	X	X	X	X	X	X	X	X	X	X	9		Temp: 9 / 9 / 9
7	Trial #7	12-Aug-19	11:45	Water	X	X	X	X	X	X	X	X	X	X	9		
8	Trial #8	12-Aug-19	12:00	Water	X	X	X	X	X	X	X	X	X	X	9		
9																	
10																	
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)										
<i>Tanner Webb</i>		2019/08/12	14:00	<i>MAYRA OJEDA</i>		2019/08/13	08:25										
Tanner Webb																	

Seal - yes
Ice - yes

9/10/10 475/



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/09/18
 Report #: R2783276
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B975888

Received: 2019/09/09, 13:15

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	8	N/A	2019/09/12	AB SOP-00005	SM 23 2310 B m
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	5	N/A	2019/09/11	AB SOP-00005	SM 23 2320 B m
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	3	N/A	2019/09/12	AB SOP-00005	SM 23 2320 B m
Chloride/Sulphate by Auto Colourimetry	2	N/A	2019/09/11	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
Chloride/Sulphate by Auto Colourimetry	6	N/A	2019/09/12	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	8	N/A	2019/09/11	AB SOP-00087	MMCW 119 1996 m
Fluoride	8	N/A	2019/09/11	AB SOP-00005	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/09/11	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/09/13	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	8	N/A	2019/09/16	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	8	N/A	2019/09/13	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	8	N/A	2019/09/17		Auto Calc
Ion Balance	8	N/A	2019/09/11		Auto Calc
Sum of cations, anions	8	N/A	2019/09/13		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	8	N/A	2019/09/13	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	8	N/A	2019/09/12	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	8	N/A	2019/09/16	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	8	N/A	2019/09/13	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	6	N/A	2019/09/12	AB SOP-00007	SM 23 4500 NH ₃ A G m
Ammonia-N (Total)	2	N/A	2019/09/13	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite	8	N/A	2019/09/12		Auto Calc
Nitrate + Nitrite-N (calculated)	8	N/A	2019/09/12		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	8	N/A	2019/09/12	AB SOP-00023	SM 23 4110 B m
pH @25°C (4)	8	N/A	2019/09/11	AB SOP-00005	SM 23 4500-H+B m
Orthophosphate by Konelab (5)	8	N/A	2019/09/12	AB SOP-00025	SM 23 4500-P A,F m
Total Sulphide	8	N/A	2019/09/13	AB SOP-00080	SM 23 4500 S2-A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/09/18
Report #: R2783276
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B975888

Received: 2019/09/09, 13:15

by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by BV Labs Vancouver
- (2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
- (4) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.
- (5) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL6341	WL6342			WL6343		
Sampling Date		2019/09/09 10:15	2019/09/09 10:25			2019/09/09 10:50		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05			BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #2	RDL	QC Batch	TRIAL #3	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	8.5	8.6	N/A	9582410	8.1	N/A	9583212
Cation Sum	meq/L	8.4	9.6	N/A	9582410	7.9	N/A	9583212
Ion Balance	N/A	0.99	1.1	0.010	9591170	0.98	0.010	9591170
Ion Balance (% Difference)	%	0.66	5.3	N/A	9583197	1.1	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	5.2	2.2	0.044	9583187	0.77	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	1.2	0.50	0.014	9583190	0.17	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	<0.033	<0.033	0.033	9583187	<0.033	0.033	9583187
Sulphide (as H2S)	mg/L	<0.0020	<0.0020	0.0020	9582602	<0.0020	0.0020	9582602
Misc. Inorganics								
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.056	<0.050	0.050	9583742	<0.050	0.050	9583742
Dissolved Organic Carbon (C)	mg/L	3.3	3.2	0.50	9583887	4.0	0.50	9583887
pH	pH	7.07	6.89	N/A	9584008	6.87	N/A	9584008
Acidity (pH 4.5)	mg/L	<1.0	<1.0	1.0	9585591	<1.0	1.0	9585591
Acidity (pH 8.3)	mg/L	4.9	10.3	1.0	9585591	5.6	1.0	9585591
Anions								
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	1.0	9584004	<1.0	1.0	9584004
Alkalinity (Total as CaCO3)	mg/L	89	100	1.0	9584004	110	1.0	9584004
Bicarbonate (HCO3)	mg/L	110	130	1.0	9584004	130	1.0	9584004
Carbonate (CO3)	mg/L	<1.0	<1.0	1.0	9584004	<1.0	1.0	9584004
Dissolved Fluoride (F)	mg/L	0.71	0.71	0.050	9584013	0.57	0.050	9584013
Hydroxide (OH)	mg/L	<1.0	<1.0	1.0	9584004	<1.0	1.0	9584004
Total Sulphide	mg/L	<0.0018	<0.0018	0.0018	9586990	<0.0018	0.0018	9586990
Dissolved Chloride (Cl)	mg/L	55	56	1.0	9583915	57	1.0	9584230
Dissolved Sulphate (SO4)	mg/L	240 (1)	230 (1)	2.0	9583915	210 (1)	2.0	9584230
Nutrients								
Total Ammonia (N)	mg/L	0.076	0.052	0.015	9586395	0.069	0.015	9586395
Orthophosphate (P)	mg/L	1.0 (1)	1.3 (1)	0.015	9585631	0.029	0.0030	9585631
Dissolved Nitrite (N)	mg/L	<0.010	<0.010	0.010	9584178	<0.010	0.010	9584178
Dissolved Nitrate (N)	mg/L	1.2	0.50	0.010	9584178	0.17	0.010	9584178
RDL = Reportable Detection Limit								
N/A = Not Applicable								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								



BUREAU
VERITAS

BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL6344			WL6345		WL6346		
Sampling Date		2019/09/09 11:00			2019/09/09 13:30		2019/09/09 11:20		
COC Number		BBY FCD-00077/05			BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	TRIAL #4	RDL	QC Batch	TRIAL #5	QC Batch	TRIAL #6	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.7	N/A	9583212	9.2	9583212	8.8	N/A	9583212
Cation Sum	meq/L	7.9	N/A	9583212	7.7	9583212	10	N/A	9583212
Ion Balance	N/A	0.91	0.010	9591170	0.85	9591170	1.2	0.010	9591170
Ion Balance (% Difference)	%	4.6	N/A	9583197	8.4	9583197	7.6	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	2.3	0.044	9583187	<0.044	9583187	1.7	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	0.52	0.014	9583190	<0.014	9583190	0.39	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	<0.033	0.033	9583187	<0.033	9583187	<0.033	0.033	9583187
Sulphide (as H2S)	mg/L	0.0030	0.0020	9582602	<0.0020	9582602	<0.0020	0.0020	9583182

Misc. Inorganics

HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	9583742	<0.050	9583742	0.068	0.050	9583742
Dissolved Organic Carbon (C)	mg/L	4.9	0.50	9583887	4.9	9583887	3.3	0.50	9583887
pH	pH	6.81	N/A	9584008	6.83	9584008	6.93	N/A	9584008
Acidity (pH 4.5)	mg/L	<1.0	1.0	9585591	<1.0	9585591	<1.0	1.0	9585591
Acidity (pH 8.3)	mg/L	21.8	1.0	9585591	11.5	9585591	8.2	1.0	9585591

Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	9584004	<1.0	9584004	<1.0	1.0	9584004
Alkalinity (Total as CaCO3)	mg/L	140	1.0	9584004	120	9584004	110	1.0	9584004
Bicarbonate (HCO3)	mg/L	170	1.0	9584004	150	9584004	130	1.0	9584004
Carbonate (CO3)	mg/L	<1.0	1.0	9584004	<1.0	9584004	<1.0	1.0	9584004
Dissolved Fluoride (F)	mg/L	0.55	0.050	9584013	0.75	9584013	0.74	0.050	9584013
Hydroxide (OH)	mg/L	<1.0	1.0	9584004	<1.0	9584004	<1.0	1.0	9584004
Total Sulphide	mg/L	0.0024	0.0018	9586990	<0.0018	9586990	<0.0018	0.0018	9586990
Dissolved Chloride (Cl)	mg/L	60	1.0	9584230	56	9584230	54	1.0	9584230
Dissolved Sulphate (SO4)	mg/L	200	1.0	9584230	240 (1)	9584230	240 (1)	2.0	9584230

Nutrients

Total Ammonia (N)	mg/L	0.27	0.015	9587031	1.8	9586395	0.087	0.015	9586395
Orthophosphate (P)	mg/L	0.22	0.0030	9585631	0.55 (1)	9585631	1.2 (1)	0.015	9585631
Dissolved Nitrite (N)	mg/L	<0.010	0.010	9584178	<0.010	9584178	<0.010	0.010	9584178
Dissolved Nitrate (N)	mg/L	0.52	0.010	9584178	<0.010	9584178	0.39	0.010	9584178

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL6347		WL6348		
Sampling Date		2019/09/09 12:00		2019/09/09 12:35		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	9.2	9583212	8.2	N/A	9583212
Cation Sum	meq/L	8.3	9583212	8.0	N/A	9583212
Ion Balance	N/A	0.90	9591170	0.98	0.010	9591170
Ion Balance (% Difference)	%	5.3	9583197	1.3	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	5.1	9583187	0.30	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	1.1	9583190	0.067	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	<0.033	9583187	<0.033	0.033	9583187
Sulphide (as H2S)	mg/L	<0.0020	9583182	<0.0020	0.0020	9583182
Misc. Inorganics						
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.068	9583742	<0.050	0.050	9583742
Dissolved Organic Carbon (C)	mg/L	2.4	9583887	2.9	0.50	9583887
pH	pH	7.15	9584008	6.97	N/A	9584008
Acidity (pH 4.5)	mg/L	<1.0	9585591	<1.0	1.0	9585591
Acidity (pH 8.3)	mg/L	2.0	9585591	5.0	1.0	9585591
Anions						
Alkalinity (PP as CaCO3)	mg/L	<1.0	9584004	<1.0	1.0	9584004
Alkalinity (Total as CaCO3)	mg/L	130	9584004	95	1.0	9584004
Bicarbonate (HCO3)	mg/L	160	9584004	120	1.0	9584004
Carbonate (CO3)	mg/L	<1.0	9584004	<1.0	1.0	9584004
Dissolved Fluoride (F)	mg/L	0.73	9584013	0.55	0.050	9584013
Hydroxide (OH)	mg/L	<1.0	9584004	<1.0	1.0	9584004
Total Sulphide	mg/L	<0.0018	9586990	<0.0018	0.0018	9586990
Dissolved Chloride (Cl)	mg/L	57	9584230	59	1.0	9584230
Dissolved Sulphate (SO4)	mg/L	230 (1)	9584230	220 (1)	2.0	9584230
Nutrients						
Total Ammonia (N)	mg/L	0.064	9586395	0.061	0.015	9587031
Orthophosphate (P)	mg/L	0.0034	9585631	<0.0030	0.0030	9585631
Dissolved Nitrite (N)	mg/L	<0.010	9584178	<0.010	0.010	9584178
Dissolved Nitrate (N)	mg/L	1.1	9584178	0.067	0.010	9584178
RDL = Reportable Detection Limit						
N/A = Not Applicable						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						

BUREAU
VERITASBV Labs Job #: B975888
Report Date: 2019/09/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6341		WL6342		WL6343		
Sampling Date		2019/09/09 10:15		2019/09/09 10:25		2019/09/09 10:50		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	349	9582660	406	9582660	330	0.50	9582660
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00154	9585956	0.00111	9585956	0.00102	0.00050	9585956
Dissolved Antimony (Sb)	mg/L	0.0151	9585956	0.00225	9585956	0.00186	0.000020	9585956
Dissolved Arsenic (As)	mg/L	0.0526	9585956	0.0453	9585956	0.00543	0.000020	9585956
Dissolved Barium (Ba)	mg/L	0.0759	9585956	0.0562	9585956	0.136	0.000020	9585956
Dissolved Beryllium (Be)	mg/L	<0.000010	9585956	<0.000010	9585956	<0.000010	0.000010	9585956
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9585956	<0.0000050	9585956	<0.0000050	0.0000050	9585956
Dissolved Boron (B)	mg/L	0.036	9585956	0.036	9585956	0.030	0.010	9585956
Dissolved Cadmium (Cd)	mg/L	0.00136	9585956	0.0000469	9585956	0.000121	0.0000050	9585956
Dissolved Chromium (Cr)	mg/L	<0.00010	9585956	<0.00010	9585956	<0.00010	0.00010	9585956
Dissolved Cobalt (Co)	mg/L	0.000372	9585956	0.000886	9585956	0.000192	0.0000050	9585956
Dissolved Copper (Cu)	mg/L	0.00416	9585956	0.000307	9585956	0.000867	0.000050	9585956
Dissolved Iron (Fe)	mg/L	0.0036	9585956	0.0113	9585956	0.0260	0.0010	9585956
Dissolved Lead (Pb)	mg/L	0.000112	9585956	0.0000245	9585956	0.0000184	0.0000050	9585956
Dissolved Lithium (Li)	mg/L	0.0116	9585956	0.0113	9585956	0.00767	0.00050	9585956
Dissolved Manganese (Mn)	mg/L	0.0881	9585956	0.188	9585956	0.835	0.000050	9585956
Dissolved Molybdenum (Mo)	mg/L	0.00220	9585956	0.000752	9585956	0.00214	0.000050	9585956
Dissolved Nickel (Ni)	mg/L	0.0106	9585956	0.00653	9585956	0.00289	0.000020	9585956
Dissolved Selenium (Se)	mg/L	0.00513	9585956	0.00237	9585956	0.00116	0.000040	9585956
Dissolved Silicon (Si)	mg/L	1.05	9585956	1.02	9585956	2.65	0.050	9585956
Dissolved Silver (Ag)	mg/L	<0.0000050	9585956	<0.0000050	9585956	<0.0000050	0.0000050	9585956
Dissolved Strontium (Sr)	mg/L	0.496	9585956	0.500	9585956	0.470	0.000050	9585956
Dissolved Thallium (Tl)	mg/L	0.000230	9585956	0.0000289	9585956	0.0000051	0.0000020	9585956
Dissolved Tin (Sn)	mg/L	<0.00020	9585956	<0.00020	9585956	<0.00020	0.00020	9585956
Dissolved Titanium (Ti)	mg/L	<0.00050	9585956	<0.00050	9585956	<0.00050	0.00050	9585956
Dissolved Uranium (U)	mg/L	0.0286	9585956	0.00850	9585956	0.00875	0.0000020	9585956
Dissolved Vanadium (V)	mg/L	0.00059 (1)	9585956	<0.00020	9592339	0.00027	0.00020	9585956
Dissolved Zinc (Zn)	mg/L	0.135	9585956	0.0204	9585956	0.0180	0.00010	9585956
Dissolved Zirconium (Zr)	mg/L	<0.00010	9585956	<0.00010	9585956	0.00012	0.00010	9585956
Dissolved Calcium (Ca)	mg/L	109	9582661	130	9582661	105	0.050	9582661

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



BUREAU
VERITAS

BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6341		WL6342		WL6343		
Sampling Date		2019/09/09 10:15		2019/09/09 10:25		2019/09/09 10:50		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	18.5	9582661	19.5	9582661	16.2	0.050	9582661
Dissolved Potassium (K)	mg/L	7.81	9582661	8.06	9582661	7.07	0.050	9582661
Dissolved Sodium (Na)	mg/L	27.0	9582661	28.8	9582661	25.8	0.050	9582661
Dissolved Sulphur (S)	mg/L	88.1	9582661	89.9	9582661	73.8	3.0	9582661
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6344		WL6345	WL6346		
Sampling Date		2019/09/09 11:00		2019/09/09 13:30	2019/09/09 11:20		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #4	QC Batch	TRIAL #5	TRIAL #6	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	328	9582660	315	444	0.50	9582660
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00170	9585956	0.00685	0.00112	0.00050	9585956
Dissolved Antimony (Sb)	mg/L	0.00122	9585956	0.00639	0.0530	0.000020	9585956
Dissolved Arsenic (As)	mg/L	0.0125	9585956	0.0388	0.263	0.000020	9585956
Dissolved Barium (Ba)	mg/L	0.117	9585956	0.0556	0.0659	0.000020	9585956
Dissolved Beryllium (Be)	mg/L	<0.000010	9585956	<0.000010	<0.000010	0.000010	9585956
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9585956	<0.0000050	<0.0000050	0.0000050	9585956
Dissolved Boron (B)	mg/L	0.031	9585956	0.035	0.035	0.010	9585956
Dissolved Cadmium (Cd)	mg/L	0.0000195	9585956	0.0000589	0.00445	0.0000050	9585956
Dissolved Chromium (Cr)	mg/L	<0.00010	9585956	<0.00010	<0.00010	0.00010	9585956
Dissolved Cobalt (Co)	mg/L	0.000207	9585956	0.000450	0.00688	0.0000050	9585956
Dissolved Copper (Cu)	mg/L	0.000349	9585956	0.000741	0.00796	0.000050	9585956
Dissolved Iron (Fe)	mg/L	0.0452	9585956	0.0375	0.0043	0.0010	9585956
Dissolved Lead (Pb)	mg/L	0.0000195	9585956	0.00117	0.00119	0.0000050	9585956
Dissolved Lithium (Li)	mg/L	0.00775	9585956	0.0111	0.0114	0.00050	9585956
Dissolved Manganese (Mn)	mg/L	1.20	9585956	0.111	0.146	0.000050	9585956
Dissolved Molybdenum (Mo)	mg/L	0.000762	9585956	0.00111	0.00115	0.000050	9585956
Dissolved Nickel (Ni)	mg/L	0.00172	9585956	0.0105	0.0365	0.000020	9585956
Dissolved Selenium (Se)	mg/L	0.000759	9585956	0.00343	0.0236	0.000040	9585956
Dissolved Silicon (Si)	mg/L	2.60	9585956	0.925	1.08	0.050	9585956
Dissolved Silver (Ag)	mg/L	<0.0000050	9585956	<0.0000050	<0.0000050	0.0000050	9585956
Dissolved Strontium (Sr)	mg/L	0.526	9585956	0.567	0.541	0.000050	9585956
Dissolved Thallium (Tl)	mg/L	<0.0000020	9585956	0.000119	0.000266	0.0000020	9585956
Dissolved Tin (Sn)	mg/L	<0.00020	9585956	<0.00020	<0.00020	0.00020	9585956
Dissolved Titanium (Ti)	mg/L	<0.00050	9585956	<0.00050	<0.00050	0.00050	9585956
Dissolved Uranium (U)	mg/L	0.00364	9585956	0.0252	0.105	0.0000020	9585956
Dissolved Vanadium (V)	mg/L	0.00059 (1)	9585956	0.00027	<0.00020	0.00020	9592339
Dissolved Zinc (Zn)	mg/L	0.00731	9585956	0.0642	0.470	0.00010	9585956
Dissolved Zirconium (Zr)	mg/L	0.00017	9585956	0.00019	<0.00010	0.00010	9585956
Dissolved Calcium (Ca)	mg/L	105	9582661	97.0	149	0.050	9582661

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6344		WL6345	WL6346		
Sampling Date		2019/09/09 11:00		2019/09/09 13:30	2019/09/09 11:20		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #4	QC Batch	TRIAL #5	TRIAL #6	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.2	9582661	17.6	17.7	0.050	9582661
Dissolved Potassium (K)	mg/L	7.28	9582661	6.78	8.21	0.050	9582661
Dissolved Sodium (Na)	mg/L	25.6	9582661	26.2	26.9	0.050	9582661
Dissolved Sulphur (S)	mg/L	61.7	9582661	82.5	82.1	3.0	9582661
RDL = Reportable Detection Limit							

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VERITASBV Labs Job #: B975888
Report Date: 2019/09/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WL6347	WL6348		
Sampling Date		2019/09/09 12:00	2019/09/09 12:35		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	346	337	0.50	9582660
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00349	0.00101	0.00050	9585956
Dissolved Antimony (Sb)	mg/L	0.0255	0.00387	0.000020	9585956
Dissolved Arsenic (As)	mg/L	0.0203	0.00182	0.000020	9585956
Dissolved Barium (Ba)	mg/L	0.0946	0.150	0.000020	9585956
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9585956
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9585956
Dissolved Boron (B)	mg/L	0.035	0.030	0.010	9585956
Dissolved Cadmium (Cd)	mg/L	0.00263	0.000284	0.0000050	9585956
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9585956
Dissolved Cobalt (Co)	mg/L	0.000323	0.0000361	0.0000050	9585956
Dissolved Copper (Cu)	mg/L	0.00538	0.00349	0.000050	9585956
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	0.0010	9585956
Dissolved Lead (Pb)	mg/L	0.00176	0.0000181	0.0000050	9585956
Dissolved Lithium (Li)	mg/L	0.0128	0.00758	0.00050	9585956
Dissolved Manganese (Mn)	mg/L	0.0339	0.00400	0.000050	9585956
Dissolved Molybdenum (Mo)	mg/L	0.00179	0.00176	0.000050	9585956
Dissolved Nickel (Ni)	mg/L	0.00737	0.000866	0.000020	9585956
Dissolved Selenium (Se)	mg/L	0.0127	0.00249	0.000040	9585956
Dissolved Silicon (Si)	mg/L	0.869	2.35	0.050	9585956
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9585956
Dissolved Strontium (Sr)	mg/L	0.634	0.569	0.000050	9585956
Dissolved Thallium (Tl)	mg/L	0.000868	0.0000230	0.0000020	9585956
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9585956
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9585956
Dissolved Uranium (U)	mg/L	0.0428	0.0144	0.0000020	9585956
Dissolved Vanadium (V)	mg/L	0.00024	0.00020	0.00020	9585956
Dissolved Zinc (Zn)	mg/L	0.114	0.0314	0.00010	9585956
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9585956
Dissolved Calcium (Ca)	mg/L	109	107	0.050	9582661
Dissolved Magnesium (Mg)	mg/L	18.2	16.9	0.050	9582661
RDL = Reportable Detection Limit					



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BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6347	WL6348		
Sampling Date		2019/09/09 12:00	2019/09/09 12:35		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.27	5.46	0.050	9582661
Dissolved Sodium (Na)	mg/L	26.5	26.2	0.050	9582661
Dissolved Sulphur (S)	mg/L	82.4	79.1	3.0	9582661
RDL = Reportable Detection Limit					



BUREAU
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BV Labs Job #: B975888

Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6341	WL6342	WL6343	WL6344		
Sampling Date		2019/09/09 10:15	2019/09/09 10:25	2019/09/09 10:50	2019/09/09 11:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	353	363	340	343	0.50	9582408
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00140	0.00168	0.00199	0.00304	0.00050	9585983
Total Antimony (Sb)	mg/L	0.0155	0.00232	0.00197	0.00127	0.000020	9585983
Total Arsenic (As)	mg/L	0.0534	0.0432	0.00706	0.0149	0.000020	9585983
Total Barium (Ba)	mg/L	0.0791	0.0594	0.146	0.127	0.000020	9585983
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9585983
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585983
Total Boron (B)	mg/L	0.035	0.034	0.030	0.031	0.010	9585983
Total Cadmium (Cd)	mg/L	0.00133	0.0000493	0.000120	0.0000194	0.0000050	9585983
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585983
Total Cobalt (Co)	mg/L	0.000374	0.000797	0.000220	0.000223	0.0000050	9585983
Total Copper (Cu)	mg/L	0.00384	0.000311	0.000879	0.000357	0.000050	9585983
Total Iron (Fe)	mg/L	0.0066	0.0440	0.161	0.289	0.0010	9585983
Total Lead (Pb)	mg/L	0.000163	0.000118	0.000241	0.000209	0.0000050	9585983
Total Lithium (Li)	mg/L	0.0125	0.0121	0.00859	0.00856	0.00050	9585983
Total Manganese (Mn)	mg/L	0.0854	0.175	0.838	1.21	0.000050	9585983
Total Molybdenum (Mo)	mg/L	0.00220	0.000773	0.00203	0.000774	0.000050	9585983
Total Nickel (Ni)	mg/L	0.00974	0.00565	0.00280	0.00175	0.000020	9585983
Total Selenium (Se)	mg/L	0.00483	0.00231	0.00113	0.000821	0.000040	9585983
Total Silicon (Si)	mg/L	1.13	1.05	2.92	2.97	0.050	9585983
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585983
Total Strontium (Sr)	mg/L	0.542	0.504	0.525	0.605	0.000050	9585983
Total Thallium (Tl)	mg/L	0.000227	0.0000292	0.0000042	<0.0000020	0.0000020	9585983
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585983
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9585983
Total Uranium (U)	mg/L	0.0280	0.00865	0.00902	0.00367	0.0000020	9585983
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585983
Total Zinc (Zn)	mg/L	0.124	0.0181	0.0200	0.00730	0.00010	9585983
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00015	0.00025	0.00010	9585983
Total Calcium (Ca)	mg/L	112	116	109	110	0.050	9582662
Total Magnesium (Mg)	mg/L	17.9	17.8	16.4	16.4	0.050	9582662

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6341	WL6342	WL6343	WL6344		
Sampling Date		2019/09/09 10:15	2019/09/09 10:25	2019/09/09 10:50	2019/09/09 11:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	RDL	QC Batch
Total Potassium (K)	mg/L	7.78	7.62	7.29	7.43	0.050	9582662
Total Sodium (Na)	mg/L	25.9	26.1	25.6	25.9	0.050	9582662
Total Sulphur (S)	mg/L	86.1	82.0	75.8	64.7	3.0	9582662
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B975888
Report Date: 2019/09/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WL6345		WL6346	WL6347	WL6348		
Sampling Date		2019/09/09 13:30		2019/09/09 11:20	2019/09/09 12:00	2019/09/09 12:35		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #5	QC Batch	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	376	9582408	360	352	346	0.50	9583184
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00778	9585983	0.00347	0.00419	0.00109	0.00050	9585983
Total Antimony (Sb)	mg/L	0.00654	9585983	0.0557	0.0260	0.00398	0.000020	9585983
Total Arsenic (As)	mg/L	0.0404	9585983	0.276	0.0208	0.00190	0.000020	9585983
Total Barium (Ba)	mg/L	0.0578	9585983	0.0715	0.0980	0.156	0.000020	9585983
Total Beryllium (Be)	mg/L	<0.000010	9585983	<0.000010	<0.000010	<0.000010	0.000010	9585983
Total Bismuth (Bi)	mg/L	<0.0000050	9585983	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585983
Total Boron (B)	mg/L	0.035	9585983	0.035	0.034	0.028	0.010	9585983
Total Cadmium (Cd)	mg/L	0.0000872	9585983	0.00458	0.00258	0.000282	0.0000050	9585983
Total Chromium (Cr)	mg/L	<0.00010	9585983	<0.00010	<0.00010	<0.00010	0.00010	9585983
Total Cobalt (Co)	mg/L	0.000440	9585983	0.00666	0.000326	0.0000405	0.0000050	9585983
Total Copper (Cu)	mg/L	0.000902	9585983	0.00772	0.00518	0.00328	0.000050	9585983
Total Iron (Fe)	mg/L	0.0873	9585983	0.0143	0.0014	0.0034	0.0010	9585983
Total Lead (Pb)	mg/L	0.00208	9585983	0.00201	0.00195	0.0000555	0.0000050	9585983
Total Lithium (Li)	mg/L	0.0120	9585983	0.0126	0.0134	0.00789	0.00050	9585983
Total Manganese (Mn)	mg/L	0.110	9585983	0.149	0.0338	0.00490	0.000050	9585983
Total Molybdenum (Mo)	mg/L	0.00113	9585983	0.00125	0.00184	0.00182	0.000050	9585983
Total Nickel (Ni)	mg/L	0.0101	9585983	0.0347	0.00682	0.000815	0.000020	9585983
Total Selenium (Se)	mg/L	0.00392	9585983	0.0179	0.0126	0.00243	0.000040	9585983
Total Silicon (Si)	mg/L	1.01	9585983	1.18	0.969	2.49	0.050	9585983
Total Silver (Ag)	mg/L	<0.0000050	9585983	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585983
Total Strontium (Sr)	mg/L	0.630	9585983	0.588	0.680	0.621	0.000050	9585983
Total Thallium (Tl)	mg/L	0.000118	9585983	0.000281	0.000870	0.0000275	0.0000020	9585983
Total Tin (Sn)	mg/L	<0.00020	9585983	<0.00020	<0.00020	<0.00020	0.00020	9585983
Total Titanium (Ti)	mg/L	<0.00050	9585983	<0.00050	<0.00050	<0.00050	0.00050	9585983
Total Uranium (U)	mg/L	0.0246	9585983	0.110	0.0421	0.0143	0.0000020	9585983
Total Vanadium (V)	mg/L	<0.00020	9585983	<0.00020	<0.00020	<0.00020	0.00020	9585983
Total Zinc (Zn)	mg/L	0.0641	9585983	0.454	0.110	0.0272	0.00010	9585983
Total Zirconium (Zr)	mg/L	0.00021	9585983	<0.00010	<0.00010	<0.00010	0.00010	9585983
Total Calcium (Ca)	mg/L	122	9582662	116	111	112	0.050	9582662
Total Magnesium (Mg)	mg/L	17.6	9582662	17.4	18.1	16.4	0.050	9582662

RDL = Reportable Detection Limit



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BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6345		WL6346	WL6347	WL6348		
Sampling Date		2019/09/09 13:30		2019/09/09 11:20	2019/09/09 12:00	2019/09/09 12:35		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #5	QC Batch	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	6.95	9582662	8.43	7.34	5.40	0.050	9582662
Total Sodium (Na)	mg/L	26.3	9582662	26.6	26.2	25.3	0.050	9582662
Total Sulphur (S)	mg/L	86.5	9582662	83.9	84.8	78.8	3.0	9582662

RDL = Reportable Detection Limit



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BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6341
Sample ID: TRIAL #1
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/12	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9583915	N/A	2019/09/11	Serena Tian
Carbon (DOC)	TECH	9583887	N/A	2019/09/11	Kayla Ghanem
Fluoride	AT	9584013	N/A	2019/09/11	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9582602	N/A	2019/09/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9582408	N/A	2019/09/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9582410	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan
Ammonia-N (Total)	KONE	9586395	N/A	2019/09/12	Fadia Mostafa
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal
Total Sulphide	SPEC	9586990	N/A	2019/09/13	Haydee Estilong

BV Labs ID: WL6341 Dup
Sample ID: TRIAL #1
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan

BV Labs ID: WL6342
Sample ID: TRIAL #2
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/11	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9583915	N/A	2019/09/11	Serena Tian
Carbon (DOC)	TECH	9583887	N/A	2019/09/11	Kayla Ghanem
Fluoride	AT	9584013	N/A	2019/09/11	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9582602	N/A	2019/09/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9582408	N/A	2019/09/16	Automated Statchk



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BV Labs Job #: B975888

Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6342
Sample ID: TRIAL #2
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9582410	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan
Ammonia-N (Total)	KONE	9586395	N/A	2019/09/12	Fadia Mostafa
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal
Total Sulphide	SPEC	9586990	N/A	2019/09/13	Haydee Estilong

BV Labs ID: WL6343
Sample ID: TRIAL #3
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/12	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Carbon (DOC)	TECH	9583887	N/A	2019/09/11	Kayla Ghanem
Fluoride	AT	9584013	N/A	2019/09/11	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9582602	N/A	2019/09/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9582408	N/A	2019/09/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan
Ammonia-N (Total)	KONE	9586395	N/A	2019/09/12	Fadia Mostafa
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal
Total Sulphide	SPEC	9586990	N/A	2019/09/13	Haydee Estilong



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BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6344
Sample ID: TRIAL #4
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/11	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Carbon (DOC)	TECH	9583887	N/A	2019/09/11	Kayla Ghanem
Fluoride	AT	9584013	N/A	2019/09/11	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9582602	N/A	2019/09/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9582408	N/A	2019/09/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan
Ammonia-N (Total)	KONE	9587031	N/A	2019/09/13	Fadia Mostafa
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal
Total Sulphide	SPEC	9586990	N/A	2019/09/13	Haydee Estilong

BV Labs ID: WL6345
Sample ID: TRIAL #5
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/11	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Carbon (DOC)	TECH	9583887	N/A	2019/09/11	Kayla Ghanem
Fluoride	AT	9584013	N/A	2019/09/11	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9582602	N/A	2019/09/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9582408	N/A	2019/09/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan
Ammonia-N (Total)	KONE	9586395	N/A	2019/09/12	Fadia Mostafa



BUREAU
VERITAS

BV Labs Job #: B975888

Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6345
Sample ID: TRIAL #5
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal
Total Sulphide	SPEC	9586990	N/A	2019/09/13	Haydee Estilong

BV Labs ID: WL6346
Sample ID: TRIAL #6
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/12	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Carbon (DOC)	TECH	9583887	N/A	2019/09/11	Kayla Ghanem
Fluoride	AT	9584013	N/A	2019/09/11	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9583182	N/A	2019/09/13	Report Automation Engine
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan
Ammonia-N (Total)	KONE	9586395	N/A	2019/09/12	Fadia Mostafa
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal
Total Sulphide	SPEC	9586990	N/A	2019/09/13	Haydee Estilong

BV Labs ID: WL6347
Sample ID: TRIAL #7
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/11	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Carbon (DOC)	TECH	9583887	N/A	2019/09/11	Kayla Ghanem
Fluoride	AT	9584013	N/A	2019/09/11	Taylor Mullings



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VERITAS

BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6347
Sample ID: TRIAL #7
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9583182	N/A	2019/09/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan
Ammonia-N (Total)	KONE	9586395	N/A	2019/09/12	Fadia Mostafa
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal
Total Sulphide	SPEC	9586990	N/A	2019/09/13	Haydee Estilong

BV Labs ID: WL6347 Dup
Sample ID: TRIAL #7
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian

BV Labs ID: WL6348
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9585591	N/A	2019/09/12	Ilonka Kovac
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/11	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Carbon (DOC)	TECH	9583887	N/A	2019/09/11	Kayla Ghanem
Fluoride	AT	9584013	N/A	2019/09/11	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9583742	N/A	2019/09/11	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9583182	N/A	2019/09/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/16	Automated Statchk



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BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6348
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9585983	N/A	2019/09/13	Vanessa Chan
Ammonia-N (Total)	KONE	9587031	N/A	2019/09/13	Fadia Mostafa
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal
Total Sulphide	SPEC	9586990	N/A	2019/09/13	Haydee Estilong

BV Labs ID: WL6348 Dup
Sample ID: TRIAL #8
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585956	N/A	2019/09/12	Vanessa Chan
Ammonia-N (Total)	KONE	9587031	N/A	2019/09/13	Fadia Mostafa
Orthophosphate by Konelab	KONE	9585631	N/A	2019/09/12	Zafar Iqbal



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	11.3°C
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Sample WL6342, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample WL6345, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample WL6346, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.



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VERITAS

BV Labs Job #: B975888

Report Date: 2019/09/18

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9583742	HCl Preserved Iron (Fe+2 Ferrous)	2019/09/11	96	80 - 120	98	90 - 110	<0.050	mg/L	12	20
9583887	Dissolved Organic Carbon (C)	2019/09/11	96	80 - 120	91	80 - 120	<0.50	mg/L	5.2	20
9583915	Dissolved Chloride (Cl)	2019/09/11	108	80 - 120	103	80 - 120	<1.0	mg/L	14	20
9583915	Dissolved Sulphate (SO4)	2019/09/11	NC	80 - 120	97	80 - 120	<1.0	mg/L	1.8	20
9584004	Alkalinity (PP as CaCO3)	2019/09/11					<1.0	mg/L	6.7	20
9584004	Alkalinity (Total as CaCO3)	2019/09/11			92	80 - 120	<1.0	mg/L	0.091	20
9584004	Bicarbonate (HCO3)	2019/09/11					<1.0	mg/L	0.37	20
9584004	Carbonate (CO3)	2019/09/11					<1.0	mg/L	6.7	20
9584004	Hydroxide (OH)	2019/09/11					<1.0	mg/L	NC	20
9584008	pH	2019/09/11			100	97 - 103			0.059	N/A
9584013	Dissolved Fluoride (F)	2019/09/11	103	80 - 120	100	80 - 120	<0.050	mg/L	0	20
9584178	Dissolved Nitrate (N)	2019/09/12	101	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
9584178	Dissolved Nitrite (N)	2019/09/12	99	80 - 120	104	80 - 120	<0.010	mg/L	NC	20
9584230	Dissolved Chloride (Cl)	2019/09/12	NC	80 - 120	103	80 - 120	<1.0	mg/L	2.9	20
9584230	Dissolved Sulphate (SO4)	2019/09/12	NC	80 - 120	101	80 - 120	<1.0	mg/L	3.3	20
9585591	Acidity (pH 4.5)	2019/09/12					<1.0	mg/L	NC	20
9585591	Acidity (pH 8.3)	2019/09/12			94	80 - 120	<1.0	mg/L	12	20
9585631	Orthophosphate (P)	2019/09/12	100	80 - 120	100	80 - 120	<0.0030	mg/L	NC	20
9585956	Dissolved Aluminum (Al)	2019/09/12	100	80 - 120	103	80 - 120	<0.00050	mg/L	10	20
9585956	Dissolved Antimony (Sb)	2019/09/12	103	80 - 120	103	80 - 120	<0.000020	mg/L	3.1	20
9585956	Dissolved Arsenic (As)	2019/09/12	107	80 - 120	104	80 - 120	<0.000020	mg/L	6.2	20
9585956	Dissolved Barium (Ba)	2019/09/12	NC	80 - 120	105	80 - 120	<0.000020	mg/L	2.7	20
9585956	Dissolved Beryllium (Be)	2019/09/12	98	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
9585956	Dissolved Bismuth (Bi)	2019/09/12	99	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9585956	Dissolved Boron (B)	2019/09/12	101	80 - 120	106	80 - 120	<0.010	mg/L	2.7	20
9585956	Dissolved Cadmium (Cd)	2019/09/12	102	80 - 120	105	80 - 120	<0.0000050	mg/L	2.4	20
9585956	Dissolved Chromium (Cr)	2019/09/12	101	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9585956	Dissolved Cobalt (Co)	2019/09/12	99	80 - 120	103	80 - 120	<0.0000050	mg/L	1.4	20
9585956	Dissolved Copper (Cu)	2019/09/12	95	80 - 120	101	80 - 120	<0.000050	mg/L	1.2	20
9585956	Dissolved Iron (Fe)	2019/09/12	101	80 - 120	107	80 - 120	<0.0010	mg/L	NC	20
9585956	Dissolved Lead (Pb)	2019/09/12	100	80 - 120	105	80 - 120	<0.0000050	mg/L	4.3	20
9585956	Dissolved Lithium (Li)	2019/09/12	96	80 - 120	100	80 - 120	<0.00050	mg/L	1.9	20



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BV Labs Job #: B975888

Report Date: 2019/09/18

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9585956	Dissolved Manganese (Mn)	2019/09/12	100	80 - 120	103	80 - 120	<0.000050	mg/L	0.53	20
9585956	Dissolved Molybdenum (Mo)	2019/09/12	109	80 - 120	105	80 - 120	<0.000050	mg/L	2.8	20
9585956	Dissolved Nickel (Ni)	2019/09/12	97	80 - 120	103	80 - 120	<0.000020	mg/L	0.99	20
9585956	Dissolved Selenium (Se)	2019/09/12	110	80 - 120	108	80 - 120	<0.000040	mg/L	3.9	20
9585956	Dissolved Silicon (Si)	2019/09/12	100	80 - 120	101	80 - 120	<0.050	mg/L	6.2	20
9585956	Dissolved Silver (Ag)	2019/09/12	100	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9585956	Dissolved Strontium (Sr)	2019/09/12	NC	80 - 120	101	80 - 120	<0.000050	mg/L	1.4	20
9585956	Dissolved Thallium (Tl)	2019/09/12	101	80 - 120	104	80 - 120	<0.0000020	mg/L	3.0	20
9585956	Dissolved Tin (Sn)	2019/09/12	103	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9585956	Dissolved Titanium (Ti)	2019/09/12	99	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9585956	Dissolved Uranium (U)	2019/09/12	105	80 - 120	105	80 - 120	<0.0000020	mg/L	3.5	20
9585956	Dissolved Vanadium (V)	2019/09/12	102	80 - 120	101	80 - 120	<0.00020	mg/L	0.80	20
9585956	Dissolved Zinc (Zn)	2019/09/12	98	80 - 120	105	80 - 120	<0.00010	mg/L	2.5	20
9585956	Dissolved Zirconium (Zr)	2019/09/12	107	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9585983	Total Aluminum (Al)	2019/09/13	101	80 - 120	103	80 - 120	<0.00050	mg/L	0.46	20
9585983	Total Antimony (Sb)	2019/09/13	NC	80 - 120	101	80 - 120	<0.000020	mg/L	1.1	20
9585983	Total Arsenic (As)	2019/09/13	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.85	20
9585983	Total Barium (Ba)	2019/09/13	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.75	20
9585983	Total Beryllium (Be)	2019/09/13	92	80 - 120	96	80 - 120	<0.000010	mg/L	NC	20
9585983	Total Bismuth (Bi)	2019/09/13	97	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9585983	Total Boron (B)	2019/09/13	96	80 - 120	99	80 - 120	<0.010	mg/L	0.38	20
9585983	Total Cadmium (Cd)	2019/09/13	96	80 - 120	101	80 - 120	<0.0000050	mg/L	1.1	20
9585983	Total Chromium (Cr)	2019/09/13	95	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9585983	Total Cobalt (Co)	2019/09/13	92	80 - 120	96	80 - 120	<0.0000050	mg/L	3.3	20
9585983	Total Copper (Cu)	2019/09/13	89	80 - 120	96	80 - 120	<0.000050	mg/L	0.078	20
9585983	Total Iron (Fe)	2019/09/13	95	80 - 120	101	80 - 120	<0.0010	mg/L	0.63	20
9585983	Total Lead (Pb)	2019/09/13	101	80 - 120	105	80 - 120	<0.0000050	mg/L	1.7	20
9585983	Total Lithium (Li)	2019/09/13	94	80 - 120	99	80 - 120	<0.00050	mg/L	0.083	20
9585983	Total Manganese (Mn)	2019/09/13	NC	80 - 120	99	80 - 120	<0.000050	mg/L	1.3	20
9585983	Total Molybdenum (Mo)	2019/09/13	108	80 - 120	105	80 - 120	<0.000050	mg/L	1.1	20
9585983	Total Nickel (Ni)	2019/09/13	89	80 - 120	97	80 - 120	<0.000020	mg/L	0.95	20
9585983	Total Selenium (Se)	2019/09/13	104	80 - 120	102	80 - 120	<0.000040	mg/L	1.0	20



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BV Labs Job #: B975888

Report Date: 2019/09/18

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9585983	Total Silicon (Si)	2019/09/13	95	80 - 120	102	80 - 120	<0.050	mg/L	0.50	20
9585983	Total Silver (Ag)	2019/09/13	96	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9585983	Total Strontium (Sr)	2019/09/13	NC	80 - 120	104	80 - 120	<0.000050	mg/L	0.64	20
9585983	Total Thallium (Tl)	2019/09/13	100	80 - 120	103	80 - 120	<0.0000020	mg/L	2.1	20
9585983	Total Tin (Sn)	2019/09/13	100	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9585983	Total Titanium (Ti)	2019/09/13	99	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9585983	Total Uranium (U)	2019/09/13	106	80 - 120	104	80 - 120	<0.0000020	mg/L	0.058	20
9585983	Total Vanadium (V)	2019/09/13	98	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9585983	Total Zinc (Zn)	2019/09/13	NC	80 - 120	102	80 - 120	<0.00010	mg/L	0.49	20
9585983	Total Zirconium (Zr)	2019/09/13	110	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
9586395	Total Ammonia (N)	2019/09/12	102	80 - 120	96	80 - 120	<0.015	mg/L	NC	20
9586990	Total Sulphide	2019/09/13	NC	80 - 120	91	80 - 120	<0.0018	mg/L	9.1	20
9587031	Total Ammonia (N)	2019/09/13	107	80 - 120	109	80 - 120	<0.015	mg/L	1.9	20
9592339	Dissolved Vanadium (V)	2019/09/18			103	80 - 120	<0.00020	mg/L		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).



BUREAU
VERITAS

BV Labs Job #: B975888
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name: BMC MINERALS LTD.	Company Name: ALEXCO ENVIRONMENTAL GROUP	Quotation #: B60751	☒ Regular TAT 5 days (Most analyses)		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS											
Contact Name:	Contact Name: Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:	☐ Rush TAT (Surcharges will be applied)		☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days											
Address: 530-1130 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-02	Site Location: Kudz Ze Kayah		Date Required:											
Vancouver, BC PC: V6E 4A4	Whitehorse, YK PC: V1A 2V3	Site #:	Sampled By:													
Phone:	Phone: (867) 668-6463 vfriesen@contangostrategies.com	Email: agault@alexcoresource.com kpiewcove@contangostrategies.com														
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ CCME (Specify) ☐ Drinking Water	☐ BC CSR Water ☐ Other (Specify) ☐ BC Water Quality	☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485	LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL Y/N Present Intact COOLING MEDIA PRESENT Y/N COMMENTS											
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO ₂ , NO ₃ , SO ₄)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1 Trial #1		09-Sep-19	10:15	Water	X	X	X	X	X	X	X	X	X	X	9	
2 Trial #2		09-Sep-19	10:25	Water	X	X	X	X	X	X	X	X	X	X	9	
3 Trial #3		09-Sep-19	10:50	Water	X	X	X	X	X	X	X	X	X	X	9	
4 Trial #4		09-Sep-19	11:00	Water	X	X	X	X	X	X	X	X	X	X	9	Received in Saskatoon
5 Trial #5		09-Sep-19	13:30	Water	X	X	X	X	X	X	X	X	X	X	9	By: Safiann Maiter
6 Trial #6		09-Sep-19	11:20	Water	X	X	X	X	X	X	X	X	X	X	9	CC 7 SEP 04 2010 17:15
7 Trial #7		09-Sep-19	12:00	Water	X	X	X	X	X	X	X	X	X	X	9	Temp: 8 113 10
8 Trial #8		09-Sep-19	12:35	Water	X	X	X	X	X	X	X	X	X	X	9	
9																
10																
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)									
<i>[Signature]</i>		2019/09/09	13:50	<i>[Signature]</i> TINA WITTUE		2019/09/10	08:00									

09-Sep-19 13:15
Safiann Maiter
B975888
SBZ INS-0168



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08473693

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/10/15
 Report #: R2796498
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B985971

Received: 2019/10/07, 12:53

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	8	N/A	2019/10/09	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	8	N/A	2019/10/13	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	7	N/A	2019/10/09	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	1	N/A	2019/10/10	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Carbon (DOC) (2)	8	N/A	2019/10/11	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	2	N/A	2019/10/09	BBY6SOP-00048	SM 23 4500-F C m
Fluoride - Low Level (1)	6	N/A	2019/10/11	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/10/11	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/10/10	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	8	N/A	2019/10/10	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	8	N/A	2019/10/11	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	8	N/A	2019/10/11	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	8	N/A	2019/10/10	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	8	N/A	2019/10/10	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	8	N/A	2019/10/10	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/10/10	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	8	N/A	2019/10/09	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	8	N/A	2019/10/09	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	8	N/A	2019/10/10	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	8	N/A	2019/10/08	BBY7 WI-00004	SM 23 3030B m
Orthophosphate by Konelab (low level) (1)	8	N/A	2019/10/09	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	8	N/A	2019/10/10	AB SOP-00080	SM 23 4500 S2-A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08473693

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/10/15
Report #: R2796498
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B985971

Received: 2019/10/07, 12:53

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

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RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WQ7941		WQ7942			WQ7943		
Sampling Date		2019/10/07 09:00		2019/10/07 09:55			2019/10/07 10:05		
COC Number		08473693		08473693			08473693		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	RDL	QC Batch	TRIAL #3	RDL	QC Batch
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE	FIELD		ONSITE
Nitrate (N)	mg/L	1.18	9619773	0.531	0.0020	9619773	0.110	0.0020	9619773
Sulphide (as H ₂ S)	mg/L	<0.0020	9619505	<0.0020	0.0020	9619505	<0.0020	0.0020	9619505
Misc. Inorganics									
Fluoride (F)	mg/L	0.690	9622041	0.690	0.010	9622041	0.470	0.010	9625184
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050 (1)	9623869	<0.050 (1)	0.050	9623869	<0.050 (1)	0.050	9623869
Dissolved Organic Carbon (C)	mg/L	3.7	9622557	4.0	0.50	9622557	4.5	0.50	9622557
Acidity (pH 4.5)	mg/L	<1.0	9621380	<1.0	1.0	9621380	<1.0	1.0	9621380
Alkalinity (Total as CaCO ₃)	mg/L	81.1	9626447	93.6	0.50	9626443	102	0.50	9626443
Acidity (pH 8.3)	mg/L	2.1	9621380	9.0	1.0	9621380	4.8	1.0	9621380
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	9626447	<0.50	0.50	9626443	<0.50	0.50	9626443
Bicarbonate (HCO ₃)	mg/L	98.9	9626447	114	0.50	9626443	125	0.50	9626443
Carbonate (CO ₃)	mg/L	<0.50	9626447	<0.50	0.50	9626443	<0.50	0.50	9626443
Hydroxide (OH)	mg/L	<0.50	9626447	<0.50	0.50	9626443	<0.50	0.50	9626443
Anions									
Orthophosphate (P)	mg/L	0.90 (2)	9621943	1.1 (2)	0.010	9621943	0.026	0.0010	9621943
Total Sulphide	mg/L	<0.0018	9623194	<0.0018	0.0018	9623194	<0.0018	0.0018	9623194
Dissolved Chloride (Cl)	mg/L	59	9623006	57	0.50	9623006	57	0.50	9623006
Dissolved Sulphate (SO ₄)	mg/L	260 (2)	9623006	280 (2)	5.0	9623006	200 (2)	5.0	9623006
Nutrients									
Total Ammonia (N)	mg/L	0.074	9622357	0.072	0.0050	9622357	0.030	0.0050	9622357
Nitrate plus Nitrite (N)	mg/L	1.18	9621704	0.531	0.0020	9621704	0.110	0.0020	9621704
Nitrite (N)	mg/L	<0.0020	9621705	<0.0020	0.0020	9621705	<0.0020	0.0020	9621705
RDL = Reportable Detection Limit									
(1) Sample was analyzed after holding time expired.									
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.									



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BV Labs Job #: B985971

Report Date: 2019/10/15

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WQ7944			WQ7945		WQ7946		
Sampling Date		2019/10/07 10:20			2019/10/07 12:30		2019/10/07 10:40		
COC Number		08473693			08473693		08473693		
	UNITS	TRIAL #4	RDL	QC Batch	TRIAL #5	RDL	TRIAL #6	RDL	QC Batch
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		FIELD		ONSITE
Nitrate (N)	mg/L	0.480	0.0020	9619773	<0.0020	0.0020	0.415	0.0020	9619773
Sulphide (as H2S)	mg/L	<0.0020	0.0020	9619505	<0.0020	0.0020	<0.0020	0.0020	9619505
Misc. Inorganics									
Fluoride (F)	mg/L	0.470	0.010	9625184	0.640	0.010	0.640	0.010	9625184
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050 (1)	0.050	9623869	<0.050 (1)	0.050	<0.050 (1)	0.050	9623869
Dissolved Organic Carbon (C)	mg/L	5.6	0.50	9622557	5.4	0.50	3.6	0.50	9622564
Acidity (pH 4.5)	mg/L	<1.0	1.0	9621380	<1.0	1.0	<1.0	1.0	9621380
Alkalinity (Total as CaCO3)	mg/L	137	0.50	9626443	120	0.50	97.0	0.50	9626447
Acidity (pH 8.3)	mg/L	9.2	1.0	9621380	10.1	1.0	4.5	1.0	9621380
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9626443	<0.50	0.50	<0.50	0.50	9626447
Bicarbonate (HCO3)	mg/L	168	0.50	9626443	146	0.50	118	0.50	9626447
Carbonate (CO3)	mg/L	<0.50	0.50	9626443	<0.50	0.50	<0.50	0.50	9626447
Hydroxide (OH)	mg/L	<0.50	0.50	9626443	<0.50	0.50	<0.50	0.50	9626447
Anions									
Orthophosphate (P)	mg/L	0.13	0.0010	9621943	0.59 (2)	0.010	1.0 (2)	0.010	9621943
Total Sulphide	mg/L	<0.0018	0.0018	9623194	<0.0018	0.0018	<0.0018	0.0018	9623194
Dissolved Chloride (Cl)	mg/L	70	0.50	9623006	55	0.50	59	0.50	9623006
Dissolved Sulphate (SO4)	mg/L	180	0.50	9623006	250 (2)	5.0	260 (2)	5.0	9623006
Nutrients									
Total Ammonia (N)	mg/L	0.041	0.0050	9622357	2.7 (2)	0.025	0.056	0.0050	9622357
Nitrate plus Nitrite (N)	mg/L	0.480	0.0020	9621704	<0.0020	0.0020	0.415	0.0020	9621704
Nitrite (N)	mg/L	<0.0020	0.0020	9621705	<0.0020	0.0020	<0.0020	0.0020	9621705
RDL = Reportable Detection Limit									
(1) Sample was analyzed after holding time expired.									
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.									



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WQ7947	WQ7948		
Sampling Date		2019/10/07 11:00	2019/10/07 11:30		
COC Number		08473693	08473693		
	UNITS	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters					
Filter and HNO3 Preservation	N/A	FIELD	FIELD		ONSITE
Nitrate (N)	mg/L	1.16	0.0546	0.0020	9619773
Sulphide (as H2S)	mg/L	<0.0020	<0.0020	0.0020	9619505
Misc. Inorganics					
Fluoride (F)	mg/L	0.490	0.450	0.010	9625184
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050 (1)	<0.050 (1)	0.050	9623869
Dissolved Organic Carbon (C)	mg/L	2.9	3.4	0.50	9622557
Acidity (pH 4.5)	mg/L	<1.0	<1.0	1.0	9621380
Alkalinity (Total as CaCO3)	mg/L	87.6	88.0	0.50	9626447
Acidity (pH 8.3)	mg/L	<1.0	1.9	1.0	9621380
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	9626447
Bicarbonate (HCO3)	mg/L	107	107	0.50	9626447
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	9626447
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9626447
Anions					
Orthophosphate (P)	mg/L	0.0056	0.0019	0.0010	9621943
Total Sulphide	mg/L	<0.0018	<0.0018	0.0018	9623194
Dissolved Chloride (Cl)	mg/L	57	64	0.50	9623006
Dissolved Sulphate (SO4)	mg/L	220 (2)	230 (2)	5.0	9623006
Nutrients					
Total Ammonia (N)	mg/L	0.058	0.057	0.0050	9622357
Nitrate plus Nitrite (N)	mg/L	1.16	0.0546	0.0020	9621704
Nitrite (N)	mg/L	<0.0020	<0.0020	0.0020	9621705
RDL = Reportable Detection Limit					
(1) Sample was analyzed after holding time expired.					
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.					



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BV Labs Job #: B985971
Report Date: 2019/10/15

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ7941	WQ7942	WQ7943	WQ7944	WQ7945		
Sampling Date		2019/10/07 09:00	2019/10/07 09:55	2019/10/07 10:05	2019/10/07 10:20	2019/10/07 12:30		
COC Number		08473693	08473693	08473693	08473693	08473693		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	365	371	343	350	384	0.50	9619073
---	------	-----	-----	-----	-----	-----	------	---------

Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00159	0.00139	0.00118	0.00147	0.00581	0.00050	9621001
Dissolved Antimony (Sb)	mg/L	0.0165	0.00495	0.00158	0.00108	0.0117	0.000020	9621001
Dissolved Arsenic (As)	mg/L	0.0501	0.0475	0.00367	0.00977	0.0452	0.000020	9621001
Dissolved Barium (Ba)	mg/L	0.0762	0.0762	0.136	0.115	0.0521	0.000020	9621001
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9621001
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621001
Dissolved Boron (B)	mg/L	0.037	0.039	0.032	0.033	0.037	0.010	9621001
Dissolved Cadmium (Cd)	mg/L	0.00139	0.000193	0.000198	0.0000297	0.000128	0.0000050	9621001
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9621001
Dissolved Cobalt (Co)	mg/L	0.000306	0.000595	0.000126	0.000135	0.000220	0.0000050	9621001
Dissolved Copper (Cu)	mg/L	0.00467	0.000649	0.00128	0.000460	0.00102	0.000050	9621001
Dissolved Iron (Fe)	mg/L	0.0061	0.0071	0.0107	0.0408	0.0391	0.0010	9621001
Dissolved Lead (Pb)	mg/L	0.0000634	0.0000555	0.0000108	0.0000210	0.00164	0.0000050	9621001
Dissolved Lithium (Li)	mg/L	0.0124	0.0127	0.00822	0.00817	0.0120	0.00050	9621001
Dissolved Manganese (Mn)	mg/L	0.0816	0.182	0.739	1.13	0.106	0.000050	9621001
Dissolved Molybdenum (Mo)	mg/L	0.00222	0.000916	0.00190	0.000762	0.00119	0.000050	9621001
Dissolved Nickel (Ni)	mg/L	0.0105	0.00710	0.00277	0.00178	0.0110	0.000020	9621001
Dissolved Selenium (Se)	mg/L	0.00489	0.00229	0.000959	0.000680	0.00481	0.000040	9621001
Dissolved Silicon (Si)	mg/L	1.07	1.08	2.75	2.92	0.955	0.050	9621001
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621001
Dissolved Strontium (Sr)	mg/L	0.510	0.516	0.478	0.554	0.590	0.000050	9621001
Dissolved Thallium (Tl)	mg/L	0.000261	0.000103	0.0000079	<0.0000020	0.000194	0.0000020	9621001
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9621001
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9621001
Dissolved Uranium (U)	mg/L	0.0302	0.0122	0.00809	0.00406	0.0295	0.0000020	9621001
Dissolved Vanadium (V)	mg/L	0.00033	<0.00020	<0.00020	<0.00020	0.00028	0.00020	9621001
Dissolved Zinc (Zn)	mg/L	0.132	0.0478	0.0253	0.00945	0.129	0.00010	9621001
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00011	0.00014	0.00022	0.00010	9621001
Dissolved Calcium (Ca)	mg/L	116	119	111	113	124	0.050	9619074
Dissolved Magnesium (Mg)	mg/L	18.1	18.3	16.1	16.4	17.9	0.050	9619074

RDL = Reportable Detection Limit



BUREAU
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BV Labs Job #: B985971
Report Date: 2019/10/15

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ7941	WQ7942	WQ7943	WQ7944	WQ7945		
Sampling Date		2019/10/07 09:00	2019/10/07 09:55	2019/10/07 10:05	2019/10/07 10:20	2019/10/07 12:30		
COC Number		08473693	08473693	08473693	08473693	08473693		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.64	7.44	6.82	7.04	6.73	0.050	9619074
Dissolved Sodium (Na)	mg/L	26.0	26.7	25.0	25.6	26.2	0.050	9619074
Dissolved Sulphur (S)	mg/L	79.9	83.3	67.0	61.9	82.2	3.0	9619074
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B985971
Report Date: 2019/10/15ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WQ7946	WQ7947	WQ7948		
Sampling Date		2019/10/07 10:40	2019/10/07 11:00	2019/10/07 11:30		
COC Number		08473693	08473693	08473693		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	359	366	343	0.50	9619073
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00090	0.00321	0.00080	0.00050	9621001
Dissolved Antimony (Sb)	mg/L	0.0664	0.0246	0.00332	0.000020	9621001
Dissolved Arsenic (As)	mg/L	0.271	0.0182	0.00168	0.000020	9621001
Dissolved Barium (Ba)	mg/L	0.0730	0.0934	0.149	0.000020	9621001
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9621001
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621001
Dissolved Boron (B)	mg/L	0.037	0.038	0.031	0.010	9621001
Dissolved Cadmium (Cd)	mg/L	0.00624	0.00246	0.000414	0.0000050	9621001
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9621001
Dissolved Cobalt (Co)	mg/L	0.00697	0.000263	0.0000369	0.0000050	9621001
Dissolved Copper (Cu)	mg/L	0.0119	0.00498	0.00341	0.000050	9621001
Dissolved Iron (Fe)	mg/L	0.0022	<0.0010	<0.0010	0.0010	9621001
Dissolved Lead (Pb)	mg/L	0.00112	0.00162	0.0000145	0.0000050	9621001
Dissolved Lithium (Li)	mg/L	0.0124	0.0136	0.00772	0.00050	9621001
Dissolved Manganese (Mn)	mg/L	0.162	0.0336	0.0148	0.000050	9621001
Dissolved Molybdenum (Mo)	mg/L	0.00135	0.00177	0.00178	0.000050	9621001
Dissolved Nickel (Ni)	mg/L	0.0387	0.00676	0.000913	0.000020	9621001
Dissolved Selenium (Se)	mg/L	0.0213	0.0118	0.00196	0.000040	9621001
Dissolved Silicon (Si)	mg/L	1.11	0.927	2.46	0.050	9621001
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621001
Dissolved Strontium (Sr)	mg/L	0.564	0.641	0.580	0.000050	9621001
Dissolved Thallium (Tl)	mg/L	0.000392	0.000897	0.0000220	0.0000020	9621001
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9621001
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9621001
Dissolved Uranium (U)	mg/L	0.124	0.0441	0.0137	0.0000020	9621001
Dissolved Vanadium (V)	mg/L	0.00020	<0.00020	<0.00020	0.00020	9621001
Dissolved Zinc (Zn)	mg/L	0.641	0.103	0.0346	0.00010	9621001
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9621001
Dissolved Calcium (Ca)	mg/L	115	116	111	0.050	9619074
Dissolved Magnesium (Mg)	mg/L	17.5	18.6	16.3	0.050	9619074
RDL = Reportable Detection Limit						



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ7946	WQ7947	WQ7948		
Sampling Date		2019/10/07 10:40	2019/10/07 11:00	2019/10/07 11:30		
COC Number		08473693	08473693	08473693		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.15	7.32	5.21	0.050	9619074
Dissolved Sodium (Na)	mg/L	26.6	26.5	25.4	0.050	9619074
Dissolved Sulphur (S)	mg/L	79.2	83.2	76.3	3.0	9619074
RDL = Reportable Detection Limit						



BUREAU
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BV Labs Job #: B985971
Report Date: 2019/10/15

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WQ7941	WQ7942	WQ7943	WQ7944	WQ7945		
Sampling Date		2019/10/07 09:00	2019/10/07 09:55	2019/10/07 10:05	2019/10/07 10:20	2019/10/07 12:30		
COC Number		08473693	08473693	08473693	08473693	08473693		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	361	367	344	344	381	0.50	9619072
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00175	0.00146	0.00102	0.00243	0.00691	0.00050	9621992
Total Antimony (Sb)	mg/L	0.0167	0.00503	0.00154	0.00112	0.0114	0.000020	9621992
Total Arsenic (As)	mg/L	0.0510	0.0468	0.00397	0.0112	0.0451	0.000020	9621992
Total Barium (Ba)	mg/L	0.0745	0.0741	0.135	0.116	0.0508	0.000020	9621992
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9621992
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621992
Total Boron (B)	mg/L	0.037	0.037	0.032	0.033	0.036	0.010	9621992
Total Cadmium (Cd)	mg/L	0.00139	0.000204	0.000215	0.0000317	0.000160	0.0000050	9621992
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9621992
Total Cobalt (Co)	mg/L	0.000342	0.000599	0.000144	0.000160	0.000232	0.0000050	9621992
Total Copper (Cu)	mg/L	0.00478	0.000653	0.00136	0.000484	0.00128	0.000050	9621992
Total Iron (Fe)	mg/L	0.0067	0.0217	0.0743	0.249	0.0798	0.0010	9621992
Total Lead (Pb)	mg/L	0.000144	0.000141	0.0000781	0.000165	0.00243	0.0000050	9621992
Total Lithium (Li)	mg/L	0.0119	0.0117	0.00761	0.00776	0.0112	0.00050	9621992
Total Manganese (Mn)	mg/L	0.0828	0.180	0.772	1.16	0.107	0.000050	9621992
Total Molybdenum (Mo)	mg/L	0.00213	0.000914	0.00188	0.000764	0.00119	0.000050	9621992
Total Nickel (Ni)	mg/L	0.0107	0.00717	0.00292	0.00178	0.0111	0.000020	9621992
Total Selenium (Se)	mg/L	0.00516	0.00232	0.000953	0.000724	0.00483	0.000040	9621992
Total Silicon (Si)	mg/L	1.03	1.02	2.71	2.75	0.910	0.050	9621992
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621992
Total Strontium (Sr)	mg/L	0.477	0.496	0.460	0.535	0.565	0.000050	9621992
Total Thallium (Tl)	mg/L	0.000258	0.0000953	0.0000079	0.0000023	0.000186	0.0000020	9621992
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9621992
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9621992
Total Uranium (U)	mg/L	0.0305	0.0122	0.00815	0.00392	0.0293	0.0000020	9621992
Total Vanadium (V)	mg/L	0.00033	<0.00020	<0.00020	0.00021	0.00027	0.00020	9621992
Total Zinc (Zn)	mg/L	0.135	0.0439	0.0267	0.00819	0.132	0.00010	9621992
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	0.00019	0.00021	0.00010	9621992
Total Calcium (Ca)	mg/L	115	118	111	111	124	0.050	9619769
Total Magnesium (Mg)	mg/L	18.1	17.8	16.5	16.4	17.6	0.050	9619769

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WQ7941	WQ7942	WQ7943	WQ7944	WQ7945		
Sampling Date		2019/10/07 09:00	2019/10/07 09:55	2019/10/07 10:05	2019/10/07 10:20	2019/10/07 12:30		
COC Number		08473693	08473693	08473693	08473693	08473693		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Potassium (K)	mg/L	7.45	7.18	6.96	6.95	6.64	0.050	9619769
Total Sodium (Na)	mg/L	26.4	25.9	25.6	25.5	26.0	0.050	9619769
Total Sulphur (S)	mg/L	82.1	80.0	69.2	59.6	77.1	3.0	9619769

RDL = Reportable Detection Limit

BUREAU
VERITASBV Labs Job #: B985971
Report Date: 2019/10/15ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WQ7946	WQ7947	WQ7948		
Sampling Date		2019/10/07 10:40	2019/10/07 11:00	2019/10/07 11:30		
COC Number		08473693	08473693	08473693		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	365	358	343	0.50	9619072
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00133	0.00358	0.00083	0.00050	9621992
Total Antimony (Sb)	mg/L	0.0667	0.0245	0.00328	0.000020	9621992
Total Arsenic (As)	mg/L	0.276	0.0183	0.00166	0.000020	9621992
Total Barium (Ba)	mg/L	0.0730	0.0911	0.144	0.000020	9621992
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9621992
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621992
Total Boron (B)	mg/L	0.038	0.037	0.031	0.010	9621992
Total Cadmium (Cd)	mg/L	0.00631	0.00248	0.000394	0.0000050	9621992
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9621992
Total Cobalt (Co)	mg/L	0.00716	0.000252	0.0000399	0.0000050	9621992
Total Copper (Cu)	mg/L	0.0125	0.00504	0.00354	0.000050	9621992
Total Iron (Fe)	mg/L	0.0053	<0.0010	0.0017	0.0010	9621992
Total Lead (Pb)	mg/L	0.00145	0.00172	0.0000319	0.0000050	9621992
Total Lithium (Li)	mg/L	0.0122	0.0131	0.00732	0.00050	9621992
Total Manganese (Mn)	mg/L	0.164	0.0334	0.0155	0.000050	9621992
Total Molybdenum (Mo)	mg/L	0.00127	0.00178	0.00173	0.000050	9621992
Total Nickel (Ni)	mg/L	0.0389	0.00696	0.000886	0.000020	9621992
Total Selenium (Se)	mg/L	0.0219	0.0125	0.00200	0.000040	9621992
Total Silicon (Si)	mg/L	1.10	0.890	2.38	0.050	9621992
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000124	0.0000050	9621992
Total Strontium (Sr)	mg/L	0.553	0.620	0.544	0.000050	9621992
Total Thallium (Tl)	mg/L	0.000395	0.000889	0.0000223	0.0000020	9621992
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9621992
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9621992
Total Uranium (U)	mg/L	0.125	0.0417	0.0135	0.0000020	9621992
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9621992
Total Zinc (Zn)	mg/L	0.646	0.104	0.0350	0.00010	9621992
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9621992
Total Calcium (Ca)	mg/L	117	113	110	0.050	9619769
Total Magnesium (Mg)	mg/L	17.7	18.4	16.4	0.050	9619769
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WQ7946	WQ7947	WQ7948		
Sampling Date		2019/10/07 10:40	2019/10/07 11:00	2019/10/07 11:30		
COC Number		08473693	08473693	08473693		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	8.14	7.08	5.18	0.050	9619769
Total Sodium (Na)	mg/L	26.8	26.3	25.4	0.050	9619769
Total Sulphur (S)	mg/L	81.2	79.7	76.5	3.0	9619769
RDL = Reportable Detection Limit						



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BV Labs Job #: B985971
Report Date: 2019/10/15

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.7°C
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Results relate only to the items tested.

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BV Labs Job #: B985971

Report Date: 2019/10/15

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9621001	Dissolved Aluminum (Al)	2019/10/10	98	80 - 120	99	80 - 120	<0.00050	mg/L	10	20
9621001	Dissolved Antimony (Sb)	2019/10/10	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.43	20
9621001	Dissolved Arsenic (As)	2019/10/10	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.88	20
9621001	Dissolved Barium (Ba)	2019/10/10	NC	80 - 120	97	80 - 120	<0.000020	mg/L	1.3	20
9621001	Dissolved Beryllium (Be)	2019/10/10	97	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9621001	Dissolved Bismuth (Bi)	2019/10/10	100	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9621001	Dissolved Boron (B)	2019/10/10	97	80 - 120	101	80 - 120	<0.010	mg/L	0.27	20
9621001	Dissolved Cadmium (Cd)	2019/10/10	100	80 - 120	99	80 - 120	<0.0000050	mg/L	1.8	20
9621001	Dissolved Chromium (Cr)	2019/10/10	95	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9621001	Dissolved Cobalt (Co)	2019/10/10	93	80 - 120	96	80 - 120	<0.0000050	mg/L	0.52	20
9621001	Dissolved Copper (Cu)	2019/10/10	92	80 - 120	97	80 - 120	<0.000050	mg/L	1.8	20
9621001	Dissolved Iron (Fe)	2019/10/10	103	80 - 120	98	80 - 120	<0.0010	mg/L	0.46	20
9621001	Dissolved Lead (Pb)	2019/10/10	103	80 - 120	102	80 - 120	<0.0000050	mg/L	0.47	20
9621001	Dissolved Lithium (Li)	2019/10/10	98	80 - 120	101	80 - 120	<0.00050	mg/L	0.62	20
9621001	Dissolved Manganese (Mn)	2019/10/10	NC	80 - 120	101	80 - 120	<0.000050	mg/L	1.2	20
9621001	Dissolved Molybdenum (Mo)	2019/10/10	104	80 - 120	96	80 - 120	<0.000050	mg/L	0.96	20
9621001	Dissolved Nickel (Ni)	2019/10/10	93	80 - 120	99	80 - 120	<0.000020	mg/L	0.055	20
9621001	Dissolved Selenium (Se)	2019/10/10	102	80 - 120	101	80 - 120	<0.000040	mg/L	1.4	20
9621001	Dissolved Silicon (Si)	2019/10/10	108	80 - 120	99	80 - 120	<0.050	mg/L	1.3	20
9621001	Dissolved Silver (Ag)	2019/10/10	99	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9621001	Dissolved Strontium (Sr)	2019/10/10	NC	80 - 120	96	80 - 120	<0.000050	mg/L	2.2	20
9621001	Dissolved Thallium (Tl)	2019/10/10	101	80 - 120	98	80 - 120	<0.0000020	mg/L	2.0	20
9621001	Dissolved Tin (Sn)	2019/10/10	94	80 - 120	92	80 - 120	<0.00020	mg/L	NC	20
9621001	Dissolved Titanium (Ti)	2019/10/10	104	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9621001	Dissolved Uranium (U)	2019/10/10	106	80 - 120	105	80 - 120	0.0000024, RDL=0.0000020 (1)	mg/L	2.8	20
9621001	Dissolved Vanadium (V)	2019/10/10	100	80 - 120	98	80 - 120	<0.00020	mg/L	5.6	20
9621001	Dissolved Zinc (Zn)	2019/10/10	NC	80 - 120	101	80 - 120	<0.00010	mg/L	1.2	20
9621001	Dissolved Zirconium (Zr)	2019/10/10	105	80 - 120	95	80 - 120	<0.00010	mg/L	NC	20
9621380	Acidity (pH 4.5)	2019/10/09					<1.0	mg/L	NC	20
9621380	Acidity (pH 8.3)	2019/10/09			99	80 - 120	<1.0	mg/L	6.5	20
9621704	Nitrate plus Nitrite (N)	2019/10/09	NC	80 - 120	107	80 - 120	<0.0020	mg/L	1.1	25



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BV Labs Job #: B985971

Report Date: 2019/10/15

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9621705	Nitrite (N)	2019/10/09	NC	80 - 120	96	80 - 120	<0.0020	mg/L	6.0	25
9621943	Orthophosphate (P)	2019/10/09	NC	80 - 120	102	80 - 120	<0.0010	mg/L	2.8	20
9621992	Total Aluminum (Al)	2019/10/10	97	80 - 120	98	80 - 120	<0.00050	mg/L	0.46	20
9621992	Total Antimony (Sb)	2019/10/10	99	80 - 120	97	80 - 120	<0.000020	mg/L	0.95	20
9621992	Total Arsenic (As)	2019/10/10	102	80 - 120	98	80 - 120	<0.000020	mg/L	0.12	20
9621992	Total Barium (Ba)	2019/10/10	NC	80 - 120	96	80 - 120	<0.000020	mg/L	0.80	20
9621992	Total Beryllium (Be)	2019/10/10	95	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9621992	Total Bismuth (Bi)	2019/10/10	96	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9621992	Total Boron (B)	2019/10/10	94	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
9621992	Total Cadmium (Cd)	2019/10/10	97	80 - 120	99	80 - 120	<0.0000050	mg/L	9.3	20
9621992	Total Chromium (Cr)	2019/10/10	95	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9621992	Total Cobalt (Co)	2019/10/10	92	80 - 120	96	80 - 120	<0.0000050	mg/L	0.56	20
9621992	Total Copper (Cu)	2019/10/10	91	80 - 120	98	80 - 120	<0.000050	mg/L	2.2	20
9621992	Total Iron (Fe)	2019/10/10	102	80 - 120	100	80 - 120	<0.0010	mg/L	0.45	20
9621992	Total Lead (Pb)	2019/10/10	100	80 - 120	100	80 - 120	<0.0000050	mg/L	14	20
9621992	Total Lithium (Li)	2019/10/10	91	80 - 120	96	80 - 120	<0.00050	mg/L	0.32	20
9621992	Total Manganese (Mn)	2019/10/10	97	80 - 120	100	80 - 120	<0.000050	mg/L	1.7	20
9621992	Total Molybdenum (Mo)	2019/10/10	103	80 - 120	99	80 - 120	<0.000050	mg/L	0	20
9621992	Total Nickel (Ni)	2019/10/10	93	80 - 120	100	80 - 120	<0.000020	mg/L	3.4	20
9621992	Total Selenium (Se)	2019/10/10	104	80 - 120	100	80 - 120	<0.000040	mg/L	2.9	20
9621992	Total Silicon (Si)	2019/10/10	105	80 - 120	99	80 - 120	<0.050	mg/L	0.20	20
9621992	Total Silver (Ag)	2019/10/10	95	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9621992	Total Strontium (Sr)	2019/10/10	NC	80 - 120	94	80 - 120	<0.000050	mg/L	0.98	20
9621992	Total Thallium (Tl)	2019/10/10	97	80 - 120	97	80 - 120	<0.0000020	mg/L	NC	20
9621992	Total Tin (Sn)	2019/10/10	93	80 - 120	92	80 - 120	<0.00020	mg/L	NC	20
9621992	Total Titanium (Ti)	2019/10/10	101	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9621992	Total Uranium (U)	2019/10/10	102	80 - 120	99	80 - 120	0.0000028, RDL=0.0000020 (1)	mg/L	1.7	20
9621992	Total Vanadium (V)	2019/10/10	100	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9621992	Total Zinc (Zn)	2019/10/10	93	80 - 120	101	80 - 120	<0.00010	mg/L	1.5	20
9621992	Total Zirconium (Zr)	2019/10/10	102	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9622041	Fluoride (F)	2019/10/09	104	80 - 120	102	80 - 120	<0.010	mg/L	1.2	20



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VERITAS

BV Labs Job #: B985971

Report Date: 2019/10/15

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9622357	Total Ammonia (N)	2019/10/10	105	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
9622557	Dissolved Organic Carbon (C)	2019/10/11	115	80 - 120	109	80 - 120	<0.50	mg/L	0.90	20
9622564	Dissolved Organic Carbon (C)	2019/10/11	101	80 - 120	102	80 - 120	<0.50	mg/L	4.4	20
9623006	Dissolved Chloride (Cl)	2019/10/09			104	80 - 120	<0.50	mg/L		
9623006	Dissolved Sulphate (SO4)	2019/10/09			104	80 - 120	<0.50	mg/L		
9623194	Total Sulphide	2019/10/10	100	80 - 120	105	80 - 120	<0.0018	mg/L	19	20
9623869	HCl Preserved Iron (Fe+2 Ferrous)	2019/10/11	99	80 - 120	97	90 - 110	<0.050	mg/L	NC	20
9625184	Fluoride (F)	2019/10/11	94	80 - 120	100	80 - 120	<0.010	mg/L	0	20
9626443	Alkalinity (PP as CaCO3)	2019/10/13					<0.50	mg/L	NC	20
9626443	Alkalinity (Total as CaCO3)	2019/10/13	NC	80 - 120	97	80 - 120	<0.50	mg/L	1.2	20
9626443	Bicarbonate (HCO3)	2019/10/13					<0.50	mg/L	1.2	20
9626443	Carbonate (CO3)	2019/10/13					<0.50	mg/L	NC	20
9626443	Hydroxide (OH)	2019/10/13					<0.50	mg/L	NC	20
9626447	Alkalinity (PP as CaCO3)	2019/10/13					<0.50	mg/L		
9626447	Alkalinity (Total as CaCO3)	2019/10/13			102	80 - 120	<0.50	mg/L		
9626447	Bicarbonate (HCO3)	2019/10/13					<0.50	mg/L		
9626447	Carbonate (CO3)	2019/10/13					<0.50	mg/L		
9626447	Hydroxide (OH)	2019/10/13					<0.50	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for U- 2X RDL acceptable for low level metals determination.



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BV Labs Job #: B985971
Report Date: 2019/10/15

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required											
Company Name: BMC MINERALS LTD.	Company Name: ALEXCO ENVIRONMENTAL GROUP	Quotation #: B60751	☒ Regular TAT 5 days (Most analyses)		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS												
Contact Name:	Contact Name: Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:	☐ Same Day ☐ 2 Days		☐ 1 Day ☐ 3 Days												
Address: 530-1130 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-02	Rush TAT (Surcharges will be applied)		Date Required:												
Vancouver, BC PC: V6E 4A4	Whitehorse, YK PC: V1A 2V3	Site Location: Kudz Ze Kayah	☐ Same Day ☐ 2 Days		☐ 1 Day ☐ 3 Days												
Phone:	Phone: (867) 668-6463	Site #:	Date Required:		Rush Confirmation #:												
Email:	Email: agault@alexcoresource.com	Sampled By:	Date Required:		Rush Confirmation #:												
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:											
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL COOLER TEMPERATURES COOLING MEDIA PRESENT											
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																	
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1 Trial #1		07-Oct-19	9:00	Water	X	X	X	X	X	X	X	X	X	X	9		
2 Trial #2		07-Oct-19	9:55	Water	X	X	X	X	X	X	X	X	X	X	9		
3 Trial #3		07-Oct-19	10:05	Water	X	X	X	X	X	X	X	X	X	X	9		
4 Trial #4		07-Oct-19	10:20	Water	X	X	X	X	X	X	X	X	X	X	9		
5 Trial #5		07-Oct-19	12:30 PM	Water	X	X	X	X	X	X	X	X	X	X	9		
6 Trial #6		07-Oct-19	10:40	Water	X	X	X	X	X	X	X	X	X	X	9		
7 Trial #7		07-Oct-19	11:00	Water	X	X	X	X	X	X	X	X	X	X	9		
8 Trial #8		07-Oct-19	11:30	Water	X	X	X	X	X	X	X	X	X	X	9		
9																	
10																	

REUNQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
<i>[Signature]</i>	2019/10/07		<i>[Signature]</i>	2019/10/08	8:20



B985971_COC

Temp: 17, 11, 10



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08474439

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/11/13
 Report #: R2809827
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B995324

Received: 2019/11/04, 12:50

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	8	N/A	2019/11/06	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	8	N/A	2019/11/06	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	7	N/A	2019/11/06	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Low level chloride/sulphate by AC (1)	1	N/A	2019/11/07	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	8	N/A	2019/11/07	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	8	N/A	2019/11/08	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/11/08	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/11/08	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	8	N/A	2019/11/07	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	8	N/A	2019/11/07	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	1	N/A	2019/11/08	BBY WI-00033	Auto Calc
Ion Balance (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Ion Balance (1)	1	N/A	2019/11/08	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	8	N/A	2019/11/07	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	8	N/A	2019/11/07	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	8	N/A	2019/11/06	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	8	N/A	2019/11/07	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	8	N/A	2019/11/07	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/11/08	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	8	N/A	2019/11/06	BBY6SOP-00010	SM 23 4500-NO ₃ -I m
Nitrite (N) (low level) (1)	8	N/A	2019/11/06	BBY6SOP-00010	SM 23 4500-NO ₃ -I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	8	N/A	2019/11/07	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	8	N/A	2019/11/05	BBY7 WI-00004	SM 23 3030B m
Orthophosphate by Konelab (low level) (1)	8	N/A	2019/11/05	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	8	N/A	2019/11/08	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08474439

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/11/13
Report #: R2809827
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B995324

Received: 2019/11/04, 12:50

by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WW2042	WW2043		WW2044		WW2045		
Sampling Date		2019/11/04 10:10	2019/11/04 10:30		2019/11/04 10:45		2019/11/04 11:00		
COC Number		08474439	08474439		08474439		08474439		
	UNITS	TRIAL #1	TRIAL #2	RDL	TRIAL #3	RDL	TRIAL #4	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.8	8.7	N/A	8.2	N/A	8.4	N/A	9659832
Cation Sum	meq/L	8.6	8.8	N/A	8.2	N/A	8.3	N/A	9659832
Filter and HNO3 Preservation	N/A	FIELD	FIELD		FIELD		FIELD		ONSITE
Ion Balance	N/A	0.98	1.0	0.010	1.0	0.010	0.98	0.010	9659830
Ion Balance (% Difference)	%	0.88	0.86	N/A	0.23	N/A	0.83	N/A	9659831
Nitrate (N)	mg/L	1.21	0.568	0.0020	0.0765	0.0020	0.284	0.0020	9658489
Sulphide (as H ₂ S)	mg/L	<0.0020	<0.0020	0.0020	<0.0020	0.0020	<0.0020	0.0020	9657275
Misc. Inorganics									
Fluoride (F)	mg/L	0.650	0.660	0.010	0.520	0.010	0.510	0.010	9663658
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.059	0.050	<0.050	0.050	0.059	0.050	9664141
Dissolved Organic Carbon (C)	mg/L	2.8	3.3	0.50	3.9	0.50	4.4	0.50	9661902
Acidity (pH 4.5)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9661454
Alkalinity (Total as CaCO ₃)	mg/L	80.7	96.0	0.50	100	0.50	136	0.50	9660669
Acidity (pH 8.3)	mg/L	4.2	13.1	1.0	8.0	1.0	9.2	1.0	9661454
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9660669
Bicarbonate (HCO ₃)	mg/L	98.5	117	0.50	122	0.50	166	0.50	9660669
Carbonate (CO ₃)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9660669
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9660669
Anions									
Orthophosphate (P)	mg/L	0.88 (1)	1.1 (1)	0.010	0.024	0.0010	0.092	0.0010	9661134
Total Sulphide	mg/L	<0.0018	<0.0018	0.0018	<0.0018	0.0018	<0.0018	0.0018	9663378
Dissolved Chloride (Cl)	mg/L	60	61	0.50	60	0.50	62	0.50	9660811
Dissolved Sulphate (SO ₄)	mg/L	250	240	5.0	220	5.0	190	0.50	9660811
Nutrients									
Total Ammonia (N)	mg/L	0.058	0.055	0.0050	0.053	0.0050	0.055	0.0050	9663092
Nitrate plus Nitrite (N)	mg/L	1.21	0.568	0.0020	0.0765	0.0020	0.286	0.0020	9660906
Nitrite (N)	mg/L	<0.0020	<0.0020	0.0020	<0.0020	0.0020	0.0020	0.0020	9660907
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WW2046		WW2047		WW2048	WW2049		
Sampling Date		2019/11/04 12:30		2019/11/04 11:15		2019/11/04 11:30	2019/11/04 11:35		
COC Number		08474439		08474439		08474439	08474439		
	UNITS	TRIAL #5	RDL	TRIAL #6	RDL	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	9.1	N/A	8.8	N/A	8.3	8.2	N/A	9659832
Cation Sum	meq/L	9.3	N/A	8.6	N/A	8.7	8.2	N/A	9659832
Filter and HNO3 Preservation	N/A	FIELD		FIELD		FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	0.98	0.010	1.0	1.0	0.010	9659830
Ion Balance (% Difference)	%	1.3	N/A	0.86	N/A	2.4	0.51	N/A	9659831
Nitrate (N)	mg/L	<0.0020	0.0020	0.420	0.0020	1.20	0.0405	0.0020	9658489
Sulphide (as H ₂ S)	mg/L	<0.0020	0.0020	<0.0020	0.0020	<0.0020	<0.0020	0.0020	9657275
Misc. Inorganics									
Fluoride (F)	mg/L	0.700	0.010	0.700	0.010	0.670	0.480	0.010	9663658
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.083	0.050	<0.050	0.050	<0.050	<0.050	0.050	9664141
Dissolved Organic Carbon (C)	mg/L	5.1	0.50	3.2	0.50	2.2	2.8	0.50	9661902
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	9661454
Alkalinity (Total as CaCO ₃)	mg/L	123	0.50	96.2	0.50	86.6	84.9	0.50	9660669
Acidity (pH 8.3)	mg/L	10.7	1.0	7.8	1.0	2.3	3.8	1.0	9661454
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9660669
Bicarbonate (HCO ₃)	mg/L	149	0.50	117	0.50	106	104	0.50	9660669
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9660669
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9660669
Anions									
Orthophosphate (P)	mg/L	0.65 (1)	0.010	1.0 (1)	0.010	0.0049	<0.0010	0.0010	9661134
Total Sulphide	mg/L	<0.0018	0.0018	<0.0018	0.0018	<0.0018	<0.0018	0.0018	9663378
Dissolved Chloride (Cl)	mg/L	59	0.50	61	0.50	61	62	0.50	9660811
Dissolved Sulphate (SO ₄)	mg/L	240	5.0	240	5.0	230	230	5.0	9660811
Nutrients									
Total Ammonia (N)	mg/L	3.0 (1)	0.025	0.029	0.0050	0.023	0.035	0.0050	9663092
Nitrate plus Nitrite (N)	mg/L	0.0271	0.0020	0.420	0.0020	1.20	0.0405	0.0020	9660906
Nitrite (N)	mg/L	0.0297	0.0020	<0.0020	0.0020	<0.0020	<0.0020	0.0020	9660907
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



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BV Labs Job #: B995324
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW2042	WW2043	WW2044	WW2045	WW2046		
Sampling Date		2019/11/04 10:10	2019/11/04 10:30	2019/11/04 10:45	2019/11/04 11:00	2019/11/04 12:30		
COC Number		08474439	08474439	08474439	08474439	08474439		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	363	374	346	347	390	0.50	9657370
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00235	0.00094	0.00092	0.00107	0.00523	0.00050	9660184
Dissolved Antimony (Sb)	mg/L	0.0204	0.00709	0.00144	0.00103	0.0138	0.000020	9660184
Dissolved Arsenic (As)	mg/L	0.0518	0.0486	0.00307	0.00703	0.0478	0.000020	9660184
Dissolved Barium (Ba)	mg/L	0.0811	0.0792	0.139	0.114	0.0526	0.000020	9660184
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9660184
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660184
Dissolved Boron (B)	mg/L	0.036	0.035	0.030	0.032	0.035	0.010	9660184
Dissolved Cadmium (Cd)	mg/L	0.00168	0.000467	0.000257	0.0000394	0.000514	0.0000050	9660184
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00023	<0.00010	0.00010	9660184
Dissolved Cobalt (Co)	mg/L	0.000349	0.000529	0.000158	0.000125	0.000103	0.0000050	9660184
Dissolved Copper (Cu)	mg/L	0.00572	0.00106	0.00148	0.000581	0.00158	0.000050	9660184
Dissolved Iron (Fe)	mg/L	0.0023	0.0057	0.0068	0.0157	0.0285	0.0010	9660184
Dissolved Lead (Pb)	mg/L	0.0000560	0.0000355	<0.0000050	<0.0000050	0.00134	0.0000050	9660184
Dissolved Lithium (Li)	mg/L	0.0123	0.0120	0.00790	0.00796	0.0119	0.00050	9660184
Dissolved Manganese (Mn)	mg/L	0.0749	0.171	0.707	0.978	0.0190	0.000050	9660184
Dissolved Molybdenum (Mo)	mg/L	0.00230	0.00102	0.00210	0.000799	0.00132	0.000050	9660184
Dissolved Nickel (Ni)	mg/L	0.0120	0.00803	0.00290	0.00180	0.0117	0.000020	9660184
Dissolved Selenium (Se)	mg/L	0.00625	0.00291	0.00110	0.000756	0.00635	0.000040	9660184
Dissolved Silicon (Si)	mg/L	1.07	1.02	2.77	2.85	0.942	0.050	9660184
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660184
Dissolved Strontium (Sr)	mg/L	0.514	0.522	0.472	0.542	0.582	0.000050	9660184
Dissolved Thallium (Tl)	mg/L	0.000356	0.000163	0.0000101	0.0000026	0.000256	0.0000020	9660184
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9660184
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9660184
Dissolved Uranium (U)	mg/L	0.0331	0.0155	0.00801	0.00436	0.0307	0.0000020	9660184
Dissolved Vanadium (V)	mg/L	0.00030	<0.00020	<0.00020	<0.00020	0.00022	0.00020	9660184
Dissolved Zinc (Zn)	mg/L	0.163	0.0757	0.0280	0.00990	0.202	0.00010	9660184
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	0.00018	0.00010	9660184
Dissolved Calcium (Ca)	mg/L	115	120	112	112	127	0.050	9657371
Dissolved Magnesium (Mg)	mg/L	18.1	17.9	16.2	16.4	17.9	0.050	9657371

RDL = Reportable Detection Limit



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BV Labs Job #: B995324
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW2042	WW2043	WW2044	WW2045	WW2046		
Sampling Date		2019/11/04 10:10	2019/11/04 10:30	2019/11/04 10:45	2019/11/04 11:00	2019/11/04 12:30		
COC Number		08474439	08474439	08474439	08474439	08474439		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.80	7.34	6.97	7.10	6.76	0.050	9657371
Dissolved Sodium (Na)	mg/L	26.0	26.1	25.3	25.6	25.9	0.050	9657371
Dissolved Sulphur (S)	mg/L	87.3	83.4	72.9	63.8	84.4	3.0	9657371
RDL = Reportable Detection Limit								



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BV Labs Job #: B995324
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW2047	WW2048	WW2049		
Sampling Date		2019/11/04 11:15	2019/11/04 11:30	2019/11/04 11:35		
COC Number		08474439	08474439	08474439		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	364	366	349	0.50	9657370
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00142	0.00374	0.00145	0.00050	9660184
Dissolved Antimony (Sb)	mg/L	0.0857	0.0239	0.00290	0.000020	9660184
Dissolved Arsenic (As)	mg/L	0.286	0.0168	0.00160	0.000020	9660184
Dissolved Barium (Ba)	mg/L	0.0784	0.0922	0.148	0.000020	9660184
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9660184
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660184
Dissolved Boron (B)	mg/L	0.036	0.034	0.029	0.010	9660184
Dissolved Cadmium (Cd)	mg/L	0.00794	0.00242	0.000537	0.0000050	9660184
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9660184
Dissolved Cobalt (Co)	mg/L	0.00812	0.000217	0.0000349	0.0000050	9660184
Dissolved Copper (Cu)	mg/L	0.0150	0.00484	0.00360	0.000050	9660184
Dissolved Iron (Fe)	mg/L	0.0019	<0.0010	<0.0010	0.0010	9660184
Dissolved Lead (Pb)	mg/L	0.00105	0.00153	0.0000305	0.0000050	9660184
Dissolved Lithium (Li)	mg/L	0.0124	0.0132	0.00739	0.00050	9660184
Dissolved Manganese (Mn)	mg/L	0.167	0.0316	0.0224	0.000050	9660184
Dissolved Molybdenum (Mo)	mg/L	0.00150	0.00180	0.00169	0.000050	9660184
Dissolved Nickel (Ni)	mg/L	0.0424	0.00681	0.00116	0.000020	9660184
Dissolved Selenium (Se)	mg/L	0.0270	0.0116	0.00172	0.000040	9660184
Dissolved Silicon (Si)	mg/L	1.09	0.870	2.41	0.050	9660184
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660184
Dissolved Strontium (Sr)	mg/L	0.573	0.638	0.559	0.000050	9660184
Dissolved Thallium (Tl)	mg/L	0.000532	0.000923	0.0000192	0.0000020	9660184
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9660184
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9660184
Dissolved Uranium (U)	mg/L	0.140	0.0430	0.0127	0.0000020	9660184
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9660184
Dissolved Zinc (Zn)	mg/L	0.801	0.0986	0.0369	0.00010	9660184
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9660184
Dissolved Calcium (Ca)	mg/L	117	116	113	0.050	9657371
Dissolved Magnesium (Mg)	mg/L	17.2	18.6	16.1	0.050	9657371
RDL = Reportable Detection Limit						



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BV Labs Job #: B995324
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW2047	WW2048	WW2049		
Sampling Date		2019/11/04 11:15	2019/11/04 11:30	2019/11/04 11:35		
COC Number		08474439	08474439	08474439		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.15	7.41	5.25	0.050	9657371
Dissolved Sodium (Na)	mg/L	26.0	26.3	25.2	0.050	9657371
Dissolved Sulphur (S)	mg/L	82.6	81.5	76.0	3.0	9657371
RDL = Reportable Detection Limit						



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BV Labs Job #: B995324
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW2042	WW2043	WW2044	WW2045	WW2046		
Sampling Date		2019/11/04 10:10	2019/11/04 10:30	2019/11/04 10:45	2019/11/04 11:00	2019/11/04 12:30		
COC Number		08474439	08474439	08474439	08474439	08474439		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	368	377	348	350	390	0.50	9657992
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00177	0.00139	0.00265	0.00191	0.00645	0.00050	9660945
Total Antimony (Sb)	mg/L	0.0209	0.00733	0.00154	0.00106	0.0138	0.000020	9660945
Total Arsenic (As)	mg/L	0.0526	0.0500	0.00339	0.00824	0.0496	0.000020	9660945
Total Barium (Ba)	mg/L	0.0810	0.0808	0.142	0.121	0.0535	0.000020	9660945
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9660945
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	0.0000050	9660945
Total Boron (B)	mg/L	0.036	0.036	0.030	0.032	0.035	0.010	9660945
Total Cadmium (Cd)	mg/L	0.00171	0.000475	0.000273	0.0000452	0.000537	0.0000050	9660945
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9660945
Total Cobalt (Co)	mg/L	0.000381	0.000574	0.000186	0.000132	0.000118	0.0000050	9660945
Total Copper (Cu)	mg/L	0.00583	0.00119	0.00156	0.000650	0.00181	0.000050	9660945
Total Iron (Fe)	mg/L	0.0033	0.0182	0.0392	0.176	0.0563	0.0010	9660945
Total Lead (Pb)	mg/L	0.0000932	0.000116	0.000106	0.0000954	0.00213	0.0000050	9660945
Total Lithium (Li)	mg/L	0.0123	0.0120	0.00793	0.00805	0.0116	0.00050	9660945
Total Manganese (Mn)	mg/L	0.0759	0.178	0.727	1.00	0.0204	0.000050	9660945
Total Molybdenum (Mo)	mg/L	0.00227	0.00108	0.00213	0.000828	0.00127	0.000050	9660945
Total Nickel (Ni)	mg/L	0.0123	0.00824	0.00297	0.00180	0.0120	0.000020	9660945
Total Selenium (Se)	mg/L	0.00630	0.00306	0.00102	0.000734	0.00651	0.000040	9660945
Total Silicon (Si)	mg/L	1.07	1.02	2.74	2.77	0.912	0.050	9660945
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660945
Total Strontium (Sr)	mg/L	0.517	0.518	0.485	0.555	0.580	0.000050	9660945
Total Thallium (Tl)	mg/L	0.000363	0.000164	0.0000101	0.0000023	0.000261	0.0000020	9660945
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9660945
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9660945
Total Uranium (U)	mg/L	0.0332	0.0155	0.00822	0.00437	0.0314	0.0000020	9660945
Total Vanadium (V)	mg/L	0.00035	<0.00020	<0.00020	<0.00020	0.00023	0.00020	9660945
Total Zinc (Zn)	mg/L	0.163	0.0760	0.0287	0.00981	0.199	0.00010	9660945
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00014	0.00019	0.00010	9660945
Total Calcium (Ca)	mg/L	117	121	112	113	126	0.050	9658771
Total Magnesium (Mg)	mg/L	18.5	18.4	16.9	16.7	18.2	0.050	9658771

RDL = Reportable Detection Limit



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BV Labs Job #: B995324
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW2042	WW2043	WW2044	WW2045	WW2046		
Sampling Date		2019/11/04 10:10	2019/11/04 10:30	2019/11/04 10:45	2019/11/04 11:00	2019/11/04 12:30		
COC Number		08474439	08474439	08474439	08474439	08474439		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Potassium (K)	mg/L	7.82	7.39	7.05	7.16	6.82	0.050	9658771
Total Sodium (Na)	mg/L	26.8	26.9	26.1	26.1	27.0	0.050	9658771
Total Sulphur (S)	mg/L	86.1	80.7	73.0	63.2	84.1	3.0	9658771

RDL = Reportable Detection Limit

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VERITASBV Labs Job #: B995324
Report Date: 2019/11/13ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WW2047	WW2048		WW2049		
Sampling Date		2019/11/04 11:15	2019/11/04 11:30		2019/11/04 11:35		
COC Number		08474439	08474439		08474439		
	UNITS	TRIAL #6	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	374	370	9657992	353	0.50	9658891
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00223	0.00387	9660945	0.00097	0.00050	9660945
Total Antimony (Sb)	mg/L	0.0864	0.0246	9660945	0.00297	0.000020	9660945
Total Arsenic (As)	mg/L	0.293	0.0173	9660945	0.00162	0.000020	9660945
Total Barium (Ba)	mg/L	0.0786	0.0942	9660945	0.149	0.000020	9660945
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	9660945	<0.000010	0.000010	9660945
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9660945	<0.0000050	0.0000050	9660945
Total Boron (B)	mg/L	0.036	0.035	9660945	0.029	0.010	9660945
Total Cadmium (Cd)	mg/L	0.00813	0.00246	9660945	0.000580	0.0000050	9660945
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	9660945	<0.00010	0.00010	9660945
Total Cobalt (Co)	mg/L	0.00838	0.000231	9660945	0.0000393	0.0000050	9660945
Total Copper (Cu)	mg/L	0.0159	0.00504	9660945	0.00369	0.000050	9660945
Total Iron (Fe)	mg/L	0.0101	<0.0010	9660945	0.0016	0.0010	9660945
Total Lead (Pb)	mg/L	0.00166	0.00170	9660945	0.0000255	0.0000050	9660945
Total Lithium (Li)	mg/L	0.0124	0.0134	9660945	0.00729	0.00050	9660945
Total Manganese (Mn)	mg/L	0.177	0.0328	9660945	0.0242	0.000050	9660945
Total Molybdenum (Mo)	mg/L	0.00146	0.00183	9660945	0.00170	0.000050	9660945
Total Nickel (Ni)	mg/L	0.0440	0.00683	9660945	0.00112	0.000020	9660945
Total Selenium (Se)	mg/L	0.0279	0.0125	9660945	0.00171	0.000040	9660945
Total Silicon (Si)	mg/L	1.10	0.887	9660945	2.44	0.050	9660945
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	9660945	<0.0000050	0.0000050	9660945
Total Strontium (Sr)	mg/L	0.582	0.637	9660945	0.559	0.000050	9660945
Total Thallium (Tl)	mg/L	0.000546	0.000940	9660945	0.0000213	0.0000020	9660945
Total Tin (Sn)	mg/L	<0.00020	<0.00020	9660945	<0.00020	0.00020	9660945
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	9660945	<0.00050	0.00050	9660945
Total Uranium (U)	mg/L	0.139	0.0425	9660945	0.0127	0.0000020	9660945
Total Vanadium (V)	mg/L	0.00023	<0.00020	9660945	<0.00020	0.00020	9660945
Total Zinc (Zn)	mg/L	0.833	0.100	9660945	0.0365	0.00010	9660945
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	9660945	<0.00010	0.00010	9660945
Total Calcium (Ca)	mg/L	120	117	9658771	114	0.050	9658771
Total Magnesium (Mg)	mg/L	18.3	19.0	9658771	16.6	0.050	9658771
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW2047	WW2048		WW2049		
Sampling Date		2019/11/04 11:15	2019/11/04 11:30		2019/11/04 11:35		
COC Number		08474439	08474439		08474439		
	UNITS	TRIAL #6	TRIAL #7	QC Batch	TRIAL #8	RDL	QC Batch
Total Potassium (K)	mg/L	8.35	7.45	9658771	5.25	0.050	9658771
Total Sodium (Na)	mg/L	27.2	27.6	9658771	25.7	0.050	9658771
Total Sulphur (S)	mg/L	82.9	82.6	9658771	78.8	3.0	9658771
RDL = Reportable Detection Limit							



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BV Labs Job #: B995324

Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
Package 2	5.0°C

Results relate only to the items tested.

BUREAU
VERITAS

BV Labs Job #: B995324

Report Date: 2019/11/13

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9660184	Dissolved Aluminum (Al)	2019/11/06	100	80 - 120	100	80 - 120	<0.00050	mg/L	9.2	20
9660184	Dissolved Antimony (Sb)	2019/11/06	102	80 - 120	99	80 - 120	<0.000020	mg/L	0.029	20
9660184	Dissolved Arsenic (As)	2019/11/06	112	80 - 120	101	80 - 120	<0.000020	mg/L	1.2	20
9660184	Dissolved Barium (Ba)	2019/11/06	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.086	20
9660184	Dissolved Beryllium (Be)	2019/11/06	97	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9660184	Dissolved Bismuth (Bi)	2019/11/06	99	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9660184	Dissolved Boron (B)	2019/11/06	NC	80 - 120	97	80 - 120	<0.010	mg/L	2.2	20
9660184	Dissolved Cadmium (Cd)	2019/11/06	98	80 - 120	103	80 - 120	<0.0000050	mg/L	0.071	20
9660184	Dissolved Chromium (Cr)	2019/11/06	95	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9660184	Dissolved Cobalt (Co)	2019/11/06	96	80 - 120	104	80 - 120	<0.0000050	mg/L	2.8	20
9660184	Dissolved Copper (Cu)	2019/11/06	87	80 - 120	99	80 - 120	<0.000050	mg/L	0.61	20
9660184	Dissolved Iron (Fe)	2019/11/06	NC	80 - 120	102	80 - 120	<0.0010	mg/L	0.018	20
9660184	Dissolved Lead (Pb)	2019/11/06	103	80 - 120	99	80 - 120	<0.0000050	mg/L	0.71	20
9660184	Dissolved Lithium (Li)	2019/11/06	98	80 - 120	98	80 - 120	<0.00050	mg/L	1.6	20
9660184	Dissolved Manganese (Mn)	2019/11/06	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.92	20
9660184	Dissolved Molybdenum (Mo)	2019/11/06	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.82	20
9660184	Dissolved Nickel (Ni)	2019/11/06	90	80 - 120	103	80 - 120	<0.000020	mg/L	2.1	20
9660184	Dissolved Selenium (Se)	2019/11/06	112	80 - 120	100	80 - 120	<0.000040	mg/L	1.2	20
9660184	Dissolved Silicon (Si)	2019/11/06	NC	80 - 120	99	80 - 120	<0.050	mg/L	0.43	20
9660184	Dissolved Silver (Ag)	2019/11/06	98	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9660184	Dissolved Strontium (Sr)	2019/11/06	NC	80 - 120	98	80 - 120	<0.000050	mg/L	1.2	20
9660184	Dissolved Thallium (Tl)	2019/11/06	104	80 - 120	99	80 - 120	<0.0000020	mg/L	0.45	20
9660184	Dissolved Tin (Sn)	2019/11/06	93	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9660184	Dissolved Titanium (Ti)	2019/11/06	104	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9660184	Dissolved Uranium (U)	2019/11/06	111	80 - 120	100	80 - 120	<0.0000020	mg/L	1.7	20
9660184	Dissolved Vanadium (V)	2019/11/06	99	80 - 120	98	80 - 120	<0.00020	mg/L	1.7	20
9660184	Dissolved Zinc (Zn)	2019/11/06	88	80 - 120	106	80 - 120	<0.00010	mg/L	0.36	20
9660184	Dissolved Zirconium (Zr)	2019/11/06	116	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9660669	Alkalinity (PP as CaCO ₃)	2019/11/06					<0.50	mg/L	NC	20
9660669	Alkalinity (Total as CaCO ₃)	2019/11/06	NC	80 - 120	95	80 - 120	<0.50	mg/L	0.74	20
9660669	Bicarbonate (HCO ₃)	2019/11/06					<0.50	mg/L	0.74	20
9660669	Carbonate (CO ₃)	2019/11/06					<0.50	mg/L	NC	20



BUREAU
VERITAS

BV Labs Job #: B995324

Report Date: 2019/11/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9660669	Hydroxide (OH)	2019/11/06					<0.50	mg/L	NC	20
9660811	Dissolved Chloride (Cl)	2019/11/06	NC	80 - 120	104	80 - 120	<0.50	mg/L	2.3	20
9660811	Dissolved Sulphate (SO4)	2019/11/06	NC	80 - 120	102	80 - 120	0.74, RDL=0.50	mg/L	0.38	20
9660906	Nitrate plus Nitrite (N)	2019/11/06			110	80 - 120	<0.0020	mg/L		
9660907	Nitrite (N)	2019/11/06			106	80 - 120	<0.0020	mg/L		
9660945	Total Aluminum (Al)	2019/11/07	101	80 - 120	102	80 - 120	<0.00050	mg/L	7.4	20
9660945	Total Antimony (Sb)	2019/11/07	NC	80 - 120	102	80 - 120	0.000023, RDL=0.000020 (1)	mg/L	1.3	20
9660945	Total Arsenic (As)	2019/11/07	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.12	20
9660945	Total Barium (Ba)	2019/11/07	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.66	20
9660945	Total Beryllium (Be)	2019/11/07	103	80 - 120	104	80 - 120	<0.000010	mg/L	NC	20
9660945	Total Bismuth (Bi)	2019/11/07	100	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9660945	Total Boron (B)	2019/11/07	97	80 - 120	100	80 - 120	<0.010	mg/L	1.3	20
9660945	Total Cadmium (Cd)	2019/11/07	104	80 - 120	104	80 - 120	<0.0000050	mg/L	0.0058	20
9660945	Total Chromium (Cr)	2019/11/07	101	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9660945	Total Cobalt (Co)	2019/11/07	103	80 - 120	104	80 - 120	<0.0000050	mg/L	2.4	20
9660945	Total Copper (Cu)	2019/11/07	95	80 - 120	101	80 - 120	<0.000050	mg/L	0.52	20
9660945	Total Iron (Fe)	2019/11/07	105	80 - 120	104	80 - 120	<0.0010	mg/L	3.2	20
9660945	Total Lead (Pb)	2019/11/07	104	80 - 120	104	80 - 120	<0.0000050	mg/L	3.2	20
9660945	Total Lithium (Li)	2019/11/07	99	80 - 120	101	80 - 120	<0.00050	mg/L	3.0	20
9660945	Total Manganese (Mn)	2019/11/07	NC	80 - 120	105	80 - 120	<0.000050	mg/L	0.62	20
9660945	Total Molybdenum (Mo)	2019/11/07	110	80 - 120	101	80 - 120	<0.000050	mg/L	0.36	20
9660945	Total Nickel (Ni)	2019/11/07	100	80 - 120	106	80 - 120	<0.000020	mg/L	0.30	20
9660945	Total Selenium (Se)	2019/11/07	107	80 - 120	102	80 - 120	<0.000040	mg/L	0.59	20
9660945	Total Silicon (Si)	2019/11/07	99	80 - 120	94	80 - 120	<0.050	mg/L	1.9	20
9660945	Total Silver (Ag)	2019/11/07	104	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9660945	Total Strontium (Sr)	2019/11/07	NC	80 - 120	97	80 - 120	<0.000050	mg/L	1.5	20
9660945	Total Thallium (Tl)	2019/11/07	104	80 - 120	102	80 - 120	<0.0000020	mg/L	1.4	20
9660945	Total Tin (Sn)	2019/11/07	96	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9660945	Total Titanium (Ti)	2019/11/07	104	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9660945	Total Uranium (U)	2019/11/07	106	80 - 120	102	80 - 120	<0.0000020	mg/L	0.63	20
9660945	Total Vanadium (V)	2019/11/07	104	80 - 120	102	80 - 120	<0.00020	mg/L	1.0	20



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VERITAS

BV Labs Job #: B995324

Report Date: 2019/11/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9660945	Total Zinc (Zn)	2019/11/07	NC	80 - 120	106	80 - 120	<0.00010	mg/L	0.68	20
9660945	Total Zirconium (Zr)	2019/11/07	107	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9661134	Orthophosphate (P)	2019/11/05	NC	80 - 120	98	80 - 120	<0.0010	mg/L	2.9	20
9661454	Acidity (pH 4.5)	2019/11/06					<1.0	mg/L	NC	20
9661454	Acidity (pH 8.3)	2019/11/06			98	80 - 120	<1.0	mg/L	NC	20
9661902	Dissolved Organic Carbon (C)	2019/11/07	99	80 - 120	96	80 - 120	<0.50	mg/L	0.49	20
9663092	Total Ammonia (N)	2019/11/08	99	80 - 120	106	80 - 120	<0.0050	mg/L	5.2	20
9663378	Total Sulphide	2019/11/08	97	80 - 120	85	80 - 120	<0.0018	mg/L	NC	20
9663658	Fluoride (F)	2019/11/08	NC	80 - 120	96	80 - 120	<0.010	mg/L	5.5	20
9664141	HCl Preserved Iron (Fe+2 Ferrous)	2019/11/08	100	80 - 120	99	90 - 110	<0.050	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for Sb- 2X RDL acceptable for low level metals determination.



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VERITAS

BV Labs Job #: B995324
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required													
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	860751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days													
Contact Name:		Contact Name:	Andrew Gault; Kristen Plecowye	P.O. #/ AFE#:															
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02														
Phone:		Phone:	(867) 668-6463 yfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah														
Email:		Email:	agault@alexcoresource.com kniecowye@contangostrategies.com	Site #:															
				Sampled By:															
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:			
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) <u>USE SCENARIO # 12485</u>		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA												LABORATORY USE ONLY CUSTODY SEAL Y/N COOLER TEMPERATURES PRESENT INTACT COOLING MEDIA PRESENT			
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS		
1 Trial #1		04-Nov-19	10:10	Water	X	X	X	X	X	X	X	X	X	X	9				
2 Trial #2		04-Nov-19	10:30	Water	X	X	X	X	X	X	X	X	X	X	9				
3 Trial #3		04-Nov-19	10:45	Water	X	X	X	X	X	X	X	X	X	X	9				
4 Trial #4		04-Nov-19	11:00	Water	X	X	X	X	X	X	X	X	X	X	9				
5 Trial #5		04-Nov-19	12:30	Water	X	X	X	X	X	X	X	X	X	X	9				
6 Trial #6		04-Nov-19	11:15	Water	X	X	X	X	X	X	X	X	X	X	9				
7 Trial #7		04-Nov-19	11:30	Water	X	X	X	X	X	X	X	X	X	X	9				
8 Trial #8		04-Nov-19	11:35	Water	X	X	X	X	X	X	X	X	X	X	9				
9																			
10																			
REINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)									
<i>[Signature]</i>		2019/11/04		12:58		<i>[Signature]</i>													
						Received in Saskatoon													
						By: <i>[Signature]</i>													
						CS-N													
						NOV 04 2019													
						Tenn: 6, 4, 3													





Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08475612

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/12/10
 Report #: R2821721
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A3658

Received: 2019/12/02, 13:11

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	8	N/A	2019/12/04	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	8	N/A	2019/12/03	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	5	N/A	2019/12/03	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Low level chloride/sulphate by AC (1)	3	N/A	2019/12/04	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	8	N/A	2019/12/06	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	8	N/A	2019/12/05	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	8	N/A	2019/12/04	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	8	N/A	2019/12/06	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	8	N/A	2019/12/05	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	8	N/A	2019/12/04	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	5	N/A	2019/12/04	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	3	N/A	2019/12/05	BBY WI-00033	Auto Calc
Ion Balance (1)	5	N/A	2019/12/04	BBY WI-00033	Auto Calc
Ion Balance (1)	3	N/A	2019/12/05	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	8	N/A	2019/12/04	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	8	N/A	2019/12/04	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	8	N/A	2019/12/03	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	8	N/A	2019/12/05	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	8	N/A	2019/12/05	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/12/05	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	8	N/A	2019/12/03	BBY6SOP-00010	SM 23 4500-NO ₃ -I m
Nitrite (N) (low level) (1)	8	N/A	2019/12/03	BBY6SOP-00010	SM 23 4500-NO ₃ -I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	8	N/A	2019/12/03	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	8	N/A	2019/12/03	BBY7 WI-00004	SM 23 3030B m
Orthophosphate by Konelab (low level) (1)	8	N/A	2019/12/04	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	8	N/A	2019/12/06	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08475612

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/12/10

Report #: R2821721

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A3658

Received: 2019/12/02, 13:11

by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



BUREAU
VERITAS

BV Labs Job #: B9A3658

Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XA9352		XA9353		XA9354	XA9355		
Sampling Date		2019/12/02 10:15		2019/12/02 10:30		2019/12/02 10:50	2019/12/02 11:00		
COC Number		08475612		08475612		08475612	08475612		
	UNITS	TRIAL #1	QC Batch	TRIAL #2	RDL	TRIAL #3	TRIAL #4	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.5	9695040	8.2	N/A	7.7	8.4	N/A	9695040
Cation Sum	meq/L	8.3	9695040	8.5	N/A	7.8	8.0	N/A	9695040
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD		FIELD	FIELD		ONSITE
Ion Balance	N/A	0.98	9695038	1.0	0.010	1.0	0.95	0.010	9695038
Ion Balance (% Difference)	%	0.96	9695039	1.3	N/A	0.93	2.5	N/A	9695039
Nitrate (N)	mg/L	1.22	9695293	0.537	0.0020	0.0934	0.280	0.0020	9695293
Sulphide (as H2S)	mg/L	<0.0020	9695390	<0.0020	0.0020	<0.0020	<0.0020	0.0020	9695390
Misc. Inorganics									
Fluoride (F)	mg/L	0.640	9697810	0.630	0.010	0.500	0.490	0.010	9697810
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	9696967	<0.050	0.050	<0.050	<0.050	0.050	9696967
Dissolved Organic Carbon (C)	mg/L	3.3	9698205	3.3	0.50	3.9	4.9	0.50	9698205
Acidity (pH 4.5)	mg/L	<1.0	9696446	<1.0	1.0	<1.0	<1.0	1.0	9696446
Alkalinity (Total as CaCO3)	mg/L	82.6	9695733	96.0	0.50	102	138	0.50	9695733
Acidity (pH 8.3)	mg/L	1.6	9696446	8.2	1.0	4.3	10.9	1.0	9696446
Alkalinity (PP as CaCO3)	mg/L	<0.50	9695733	<0.50	0.50	<0.50	<0.50	0.50	9695733
Bicarbonate (HCO3)	mg/L	101	9695733	117	0.50	124	169	0.50	9695733
Carbonate (CO3)	mg/L	<0.50	9695733	<0.50	0.50	<0.50	<0.50	0.50	9695733
Hydroxide (OH)	mg/L	<0.50	9695733	<0.50	0.50	<0.50	<0.50	0.50	9695733
Anions									
Orthophosphate (P)	mg/L	0.89 (1)	9697184	1.1 (1)	0.010	0.018	0.076	0.0010	9697184
Total Sulphide	mg/L	<0.0018	9698934	<0.0018	0.0018	<0.0018	<0.0018	0.0018	9698934
Dissolved Chloride (Cl)	mg/L	56	9696901	64	0.50	64	65	0.50	9696901
Dissolved Sulphate (SO4)	mg/L	240 (1)	9696901	210 (1)	5.0	180	180	0.50	9696901
Nutrients									
Total Ammonia (N)	mg/L	0.011	9697894	0.010	0.0050	0.022	0.020	0.0050	9697894
Nitrate plus Nitrite (N)	mg/L	1.22	9695783	0.537	0.0020	0.0934	0.280	0.0020	9695779
Nitrite (N)	mg/L	<0.0020	9695784	<0.0020	0.0020	<0.0020	<0.0020	0.0020	9695780
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



BUREAU
VERITAS

BV Labs Job #: B9A3658

Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XA9356		XA9357		XA9358	XA9359		
Sampling Date		2019/12/02 12:40		2019/12/02 11:10		2019/12/02 11:25	2019/12/02 11:35		
COC Number		08475612		08475612		08475612	08475612		
	UNITS	TRIAL #5	RDL	TRIAL #6	RDL	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	9.2	N/A	8.6	N/A	8.3	7.7	N/A	9695040
Cation Sum	meq/L	8.9	N/A	8.3	N/A	8.2	7.9	N/A	9695040
Filter and HNO3 Preservation	N/A	FIELD		FIELD		FIELD	FIELD		ONSITE
Ion Balance	N/A	0.97	0.010	0.97	0.010	0.99	1.0	0.010	9695038
Ion Balance (% Difference)	%	1.5	N/A	1.8	N/A	0.74	1.3	N/A	9695039
Nitrate (N)	mg/L	0.028	0.020	0.398	0.0020	1.19	0.0445	0.0020	9695293
Sulphide (as H2S)	mg/L	<0.0020	0.0020	<0.0020	0.0020	<0.0020	<0.0020	0.0020	9695390
Misc. Inorganics									
Fluoride (F)	mg/L	1.20	0.010	0.670	0.010	0.640	0.470	0.010	9697810
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	0.050	9696967
Dissolved Organic Carbon (C)	mg/L	4.9	0.50	3.3	0.50	2.5	3.0	0.50	9698205
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	9696446
Alkalinity (Total as CaCO3)	mg/L	116	0.50	98.3	0.50	88.1	85.7	0.50	9695733
Acidity (pH 8.3)	mg/L	10.8	1.0	5.1	1.0	1.2	2.0	1.0	9696446
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9695733
Bicarbonate (HCO3)	mg/L	141	0.50	120	0.50	107	105	0.50	9695733
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9695733
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9695733
Anions									
Orthophosphate (P)	mg/L	0.59 (1)	0.010	1.0 (1)	0.010	0.0057	0.0022	0.0010	9697184
Total Sulphide	mg/L	<0.0018	0.0018	<0.0018	0.0018	<0.0018	<0.0018	0.0018	9698934
Dissolved Chloride (Cl)	mg/L	57	0.50	54	0.50	60	60	0.50	9696901
Dissolved Sulphate (SO4)	mg/L	240 (1)	5.0	240 (1)	5.0	230 (1)	210 (1)	5.0	9696901
Nutrients									
Total Ammonia (N)	mg/L	2.2 (1)	0.025	<0.0050	0.0050	<0.0050	0.010	0.0050	9697894
Nitrate plus Nitrite (N)	mg/L	1.03	0.0020	0.398	0.0020	1.19	0.0445	0.0020	9695779
Nitrite (N)	mg/L	0.998 (2)	0.020	<0.0020	0.0020	<0.0020	<0.0020	0.0020	9695780
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									
(2) RDL raised due to sample matrix interference.									



BUREAU
VERITAS

BV Labs Job #: B9A3658
Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: TW

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9352	XA9353		XA9354		
Sampling Date		2019/12/02 10:15	2019/12/02 10:30		2019/12/02 10:50		
COC Number		08475612	08475612		08475612		
	UNITS	TRIAL #1	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	349	357	9694445	327	0.50	9694445
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00157	0.00093	9695593	0.00064	0.00050	9695593
Dissolved Antimony (Sb)	mg/L	0.0216	0.00727	9695593	0.00133	0.000020	9695593
Dissolved Arsenic (As)	mg/L	0.0521	0.0491	9695593	0.00302	0.000020	9695593
Dissolved Barium (Ba)	mg/L	0.0823	0.0812	9695593	0.137	0.000020	9695593
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9695593	<0.000010	0.000010	9695593
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9695593	<0.0000050	0.0000050	9695593
Dissolved Boron (B)	mg/L	0.035	0.035	9695593	0.030	0.010	9695593
Dissolved Cadmium (Cd)	mg/L	0.00171	0.000518	9695593	0.000237	0.0000050	9695593
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9695593	<0.00010	0.00010	9695593
Dissolved Cobalt (Co)	mg/L	0.000203	0.000340	9695593	0.000139	0.0000050	9695593
Dissolved Copper (Cu)	mg/L	0.00587	0.00142	9695593	0.00145	0.000050	9695593
Dissolved Iron (Fe)	mg/L	0.0019	0.0049	9695593	0.0088	0.0010	9695593
Dissolved Lead (Pb)	mg/L	0.0000374	0.0000241	9695593	0.0000054	0.0000050	9695593
Dissolved Lithium (Li)	mg/L	0.0116	0.0111	9695593	0.00718	0.00050	9695593
Dissolved Manganese (Mn)	mg/L	0.0658	0.163	9695593	0.711	0.000050	9695593
Dissolved Molybdenum (Mo)	mg/L	0.00230	0.00105	9695593	0.00213	0.000050	9695593
Dissolved Nickel (Ni)	mg/L	0.0120	0.00798	9695593	0.00278	0.000020	9695593
Dissolved Selenium (Se)	mg/L	0.00600	0.00275	9695593	0.000957	0.000040	9695593
Dissolved Silicon (Si)	mg/L	1.10	1.08	9695593	2.94	0.050	9695593
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9695593	<0.0000050	0.0000050	9695593
Dissolved Strontium (Sr)	mg/L	0.513	0.530	9695593	0.485	0.000050	9695593
Dissolved Thallium (Tl)	mg/L	0.000363	0.000158	9695593	0.0000069	0.0000020	9697798
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9695593	<0.00020	0.00020	9695593
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9695593	<0.00050	0.00050	9695593
Dissolved Uranium (U)	mg/L	0.0343	0.0159	9695593	0.00815	0.0000020	9695593
Dissolved Vanadium (V)	mg/L	0.00043	0.00024	9695593	<0.00020	0.00020	9695593
Dissolved Zinc (Zn)	mg/L	0.164	0.0778	9695593	0.0232	0.00010	9695593
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9695593	<0.00010	0.00010	9695593
Dissolved Calcium (Ca)	mg/L	110	113	9694452	104	0.050	9694452
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9352	XA9353		XA9354		
Sampling Date		2019/12/02 10:15	2019/12/02 10:30		2019/12/02 10:50		
COC Number		08475612	08475612		08475612		
	UNITS	TRIAL #1	TRIAL #2	QC Batch	TRIAL #3	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	18.1	18.1	9694452	16.5	0.050	9694452
Dissolved Potassium (K)	mg/L	7.90	7.39	9694452	6.91	0.050	9694452
Dissolved Sodium (Na)	mg/L	26.0	26.1	9694452	24.9	0.050	9694452
Dissolved Sulphur (S)	mg/L	83.2	80.1	9694452	70.1	3.0	9694452
RDL = Reportable Detection Limit							

BUREAU
VERITAS

BV Labs Job #: B9A3658

Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9355	XA9356	XA9357	XA9358		
Sampling Date		2019/12/02 11:00	2019/12/02 12:40	2019/12/02 11:10	2019/12/02 11:25		
COC Number		08475612	08475612	08475612	08475612		
	UNITS	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	333	372	346	345	0.50	9694445
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00092	0.00389	0.00079	0.00287	0.00050	9695593
Dissolved Antimony (Sb)	mg/L	0.000952	0.0154	0.0876	0.0243	0.000020	9695593
Dissolved Arsenic (As)	mg/L	0.00611	0.0512	0.295	0.0168	0.000020	9695593
Dissolved Barium (Ba)	mg/L	0.117	0.0534	0.0796	0.0945	0.000020	9695593
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9695593
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9695593
Dissolved Boron (B)	mg/L	0.030	0.034	0.035	0.033	0.010	9695593
Dissolved Cadmium (Cd)	mg/L	0.0000371	0.00134	0.00795	0.00235	0.0000050	9695593
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9695593
Dissolved Cobalt (Co)	mg/L	0.000113	0.000120	0.00829	0.000151	0.0000050	9695593
Dissolved Copper (Cu)	mg/L	0.000593	0.00310	0.0170	0.00499	0.000050	9695593
Dissolved Iron (Fe)	mg/L	0.0298	0.0169	0.0016	<0.0010	0.0010	9695593
Dissolved Lead (Pb)	mg/L	0.0000089	0.00144	0.000938	0.00121	0.0000050	9695593
Dissolved Lithium (Li)	mg/L	0.00734	0.0110	0.0117	0.0124	0.00050	9695593
Dissolved Manganese (Mn)	mg/L	0.964	0.00774	0.170	0.0308	0.000050	9695593
Dissolved Molybdenum (Mo)	mg/L	0.000766	0.00127	0.00149	0.00182	0.000050	9695593
Dissolved Nickel (Ni)	mg/L	0.00163	0.0119	0.0433	0.00649	0.000020	9695593
Dissolved Selenium (Se)	mg/L	0.000688	0.00706	0.0279	0.0121	0.000040	9695593
Dissolved Silicon (Si)	mg/L	2.97	0.975	1.14	0.929	0.050	9695593
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9695593
Dissolved Strontium (Sr)	mg/L	0.544	0.592	0.581	0.644	0.000050	9695593
Dissolved Thallium (Tl)	mg/L	0.0000036	0.000320	0.000530	0.000927	0.0000020	9695593
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9695593
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9695593
Dissolved Uranium (U)	mg/L	0.00433	0.0319	0.145	0.0437	0.0000020	9695593
Dissolved Vanadium (V)	mg/L	<0.00020	0.00035	0.00028	<0.00020	0.00020	9695593
Dissolved Zinc (Zn)	mg/L	0.00934	0.256	0.795	0.0949	0.00010	9695593
Dissolved Zirconium (Zr)	mg/L	0.00010	0.00015	<0.00010	<0.00010	0.00010	9695593
Dissolved Calcium (Ca)	mg/L	106	119	109	108	0.050	9694452
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9355	XA9356	XA9357	XA9358		
Sampling Date		2019/12/02 11:00	2019/12/02 12:40	2019/12/02 11:10	2019/12/02 11:25		
COC Number		08475612	08475612	08475612	08475612		
	UNITS	TRIAL #4	TRIAL #5	TRIAL #6	TRIAL #7	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.5	18.2	17.7	18.5	0.050	9694452
Dissolved Potassium (K)	mg/L	7.10	6.77	8.22	7.48	0.050	9694452
Dissolved Sodium (Na)	mg/L	25.2	25.8	26.3	25.7	0.050	9694452
Dissolved Sulphur (S)	mg/L	59.8	81.9	80.7	80.7	3.0	9694452
RDL = Reportable Detection Limit							



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VERITAS

BV Labs Job #: B9A3658
Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: TW

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9359		
Sampling Date		2019/12/02 11:35		
COC Number		08475612		
	UNITS	TRIAL #8	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	336	0.50	9694445
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.00067	0.00050	9695690
Dissolved Antimony (Sb)	mg/L	0.00282	0.000020	9695690
Dissolved Arsenic (As)	mg/L	0.00174	0.000020	9695690
Dissolved Barium (Ba)	mg/L	0.151	0.000020	9695690
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	9695690
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9695690
Dissolved Boron (B)	mg/L	0.029	0.010	9695690
Dissolved Cadmium (Cd)	mg/L	0.000795	0.0000050	9695690
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	9695690
Dissolved Cobalt (Co)	mg/L	0.0000441	0.0000050	9695690
Dissolved Copper (Cu)	mg/L	0.00385	0.000050	9695690
Dissolved Iron (Fe)	mg/L	<0.0010	0.0010	9695690
Dissolved Lead (Pb)	mg/L	0.0000107	0.0000050	9695690
Dissolved Lithium (Li)	mg/L	0.00696	0.00050	9695690
Dissolved Manganese (Mn)	mg/L	0.110	0.000050	9695690
Dissolved Molybdenum (Mo)	mg/L	0.00190	0.000050	9695690
Dissolved Nickel (Ni)	mg/L	0.00158	0.000020	9695690
Dissolved Selenium (Se)	mg/L	0.00154	0.000040	9695690
Dissolved Silicon (Si)	mg/L	2.71	0.050	9695690
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9695690
Dissolved Strontium (Sr)	mg/L	0.592	0.000050	9695690
Dissolved Thallium (Tl)	mg/L	0.0000197	0.0000020	9695690
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9695690
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9695690
Dissolved Uranium (U)	mg/L	0.0123	0.0000020	9695690
Dissolved Vanadium (V)	mg/L	<0.00020	0.00020	9695690
Dissolved Zinc (Zn)	mg/L	0.0396	0.00010	9695690
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	9695690
Dissolved Calcium (Ca)	mg/L	107	0.050	9694452
RDL = Reportable Detection Limit				



BUREAU
VERITAS

BV Labs Job #: B9A3658
Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: TW

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9359		
Sampling Date		2019/12/02 11:35		
COC Number		08475612		
	UNITS	TRIAL #8	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.5	0.050	9694452
Dissolved Potassium (K)	mg/L	5.36	0.050	9694452
Dissolved Sodium (Na)	mg/L	24.8	0.050	9694452
Dissolved Sulphur (S)	mg/L	76.9	3.0	9694452
RDL = Reportable Detection Limit				



BUREAU
VERITAS

BV Labs Job #: B9A3658
Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: TW

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XA9352	XA9353	XA9354	XA9355	XA9356		
Sampling Date		2019/12/02 10:15	2019/12/02 10:30	2019/12/02 10:50	2019/12/02 11:00	2019/12/02 12:40		
COC Number		08475612	08475612	08475612	08475612	08475612		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	366	373	339	338	384	0.50	9694602
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00150	0.00106	0.00189	0.00185	0.00608	0.00050	9697233
Total Antimony (Sb)	mg/L	0.0206	0.00718	0.00132	0.000920	0.0149	0.000020	9697233
Total Arsenic (As)	mg/L	0.0525	0.0499	0.00327	0.00669	0.0503	0.000020	9697233
Total Barium (Ba)	mg/L	0.0814	0.0812	0.140	0.118	0.0541	0.000020	9697233
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9697233
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697233
Total Boron (B)	mg/L	0.034	0.034	0.028	0.029	0.034	0.010	9697233
Total Cadmium (Cd)	mg/L	0.00170	0.000525	0.000225	0.0000352	0.00137	0.0000050	9697233
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9697233
Total Cobalt (Co)	mg/L	0.000198	0.000348	0.000168	0.000111	0.000213	0.0000050	9697233
Total Copper (Cu)	mg/L	0.00572	0.00128	0.00143	0.000585	0.00315	0.000050	9697233
Total Iron (Fe)	mg/L	0.0029	0.0077	0.0365	0.114	0.0723	0.0010	9697233
Total Lead (Pb)	mg/L	0.0000578	0.0000386	0.0000880	0.0000397	0.00233	0.0000050	9697233
Total Lithium (Li)	mg/L	0.0124	0.0118	0.00759	0.00752	0.0117	0.00050	9697233
Total Manganese (Mn)	mg/L	0.0646	0.159	0.748	0.967	0.0121	0.000050	9697233
Total Molybdenum (Mo)	mg/L	0.00243	0.00112	0.00219	0.000844	0.00138	0.000050	9697233
Total Nickel (Ni)	mg/L	0.0119	0.00762	0.00267	0.00158	0.0117	0.000020	9697233
Total Selenium (Se)	mg/L	0.00631	0.00294	0.000898	0.000669	0.00689	0.000040	9697233
Total Silicon (Si)	mg/L	1.17	1.13	3.03	3.05	1.01	0.050	9697233
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697233
Total Strontium (Sr)	mg/L	0.552	0.579	0.513	0.581	0.627	0.000050	9697233
Total Thallium (Tl)	mg/L	0.000359	0.000160	0.0000062	<0.0000020	0.000315	0.0000020	9697233
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9697233
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9697233
Total Uranium (U)	mg/L	0.0341	0.0161	0.00818	0.00417	0.0317	0.0000020	9697233
Total Vanadium (V)	mg/L	0.00042	<0.00020	<0.00020	<0.00020	0.00033	0.00020	9697233
Total Zinc (Zn)	mg/L	0.152	0.0702	0.0229	0.00918	0.233	0.00010	9697233
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00011	0.00015	0.00010	9697233
Total Calcium (Ca)	mg/L	116	120	109	109	124	0.050	9695048

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XA9352	XA9353	XA9354	XA9355	XA9356		
Sampling Date		2019/12/02 10:15	2019/12/02 10:30	2019/12/02 10:50	2019/12/02 11:00	2019/12/02 12:40		
COC Number		08475612	08475612	08475612	08475612	08475612		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #3	TRIAL #4	TRIAL #5	RDL	QC Batch
Total Magnesium (Mg)	mg/L	18.5	18.0	16.3	16.2	18.4	0.050	9695048
Total Potassium (K)	mg/L	8.02	7.29	6.96	7.14	6.84	0.050	9695048
Total Sodium (Na)	mg/L	26.7	26.6	25.5	25.7	26.7	0.050	9695048
Total Sulphur (S)	mg/L	87.4	82.7	71.8	61.8	82.0	3.0	9695048
RDL = Reportable Detection Limit								



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BV Labs Job #: B9A3658
Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: TW

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XA9357	XA9358	XA9359		
Sampling Date		2019/12/02 11:10	2019/12/02 11:25	2019/12/02 11:35		
COC Number		08475612	08475612	08475612		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	371	371	352	0.50	9694602
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00099	0.00310	0.00080	0.00050	9697233
Total Antimony (Sb)	mg/L	0.0858	0.0237	0.00282	0.000020	9697233
Total Arsenic (As)	mg/L	0.298	0.0167	0.00173	0.000020	9697233
Total Barium (Ba)	mg/L	0.0823	0.0943	0.149	0.000020	9697233
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9697233
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697233
Total Boron (B)	mg/L	0.036	0.036	0.029	0.010	9697233
Total Cadmium (Cd)	mg/L	0.00810	0.00232	0.000817	0.0000050	9697233
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9697233
Total Cobalt (Co)	mg/L	0.00798	0.000149	0.0000457	0.0000050	9697233
Total Copper (Cu)	mg/L	0.0163	0.00478	0.00388	0.000050	9697233
Total Iron (Fe)	mg/L	0.0025	<0.0010	0.0011	0.0010	9697233
Total Lead (Pb)	mg/L	0.00113	0.00125	0.0000223	0.0000050	9697233
Total Lithium (Li)	mg/L	0.0126	0.0135	0.00719	0.00050	9697233
Total Manganese (Mn)	mg/L	0.169	0.0301	0.111	0.000050	9697233
Total Molybdenum (Mo)	mg/L	0.00159	0.00183	0.00196	0.000050	9697233
Total Nickel (Ni)	mg/L	0.0423	0.00631	0.00164	0.000020	9697233
Total Selenium (Se)	mg/L	0.0280	0.0124	0.00166	0.000040	9697233
Total Silicon (Si)	mg/L	1.25	0.981	2.70	0.050	9697233
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697233
Total Strontium (Sr)	mg/L	0.640	0.674	0.609	0.000050	9697233
Total Thallium (Tl)	mg/L	0.000541	0.000928	0.0000297	0.0000020	9697233
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9697233
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9697233
Total Uranium (U)	mg/L	0.147	0.0427	0.0131	0.0000020	9697233
Total Vanadium (V)	mg/L	0.00027	<0.00020	<0.00020	0.00020	9697233
Total Zinc (Zn)	mg/L	0.741	0.0879	0.0390	0.00010	9697233
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9697233
Total Calcium (Ca)	mg/L	119	116	113	0.050	9695048
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XA9357	XA9358	XA9359		
Sampling Date		2019/12/02 11:10	2019/12/02 11:25	2019/12/02 11:35		
COC Number		08475612	08475612	08475612		
	UNITS	TRIAL #6	TRIAL #7	TRIAL #8	RDL	QC Batch
Total Magnesium (Mg)	mg/L	18.0	19.6	17.1	0.050	9695048
Total Potassium (K)	mg/L	8.46	7.68	5.60	0.050	9695048
Total Sodium (Na)	mg/L	27.3	27.8	26.5	0.050	9695048
Total Sulphur (S)	mg/L	83.3	82.0	81.1	3.0	9695048
RDL = Reportable Detection Limit						



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BV Labs Job #: B9A3658

Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	15.3°C
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LOW LEVEL DISSOLVED METALS IN WATER (WATER) Comments

Matrix Spike Elements by ICPMS Low Level (dissolved): RDL raised due to concentration over linear range, sample dilution required.

Sample XA9354, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.



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BV Labs Job #: B9A3658

Report Date: 2019/12/10

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9695593	Dissolved Aluminum (Al)	2019/12/03	99	80 - 120	100	80 - 120	<0.00050	mg/L	2.7	20
9695593	Dissolved Antimony (Sb)	2019/12/03	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.42	20
9695593	Dissolved Arsenic (As)	2019/12/03	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.35	20
9695593	Dissolved Barium (Ba)	2019/12/03	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.66	20
9695593	Dissolved Beryllium (Be)	2019/12/03	95	80 - 120	96	80 - 120	<0.000010	mg/L	NC	20
9695593	Dissolved Bismuth (Bi)	2019/12/03	97	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9695593	Dissolved Boron (B)	2019/12/03	94	80 - 120	93	80 - 120	<0.010	mg/L	0.89	20
9695593	Dissolved Cadmium (Cd)	2019/12/03	100	80 - 120	100	80 - 120	<0.0000050	mg/L	0.67	20
9695593	Dissolved Chromium (Cr)	2019/12/03	100	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9695593	Dissolved Cobalt (Co)	2019/12/03	97	80 - 120	101	80 - 120	<0.0000050	mg/L	4.4	20
9695593	Dissolved Copper (Cu)	2019/12/03	95	80 - 120	102	80 - 120	<0.000050	mg/L	1.4	20
9695593	Dissolved Iron (Fe)	2019/12/03	102	80 - 120	104	80 - 120	<0.0010	mg/L	1.7	20
9695593	Dissolved Lead (Pb)	2019/12/03	102	80 - 120	102	80 - 120	<0.0000050	mg/L	1.1	20
9695593	Dissolved Lithium (Li)	2019/12/03	96	80 - 120	95	80 - 120	<0.00050	mg/L	0.59	20
9695593	Dissolved Manganese (Mn)	2019/12/03	NC	80 - 120	102	80 - 120	<0.000050	mg/L	0.16	20
9695593	Dissolved Molybdenum (Mo)	2019/12/03	107	80 - 120	98	80 - 120	<0.000050	mg/L	2.2	20
9695593	Dissolved Nickel (Ni)	2019/12/03	95	80 - 120	102	80 - 120	<0.000020	mg/L	0.49	20
9695593	Dissolved Selenium (Se)	2019/12/03	102	80 - 120	96	80 - 120	<0.000040	mg/L	1.8	20
9695593	Dissolved Silicon (Si)	2019/12/03	99	80 - 120	99	80 - 120	<0.050	mg/L	0.0049	20
9695593	Dissolved Silver (Ag)	2019/12/03	98	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9695593	Dissolved Strontium (Sr)	2019/12/03	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.36	20
9695593	Dissolved Thallium (Tl)	2019/12/03	103	80 - 120	102	80 - 120	<0.0000020	mg/L	1.7	20
9695593	Dissolved Tin (Sn)	2019/12/03	103	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9695593	Dissolved Titanium (Ti)	2019/12/03	103	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9695593	Dissolved Uranium (U)	2019/12/03	104	80 - 120	104	80 - 120	<0.0000020	mg/L	0.99	20
9695593	Dissolved Vanadium (V)	2019/12/03	102	80 - 120	101	80 - 120	<0.00020	mg/L	2.9	20
9695593	Dissolved Zinc (Zn)	2019/12/03	NC	80 - 120	108	80 - 120	<0.00010	mg/L	0.040	20
9695593	Dissolved Zirconium (Zr)	2019/12/03	105	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9695690	Dissolved Aluminum (Al)	2019/12/03	115	80 - 120	100	80 - 120	<0.00050	mg/L	17	20
9695690	Dissolved Antimony (Sb)	2019/12/03	111	80 - 120	99	80 - 120	<0.000020	mg/L	3.5	20
9695690	Dissolved Arsenic (As)	2019/12/03	117	80 - 120	97	80 - 120	<0.000020	mg/L	1.5	20
9695690	Dissolved Barium (Ba)	2019/12/03	NC	80 - 120	103	80 - 120	<0.000020	mg/L	2.4	20



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BV Labs Job #: B9A3658

Report Date: 2019/12/10

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9695690	Dissolved Beryllium (Be)	2019/12/03	102	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
9695690	Dissolved Bismuth (Bi)	2019/12/03	105	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9695690	Dissolved Boron (B)	2019/12/03	NC	80 - 120	90	80 - 120	<0.010	mg/L	0.80	20
9695690	Dissolved Cadmium (Cd)	2019/12/03	105	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9695690	Dissolved Chromium (Cr)	2019/12/03	109	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9695690	Dissolved Cobalt (Co)	2019/12/03	106	80 - 120	100	80 - 120	<0.0000050	mg/L	3.3	20
9695690	Dissolved Copper (Cu)	2019/12/03	104	80 - 120	101	80 - 120	<0.000050	mg/L	1.9	20
9695690	Dissolved Iron (Fe)	2019/12/03	112	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
9695690	Dissolved Lead (Pb)	2019/12/03	109	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9695690	Dissolved Lithium (Li)	2019/12/03	NC	80 - 120	96	80 - 120	<0.00050	mg/L	0.91	20
9695690	Dissolved Manganese (Mn)	2019/12/03	106	80 - 120	101	80 - 120	<0.000050	mg/L	19	20
9695690	Dissolved Molybdenum (Mo)	2019/12/03	NC	80 - 120	98	80 - 120	<0.000050	mg/L	3.3	20
9695690	Dissolved Nickel (Ni)	2019/12/03	102	80 - 120	100	80 - 120	<0.000020	mg/L	5.2	20
9695690	Dissolved Selenium (Se)	2019/12/03	113	80 - 120	96	80 - 120	<0.000040	mg/L	3.7	20
9695690	Dissolved Silicon (Si)	2019/12/03	119	80 - 120	99	80 - 120	<0.050	mg/L	4.5	20
9695690	Dissolved Silver (Ag)	2019/12/03	97	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9695690	Dissolved Strontium (Sr)	2019/12/03	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.95	20
9695690	Dissolved Thallium (Tl)	2019/12/03	106	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9695690	Dissolved Tin (Sn)	2019/12/03	111	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9695690	Dissolved Titanium (Ti)	2019/12/03	116	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9695690	Dissolved Uranium (U)	2019/12/03	115	80 - 120	103	80 - 120	<0.0000020	mg/L	0.014	20
9695690	Dissolved Vanadium (V)	2019/12/03	114	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9695690	Dissolved Zinc (Zn)	2019/12/03	105	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9695690	Dissolved Zirconium (Zr)	2019/12/03	114	80 - 120	99	80 - 120	<0.00010	mg/L	12	20
9695733	Alkalinity (PP as CaCO3)	2019/12/03					<0.50	mg/L	NC	20
9695733	Alkalinity (Total as CaCO3)	2019/12/03	NC	80 - 120	98	80 - 120	<0.50	mg/L	2.9	20
9695733	Bicarbonate (HCO3)	2019/12/03					<0.50	mg/L	2.9	20
9695733	Carbonate (CO3)	2019/12/03					<0.50	mg/L	NC	20
9695733	Hydroxide (OH)	2019/12/03					<0.50	mg/L	NC	20
9695779	Nitrate plus Nitrite (N)	2019/12/03			109	80 - 120	<0.0020	mg/L		
9695780	Nitrite (N)	2019/12/03			103	80 - 120	<0.0020	mg/L		
9695783	Nitrate plus Nitrite (N)	2019/12/03	NC	80 - 120	109	80 - 120	<0.0020	mg/L	0.35	25



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BV Labs Job #: B9A3658

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QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9695784	Nitrite (N)	2019/12/03	101	80 - 120	103	80 - 120	<0.0020	mg/L	3.0	25
9696446	Acidity (pH 4.5)	2019/12/04					<1.0	mg/L	NC	20
9696446	Acidity (pH 8.3)	2019/12/04			97	80 - 120	<1.0	mg/L	NC	20
9696901	Dissolved Chloride (Cl)	2019/12/03	NC	80 - 120	99	80 - 120	<0.50	mg/L	2.4	20
9696901	Dissolved Sulphate (SO ₄)	2019/12/03	NC	80 - 120	100	80 - 120	<0.50	mg/L	3.7	20
9696967	HCl Preserved Iron (Fe+2 Ferrous)	2019/12/04	106	80 - 120	103	90 - 110	<0.050	mg/L	NC	20
9697184	Orthophosphate (P)	2019/12/04	95	80 - 120	84	80 - 120	<0.0010	mg/L	0.44	20
9697233	Total Aluminum (Al)	2019/12/05	105	80 - 120	103	80 - 120	<0.00050	mg/L	10	20
9697233	Total Antimony (Sb)	2019/12/05	98	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9697233	Total Arsenic (As)	2019/12/05	100	80 - 120	103	80 - 120	<0.000020	mg/L	NC	20
9697233	Total Barium (Ba)	2019/12/05	101	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
9697233	Total Beryllium (Be)	2019/12/05	100	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9697233	Total Bismuth (Bi)	2019/12/05	103	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9697233	Total Boron (B)	2019/12/05	96	80 - 120	94	80 - 120	<0.010	mg/L	NC	20
9697233	Total Cadmium (Cd)	2019/12/05	102	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9697233	Total Chromium (Cr)	2019/12/05	106	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9697233	Total Cobalt (Co)	2019/12/05	102	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9697233	Total Copper (Cu)	2019/12/05	104	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9697233	Total Iron (Fe)	2019/12/05	106	80 - 120	106	80 - 120	<0.0010	mg/L	2.3	20
9697233	Total Lead (Pb)	2019/12/05	106	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9697233	Total Lithium (Li)	2019/12/05	103	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9697233	Total Manganese (Mn)	2019/12/05	105	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9697233	Total Molybdenum (Mo)	2019/12/05	104	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9697233	Total Nickel (Ni)	2019/12/05	106	80 - 120	104	80 - 120	<0.000020	mg/L	NC	20
9697233	Total Selenium (Se)	2019/12/05	97	80 - 120	103	80 - 120	<0.000040	mg/L	NC	20
9697233	Total Silicon (Si)	2019/12/05	101	80 - 120	102	80 - 120	<0.050	mg/L	NC	20
9697233	Total Silver (Ag)	2019/12/05	104	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9697233	Total Strontium (Sr)	2019/12/05	103	80 - 120	101	80 - 120	<0.000050	mg/L	0.89	20
9697233	Total Thallium (Tl)	2019/12/05	104	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9697233	Total Tin (Sn)	2019/12/05	102	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9697233	Total Titanium (Ti)	2019/12/05	107	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9697233	Total Uranium (U)	2019/12/05	106	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20



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BV Labs Job #: B9A3658

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QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9697233	Total Vanadium (V)	2019/12/05	105	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9697233	Total Zinc (Zn)	2019/12/05	104	80 - 120	111	80 - 120	<0.00010	mg/L	4.7	20
9697233	Total Zirconium (Zr)	2019/12/05	104	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9697798	Dissolved Thallium (Tl)	2019/12/05	104	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9697810	Fluoride (F)	2019/12/05	102	80 - 120	100	80 - 120	<0.010	mg/L	0	20
9697894	Total Ammonia (N)	2019/12/05	100	80 - 120	94	80 - 120	<0.0050	mg/L	8.9	20
9698205	Dissolved Organic Carbon (C)	2019/12/06	NC	80 - 120	99	80 - 120	<0.50	mg/L	1.4	20
9698934	Total Sulphide	2019/12/06	118	80 - 120	98	80 - 120	<0.0018	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).



BUREAU
VERITAS

BV Labs Job #: B9A3658

Report Date: 2019/12/10

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: TW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS										
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days										
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02											
Phone:		Phone:	(867) 668-6463 yfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah											
Email:		Email:	agault@alexcoresource.com kpiewoye@contangostrategies.com	Site #:												
				Sampled By:		Date Required:										
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) <u>USE SCENARIO # 12485</u>		Analysis Requested LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (CL, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL Y/N Present Intact COOLING MEDIA PRESENT Y/N COMMENTS										
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (CL, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1	Trial #1	02-Dec-19	10:15	Water	X	X	X	X	X	X	X	X	X	X	9	
2	Trial #2	02-Dec-19	10:30	Water	X	X	X	X	X	X	X	X	X	X	9	
3	Trial #3	02-Dec-19	10:50	Water	X	X	X	X	X	X	X	X	X	X	9	
4	Trial #4	02-Dec-19	11:00	Water	X	X	X	X	X	X	X	X	X	X	9	
5	Trial #5	02-Dec-19	12:40	Water	X	X	X	X	X	X	X	X	X	X	9	
6	Trial #6	02-Dec-19	11:10	Water	X	X	X	X	X	X	X	X	X	X	9	
7	Trial #7	02-Dec-19	11:25	Water	X	X	X	X	X	X	X	X	X	X	9	
8	Trial #8	02-Dec-19	11:35	Water	X	X	X	X	X	X	X	X	X	X	9	
9																
10																
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)						
Tanner Webb		2019/12/02		12:00		By: <i>Arati Avanti Patel</i>		2019/12/02		13:11						
Tanner Webb						Temp: 17 / 16 / 13		Arati AVANTI PATEL		2019/12/03 @ 08:24		1020				



B9A3658_COC



Sent To: **ALS LABORATORY GROUP**
8081 Lougheed HWY
Burnaby, BC, V5A 1W9
Tel: (604) 253-4188

CHAIN OF CUSTODY RECORD FOR SUBCONTRACTED WORK

Page 01 of 01

COC # B9A5746-VALB-01-01

Environmental Division
Vancouver
Work Order Reference
VA19A0564



Telephone : +1 604 253 4188

REPORT INFORMATION						
Company: Bureau Veritas Laboratories						
Address: 4606 Canada Way, Burnaby, British Columbia, V5G 1K5						
Contact Name: Safiann Maiter						
Email: Safiann.Maiter@bvlab.com, customerservice@bvlab.com						
Phone: (604) 639-2616						
BV Labs Project #: B9A5746						
#	SAMPLE ID	MATRIX	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	SAMPLER INITIALS	# CONT.
1	XB9860-TRIAL 3	SOIL	2019/12/04	11:00		1 X
2	XB9861-TRIAL 4	SOIL	2019/12/04	11:00		1 X
3	XB9862-TRIAL 8	SOIL	2019/12/04	11:00		1 X
4	XB9863-SOIL INOCULUM	SOIL	2019/12/09	11:45		1 X
5						
6						
7						
8						
9						
10						

Environmental Division

Vancouver

Work Order Reference

VA19A0564

Telephone : +1 604 253 4188

ADDITIONAL SAMPLE INFORMATION

REGULATORY CRITERIA		SPECIAL INSTRUCTIONS		TURNAROUND TIME	
		Please inform BV Labs immediately if you are not accredited for the requested test(s). **Please return a copy of this form with the report.** AVS/SEM		☐ Rush Required 2020/01/06 Date Required Please inform us if rush charges will be incurred.	

COOLER ID:

	YES	NO	Temp: (°C)	1	2	3
Custody Seal Present						
Custody Seal Intact						
Cooling Media Present						

COOLER ID:

	YES	NO	Temp: (°C)	1	2	3
Custody Seal Present						
Custody Seal Intact						
Cooling Media Present						

COOLER ID:

	YES	NO	Temp: (°C)	1	2	3
Custody Seal Present						
Custody Seal Intact						
Cooling Media Present						

RELINQUISHED BY: (SIGN & PRINT)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (SIGN & PRINT)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
1. Tina N [Signature]				1.			
2.				2.			

RD Dec 11, 19
9° 3:20
Ice cubes

CERTIFICATE OF ANALYSIS

Work Order	: VA19A0564	Page	: 1 of 3
Amendment	: 2		
Client	: Bureau Veritas Canada (2019) Inc. (Maxxam Analytics)	Laboratory	: Vancouver - Environmental
Contact	: Safiann Maiter	Account Manager	: Edward Ngai
Address	: 4606 CANADA WAY BURNABY BC Canada V5G 1K5	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: B9A5746	Date Samples Received	: 11-Dec-2019 15:20
PO	: ----	Date Analysis Commenced	: 17-Dec-2019
C-O-C number	: B9A5746-VALB-01-01	Issue Date	: 28-Jan-2020 16:56
Sampler	: ----		
Site	: ----		
Quote number	: Vancouver Sublets		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Shaneel Dayal	Metal Analyst	Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	Description
µmole/g	micromole per gram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.



Analytical Results

Sub-Matrix: Soil					Client sample ID	XB9860-TRIAL 3	XB9861-TRIAL 4	XB9862-TRIAL 8	XB9863-SOIL INOCULUM	----
(Matrix: Soil)					Client sampling date / time	04-Dec-2019 11:00	04-Dec-2019 11:00	04-Dec-2019 11:00	09-Dec-2019 11:45	----
Analyte	CAS Number	Method	LOR	Unit	VA19A0564-001	VA19A0564-002	VA19A0564-003	VA19A0564-004	-----	----
					Result	Result	Result	Result	----	----
Inorganic Parameters										
sulfides, acid volatile	----	EC400	0.20	µmole/g	24.6	9.03	10.9	<0.20	----	----
Extractable Metals										
cadmium	7440-43-9	EC495	0.0050	µmole/g	0.0235	0.0091	0.0157	0.0107	----	----
mercury	7439-97-6	EC519	0.000050	µmole/g	<0.000050	<0.000050	<0.000050	<0.000050	----	----
copper	7440-50-8	EC495	0.010	µmole/g	0.141	0.089	0.181	0.417	----	----
lead	7439-92-1	EC495	0.020	µmole/g	0.152	0.110	0.210	0.232	----	----
nickel	7440-02-0	EC495	0.050	µmole/g	<0.050	<0.050	0.080	0.073	----	----
zinc	7440-66-6	EC495	0.0050	µmole/g	2.78	1.79	3.07	1.91	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL REPORT

Work Order	: VA19A0564	Page	: 1 of 2
Amendment	: 2		
Client	: Bureau Veritas Canada (2019) Inc. (Maxxam Analytics)	Laboratory	: Vancouver - Environmental
Contact	: Safiann Maiter	Account Manager	: Edward Ngai
Address	: 4606 CANADA WAY BURNABY BC Canada V5G 1K5	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: B9A5746	Date Samples Received	: 11-Dec-2019 15:20
PO	: ----	Date Analysis Commenced	: 17-Dec-2019
C-O-C number	: B9A5746-VALB-01-01	Issue Date	: 28-Jan-2020 16:56
Sampler	: ----		
Site	: ----		
Quote number	: Vancouver Sublets		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics - Water Quality, Burnaby, British Columbia
Shaneel Dayal	Metal Analyst	Vancouver Metals, Burnaby, British Columbia



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

= Indicates a QC result that did not meet the ALS DQO.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA19A0564	Page	: 1 of 4
Amendment	: 2		
Client	: Bureau Veritas Canada (2019) Inc. (Maxxam Analytics)	Laboratory	: Vancouver - Environmental
Contact	: Safiann Maiter	Account Manager	: Edward Ngai
Address	: 4606 CANADA WAY BURNABY BC Canada V5G 1K5	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: B9A5746	Date Samples Received	: 11-Dec-2019 15:20
PO	: ----	Issue Date	: 28-Jan-2020 16:56
C-O-C number	: B9A5746-VALB-01-01		
Sampler	: ----		
Site	: ----		
Quote number	: Vancouver Sublets		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- **No** Method Blank value outliers occur.
- **No** Duplicate outliers occur.
- **No** Laboratory Control Sample (LCS) outliers occur
- **No** Matrix Spike outliers occur.
- **No** Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- **No** Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- **No** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **No** Quality Control Sample Frequency Outliers occur.

Page : 2 of 4
Work Order : VA19A0564 Amendment 2
Client : Bureau Veritas Canada (2019) Inc. (Maxxam Analytics)
Project : B9A5746





Quality Control Parameter Frequency Compliance

- No Quality Control data available for this section.



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Acid Volatile Sulfide by Colourimetry	EC400 Vancouver - Environmental	Soil	EPA 821/R-91-100 (mod)	Acid Volatile Sulfide is determined by colourimetric measurement on a sediment sample that has been treated with hydrochloric acid within a purge and trap system, where the evolved hydrogen sulfide gas is carried into a basic solution by argon gas for analysis.
Simultaneously Extracted Metals by ICPOES (umol/g)	EC495 Vancouver - Environmental	Soil	EPA 821/R-91-100; EPA 6010B	This analysis is carried out in accordance with the method described in EPA 821/R-91-100. Hydrochloric acid is added to sediment samples within a purge and trap system. The extract produced from the addition of the acid is then analyzed for simultaneously extracted metals (SEM) using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).
Simultaneously Extracted Mercury by CVAAS (umol/g)	EC519 Vancouver - Environmental	Soil	EPA 821/R-91-100/1631E (mod)	An extract of sediment sample that has been treated with hydrochloric acid within a purge and trap system is analyzed by CVAAS.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Distillation for Acid Volatile Sulfide in Soil	EP400 Vancouver - Environmental	Soil	EPA 821/R-91-100 (mod)	Acid Volatile Sulfide is determined by colourimetric measurement on a sediment sample that has been treated with hydrochloric acid within a purge and trap system, where the evolved hydrogen sulfide gas is carried into a basic solution by argon gas for analysis.
Simultaneously Extracted Metals Preparation	EP495 Vancouver - Environmental	Soil	EPA 821/R-91-100; EPA 6010B	This analysis is carried out in accordance with the method described in EPA 821/R-91-100. Hydrochloric acid is added to sediment samples within a purge and trap system. The extract produced from the addition of the acid is then analyzed for simultaneously extracted metals (SEM) and Mercury .



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08475863

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/02/11
 Report #: R2843771
 Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: B9A5746

Received: 2019/12/09, 12:30

Sample Matrix: Soil
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
AVS/SEM in Soil Subcontract (1)	4	N/A	2019/12/23		

Sample Matrix: Solid
 # Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Ultratrace 4 Acid Dig. Metals ICPMS-% (2, 4)	2	2020/01/17	2020/01/17	1T-MS	.
Ultratrace 4 Acid Dig. Metals ICPMS-ppb (2, 4)	2	2020/01/17	2020/01/17	1T-MS	.
Ultratrace Acid 4 Dig. Metals ICPMS-ppm (2, 4)	2	2020/01/17	2020/01/17	1T-MS	.
ICP-MS DissMET MEND SFE Extract (3)	6	N/A	2019/12/17	BBY7SOP-00002	EPA 6020B R2 m
ICP-MS DissMET MEND SFE Extract (3)	6	N/A	2019/12/19	BBY7SOP-00002	EPA 6020B R2 m
TESSIER Leachable Metals Calc. (mg/kg) (3)	12	N/A	2020/02/11	BBY WI-00033	Auto Calc
Extract Sample Volume - TESSIER (3)	12	N/A	2020/02/11		

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08475863

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/02/11
Report #: R2843771
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: B9A5746

Received: 2019/12/09, 12:30

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Sub Vancouver to ALS Burnaby
- (2) This test was performed by Sub Vancouver to Acme
- (3) This test was performed by BV Labs Vancouver
- (4) Ultra trace metals by aqua regia digestion done at Acme Labs.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BUREAU
VERITAS

BV Labs Job #: B9A5746

Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

EXCHANGEABLE METALS BY TESSIER LEACH (SOLID)

BV Labs ID		XC2857	XC2863			XC5107		
Sampling Date		2019/12/04 00:00	2019/12/04 00:00			2019/12/04 00:00		
COC Number		08475863	08475863			08475863		
	UNITS	TRIAL 4 EXTRACT 2	TRIAL 8 EXTRACT 2	RDL	QC Batch	BLANK EXTRACT 2	RDL	QC Batch

Calculated Parameters								
Leachable Extraction Volume	mL	25.0	25.0		9762778	25.0		9762778
Leachable Aluminum (Al)	mg/kg	10.5	9.2	2.5	9762777	7.9	2.5	9762777
Leachable Antimony (Sb)	mg/kg	<0.10	<0.10	0.10	9762777	<0.10	0.10	9762777
Leachable Arsenic (As)	mg/kg	<0.10	0.16	0.10	9762777	<0.10	0.10	9762777
Leachable Barium (Ba)	mg/kg	7.29	13.4	0.10	9762777	<0.10	0.10	9762777
Leachable Beryllium (Be)	mg/kg	<0.050	<0.050	0.050	9762777	<0.050	0.050	9762777
Leachable Bismuth (Bi)	mg/kg	<0.025	<0.025	0.025	9762777	<0.025	0.025	9762777
Leachable Boron (B)	mg/kg	<250	<250	250	9762777	<250	250	9762777
Leachable Cadmium (Cd)	mg/kg	0.060	0.107	0.025	9762777	<0.025	0.025	9762777
Leachable Cesium (Cs)	mg/kg	<0.25	<0.25	0.25	9762777	<0.25	0.25	9762777
Leachable Chromium (Cr)	mg/kg	<0.50	<0.50	0.50	9762777	<0.50	0.50	9762777
Leachable Cobalt (Co)	mg/kg	0.051	0.080	0.025	9762777	<0.025	0.025	9762777
Leachable Copper (Cu)	mg/kg	<0.25	<0.25	0.25	9762777	<0.25	0.25	9762777
Leachable Iron (Fe)	mg/kg	<5.0	<5.0	5.0	9762777	<5.0	5.0	9762777
Leachable Lanthanum (La)	mg/kg	<0.25	<0.25	0.25	9762777	<0.25	0.25	9762777
Leachable Lead (Pb)	mg/kg	0.085	0.254	0.025	9762777	<0.025	0.025	9762777
Leachable Lithium (Li)	mg/kg	<2.5	<2.5	2.5	9762777	<2.5	2.5	9762777
Leachable Manganese (Mn)	mg/kg	9.45	25.8	0.25	9762777	<0.25	0.25	9762777
Leachable Molybdenum (Mo)	mg/kg	<0.25	<0.25	0.25	9762777	<0.25	0.25	9762777
Leachable Nickel (Ni)	mg/kg	0.14	0.12	0.10	9762777	0.36	0.10	9762777
Leachable Phosphorus (P)	mg/kg	<10	<10	10	9762777	<10	10	9762777
Leachable Rubidium (Rb)	mg/kg	<0.25	<0.25	0.25	9762777	<0.25	0.25	9762777
Leachable Selenium (Se)	mg/kg	<0.20	<0.20	0.20	9762777	<0.20	0.20	9762777
Leachable Silicon (Si)	mg/kg	<500	<500	500	9762777	<500	500	9762777
Leachable Silver (Ag)	mg/kg	<0.025	<0.025	0.025	9762777	<0.025	0.025	9762777
Leachable Strontium (Sr)	mg/kg	2.17	4.95	0.25	9762777	<0.25	0.25	9762777
Leachable Tellurium (Te)	mg/kg	<0.10	<0.10	0.10	9762777	<0.10	0.10	9762777
Leachable Thallium (Tl)	mg/kg	<0.010	<0.010	0.010	9762777	<0.010	0.010	9762777
Leachable Thorium (Th)	mg/kg	<0.025	<0.025	0.025	9762777	<0.025	0.025	9762777
Leachable Tin (Sn)	mg/kg	<1.0	<1.0	1.0	9762777	<1.0	1.0	9762777
Leachable Titanium (Ti)	mg/kg	<2.5	<2.5	2.5	9762777	<2.5	2.5	9762777

RDL = Reportable Detection Limit

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BV Labs Job #: B9A5746

Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

EXCHANGEABLE METALS BY TESSIER LEACH (SOLID)

BV Labs ID		XC2857	XC2863			XC5107		
Sampling Date		2019/12/04 00:00	2019/12/04 00:00			2019/12/04 00:00		
COC Number		08475863	08475863			08475863		
	UNITS	TRIAL 4 EXTRACT 2	TRIAL 8 EXTRACT 2	RDL	QC Batch	BLANK EXTRACT 2	RDL	QC Batch
Leachable Tungsten (W)	mg/kg	0.715	0.759	0.050	9762777	0.912	0.050	9762777
Leachable Uranium (U)	mg/kg	0.176	0.407	0.010	9762777	<0.010	0.010	9762777
Leachable Vanadium (V)	mg/kg	<1.0	<1.0	1.0	9762777	<1.0	1.0	9762777
Leachable Zinc (Zn)	mg/kg	1.81	2.11	0.50	9762777	1.43	0.50	9762777
Leachable Zirconium (Zr)	mg/kg	0.59	<0.50	0.50	9762777	0.88	0.50	9762777
Leachable Calcium (Ca)	mg/kg	378	883	250	9762777	<250	250	9762777
Leachable Magnesium (Mg)	mg/kg	372000	408000	250	9762777	357000	250	9762777
Leachable Potassium (K)	mg/kg	<250	<250	250	9762777	<250	250	9762777
Leachable Sodium (Na)	mg/kg	3360	3670	250	9762777	3150	250	9762777
Leachable Mercury (Hg)	mg/kg	<0.25	<0.25	0.25	9762777	<0.25	0.25	9762777
Leachable Sulphur (S)	mg/kg	<50000	<50000	50000	9762777	<50000	50000	9762777
Dissolved Metals by ICPMS								
MEND Extract Aluminum (Al)	ug/L	420	368	100	9711697			
MEND Extract Antimony (Sb)	ug/L	<4.0	<4.0	4.0	9711697			
MEND Extract Arsenic (As)	ug/L	<4.0	6.3	4.0	9711697			
MEND Extract Barium (Ba)	ug/L	292	536	4.0	9711697			
MEND Extract Beryllium (Be)	ug/L	<2.0	<2.0	2.0	9711697			
MEND Extract Bismuth (Bi)	ug/L	<1.0	<1.0	1.0	9711697			
MEND Extract Boron (B)	ug/L	<10000	<10000	10000	9711697			
MEND Extract Cadmium (Cd)	ug/L	2.4	4.3	1.0	9711697			
MEND Extract Cesium (Cs)	ug/L	<10	<10	10	9711697			
MEND Extract Chromium (Cr)	ug/L	<20	<20	20	9711697			
MEND Extract Cobalt (Co)	ug/L	2.0	3.2	1.0	9711697			
MEND Extract Copper (Cu)	ug/L	<10	<10	10	9711697			
MEND Extract Iron (Fe)	ug/L	<200	<200	200	9711697			
MEND Extract Lanthanum (La)	ug/L	<10	<10	10	9711697			
MEND Extract Lead (Pb)	ug/L	3.4	10.1	1.0	9711697			
MEND Extract Lithium (Li)	ug/L	<100	<100	100	9711697			
MEND Extract Manganese (Mn)	ug/L	378	1030	10	9711697			
MEND Extract Molybdenum (Mo)	ug/L	<10	<10	10	9711697			
MEND Extract Nickel (Ni)	ug/L	5.5	4.8	4.0	9711697			
MEND Extract Phosphorus (P)	ug/L	<400	<400	400	9711697			
RDL = Reportable Detection Limit								



EXCHANGEABLE METALS BY TESSIER LEACH (SOLID)

BV Labs ID		XC2857	XC2863			XC5107		
Sampling Date		2019/12/04 00:00	2019/12/04 00:00			2019/12/04 00:00		
COC Number		08475863	08475863			08475863		
	UNITS	TRIAL 4 EXTRACT 2	TRIAL 8 EXTRACT 2	RDL	QC Batch	BLANK EXTRACT 2	RDL	QC Batch
MEND Extract Rubidium (Rb)	ug/L	<10	<10	10	9711697			
MEND Extract Selenium (Se)	ug/L	<8.0	<8.0	8.0	9711697			
MEND Extract Silicon (Si)	ug/L	<20000	<20000	20000	9711697			
MEND Extract Silver (Ag)	ug/L	<1.0	<1.0	1.0	9711697			
MEND Extract Strontium (Sr)	ug/L	87	198	10	9711697			
MEND Extract Tellurium (Te)	ug/L	<4.0	<4.0	4.0	9711697			
MEND Extract Thallium (Tl)	ug/L	<0.40	<0.40	0.40	9711697			
MEND Extract Thorium (Th)	ug/L	<1.0	<1.0	1.0	9711697			
MEND Extract Tin (Sn)	ug/L	<40	<40	40	9711697			
MEND Extract Titanium (Ti)	ug/L	<100	<100	100	9711697			
MEND Extract Tungsten (W)	ug/L	28.6	30.3	2.0	9711697			
MEND Extract Uranium (U)	ug/L	7.02	16.3	0.40	9711697			
MEND Extract Vanadium (V)	ug/L	<40	<40	40	9711697			
MEND Extract Zinc (Zn)	ug/L	72	84	20	9711697			
MEND Extract Zirconium (Zr)	ug/L	24	<20	20	9711697			
MEND Extract Calcium (Ca)	ug/L	15100	35300	10000	9711697			
MEND Extract Magnesium (Mg)	ug/L	14900000	16300000	10000	9711697			
MEND Extract Potassium (K)	ug/L	<10000	<10000	10000	9711697			
MEND Extract Sodium (Na)	ug/L	134000	147000	10000	9711697			
MEND Extract Mercury (Hg)	ug/L	<10	<10	10	9711697			
MEND Extract Sulphur (S)	ug/L	<2000000	<2000000	2000000	9711697			
RDL = Reportable Detection Limit								

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VERITAS

BV Labs Job #: B9A5746

Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

METALS BOUND TO CARBONATES BY TESSIER (SOLID)

BV Labs ID		XC2858	XC2864	XC5108		
Sampling Date		2019/12/04 00:00	2019/12/04 00:00	2019/12/04 00:00		
COC Number		08475863	08475863	08475863		
	UNITS	TRIAL 4 EXTRACT 3	TRIAL 8 EXTRACT 3	BLANK EXTRACT 3	RDL	QC Batch

Calculated Parameters						
Leachable Extraction Volume	mL	30.0	30.0	30.0		9762778
Leachable Aluminum (Al)	mg/kg	28.7	49.4	2.09	0.75	9762777
Leachable Antimony (Sb)	mg/kg	0.059	0.127	<0.030	0.030	9762777
Leachable Arsenic (As)	mg/kg	0.731	1.16	<0.030	0.030	9762777
Leachable Barium (Ba)	mg/kg	16.1	22.8	0.536	0.030	9762777
Leachable Beryllium (Be)	mg/kg	<0.015	0.020	<0.015	0.015	9762777
Leachable Bismuth (Bi)	mg/kg	0.0718	0.180	<0.0075	0.0075	9762777
Leachable Boron (B)	mg/kg	<75	<75	<75	75	9762777
Leachable Cadmium (Cd)	mg/kg	0.221	0.465	0.0151	0.0075	9762777
Leachable Cesium (Cs)	mg/kg	<0.075	<0.075	<0.075	0.075	9762777
Leachable Chromium (Cr)	mg/kg	0.15	0.22	<0.15	0.15	9762777
Leachable Cobalt (Co)	mg/kg	0.509	0.845	<0.0075	0.0075	9762777
Leachable Copper (Cu)	mg/kg	0.809	1.01	0.299	0.075	9762777
Leachable Iron (Fe)	mg/kg	766	1090	<1.5	1.5	9762777
Leachable Lanthanum (La)	mg/kg	2.07	4.37	<0.075	0.075	9762777
Leachable Lead (Pb)	mg/kg	13.4	27.6	0.0351	0.0075	9762777
Leachable Lithium (Li)	mg/kg	<0.75	<0.75	<0.75	0.75	9762777
Leachable Manganese (Mn)	mg/kg	42.3	78.5	<0.075	0.075	9762777
Leachable Molybdenum (Mo)	mg/kg	<0.075	<0.075	<0.075	0.075	9762777
Leachable Nickel (Ni)	mg/kg	0.557	1.20	0.075	0.030	9762777
Leachable Phosphorus (P)	mg/kg	5.2	4.9	4.0	3.0	9762777
Leachable Rubidium (Rb)	mg/kg	0.543	0.745	<0.075	0.075	9762777
Leachable Selenium (Se)	mg/kg	<0.060	<0.060	<0.060	0.060	9762777
Leachable Silicon (Si)	mg/kg	<150	<150	<150	150	9762777
Leachable Silver (Ag)	mg/kg	0.0104	0.0083	<0.0075	0.0075	9762777
Leachable Strontium (Sr)	mg/kg	1.41	2.39	0.093	0.075	9762777
Leachable Tellurium (Te)	mg/kg	<0.030	<0.030	<0.030	0.030	9762777
Leachable Thallium (Tl)	mg/kg	0.0041	0.0044	<0.0030	0.0030	9762777
Leachable Thorium (Th)	mg/kg	0.434	0.733	<0.0075	0.0075	9762777
Leachable Tin (Sn)	mg/kg	<0.30	<0.30	<0.30	0.30	9762777
Leachable Titanium (Ti)	mg/kg	<0.75	<0.75	<0.75	0.75	9762777

RDL = Reportable Detection Limit

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VERITAS

BV Labs Job #: B9A5746

Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

METALS BOUND TO CARBONATES BY TESSIER (SOLID)

BV Labs ID		XC2858	XC2864	XC5108		
Sampling Date		2019/12/04 00:00	2019/12/04 00:00	2019/12/04 00:00		
COC Number		08475863	08475863	08475863		
	UNITS	TRIAL 4 EXTRACT 3	TRIAL 8 EXTRACT 3	BLANK EXTRACT 3	RDL	QC Batch
Leachable Tungsten (W)	mg/kg	0.173	0.152	0.025	0.015	9762777
Leachable Uranium (U)	mg/kg	0.552	1.52	<0.0030	0.0030	9762777
Leachable Vanadium (V)	mg/kg	<0.30	0.66	<0.30	0.30	9762777
Leachable Zinc (Zn)	mg/kg	19.9	42.7	0.92	0.15	9762777
Leachable Zirconium (Zr)	mg/kg	2.25	1.93	<0.15	0.15	9762777
Leachable Calcium (Ca)	mg/kg	335	529	<75	75	9762777
Leachable Magnesium (Mg)	mg/kg	1790	6390	<75	75	9762777
Leachable Potassium (K)	mg/kg	127	185	<75	75	9762777
Leachable Sodium (Na)	mg/kg	416000	399000	381000	75	9762777
Leachable Mercury (Hg)	mg/kg	<0.075	<0.075	<0.075	0.075	9762777
Leachable Sulphur (S)	mg/kg	<15000	<15000	<15000	15000	9762777
Dissolved Metals by ICPMS						
MEND Extract Aluminum (Al)	ug/L	956	1650	70	25	9711697
MEND Extract Antimony (Sb)	ug/L	2.0	4.2	<1.0	1.0	9711697
MEND Extract Arsenic (As)	ug/L	24.4	38.7	<1.0	1.0	9711697
MEND Extract Barium (Ba)	ug/L	535	761	17.9	1.0	9711697
MEND Extract Beryllium (Be)	ug/L	<0.50	0.67	<0.50	0.50	9711697
MEND Extract Bismuth (Bi)	ug/L	2.39	6.00	<0.25	0.25	9711697
MEND Extract Boron (B)	ug/L	<2500	<2500	<2500	2500	9711697
MEND Extract Cadmium (Cd)	ug/L	7.35	15.5	0.50	0.25	9711697
MEND Extract Cesium (Cs)	ug/L	<2.5	<2.5	<2.5	2.5	9711697
MEND Extract Chromium (Cr)	ug/L	5.1	7.3	<5.0	5.0	9711697
MEND Extract Cobalt (Co)	ug/L	17.0	28.2	<0.25	0.25	9711697
MEND Extract Copper (Cu)	ug/L	27.0	33.7	10.0	2.5	9711697
MEND Extract Iron (Fe)	ug/L	25500	36400	<50	50	9711697
MEND Extract Lanthanum (La)	ug/L	69.0	146	<2.5	2.5	9711697
MEND Extract Lead (Pb)	ug/L	447	919	1.17 (1)	0.25	9711697
MEND Extract Lithium (Li)	ug/L	<25	<25	<25	25	9711697
MEND Extract Manganese (Mn)	ug/L	1410	2620	<2.5	2.5	9711697
MEND Extract Molybdenum (Mo)	ug/L	<2.5	<2.5	<2.5	2.5	9711697
MEND Extract Nickel (Ni)	ug/L	18.6	40.1	2.5	1.0	9711697
RDL = Reportable Detection Limit						
(1) Matrix Spike outside acceptance criteria due to sample matrix interference.						



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BV Labs Job #: B9A5746

Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

METALS BOUND TO CARBONATES BY TESSIER (SOLID)

BV Labs ID		XC2858	XC2864	XC5108		
Sampling Date		2019/12/04 00:00	2019/12/04 00:00	2019/12/04 00:00		
COC Number		08475863	08475863	08475863		
	UNITS	TRIAL 4 EXTRACT 3	TRIAL 8 EXTRACT 3	BLANK EXTRACT 3	RDL	QC Batch
MEND Extract Phosphorus (P)	ug/L	172	165	133	100	9711697
MEND Extract Rubidium (Rb)	ug/L	18.1	24.8	<2.5	2.5	9711697
MEND Extract Selenium (Se)	ug/L	<2.0	<2.0	<2.0	2.0	9711697
MEND Extract Silicon (Si)	ug/L	<5000	<5000	<5000	5000	9711697
MEND Extract Silver (Ag)	ug/L	0.35	0.28	<0.25	0.25	9711697
MEND Extract Strontium (Sr)	ug/L	46.9	79.8	3.1	2.5	9711697
MEND Extract Tellurium (Te)	ug/L	<1.0	<1.0	<1.0	1.0	9711697
MEND Extract Thallium (Tl)	ug/L	0.14	0.15	<0.10	0.10	9711697
MEND Extract Thorium (Th)	ug/L	14.5	24.4	<0.25	0.25	9711697
MEND Extract Tin (Sn)	ug/L	<10	<10	<10	10	9711697
MEND Extract Titanium (Ti)	ug/L	<25	<25	<25	25	9711697
MEND Extract Tungsten (W)	ug/L	5.76	5.05	0.82 (1)	0.50	9711697
MEND Extract Uranium (U)	ug/L	18.4	50.7	<0.10	0.10	9711697
MEND Extract Vanadium (V)	ug/L	<10	22	<10	10	9711697
MEND Extract Zinc (Zn)	ug/L	664	1420	30.6 (1)	5.0	9711697
MEND Extract Zirconium (Zr)	ug/L	75.1	64.4	<5.0 (1)	5.0	9711697
MEND Extract Calcium (Ca)	ug/L	11200	17600	<2500	2500	9711697
MEND Extract Magnesium (Mg)	ug/L	59800	213000	<2500	2500	9711697
MEND Extract Potassium (K)	ug/L	4220	6160	<2500	2500	9711697
MEND Extract Sodium (Na)	ug/L	13900000	13300000	12700000	2500	9711697
MEND Extract Mercury (Hg)	ug/L	<2.5	<2.5	<2.5	2.5	9711697
MEND Extract Sulphur (S)	ug/L	<500000	<500000	<500000	500000	9711697
RDL = Reportable Detection Limit						
(1) Matrix Spike outside acceptance criteria due to sample matrix interference.						

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BV Labs Job #: B9A5746

Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

METALS BOUND TO FE & MN OXIDES TESSIER (SOLID)

BV Labs ID		XC2859		XC2865		XC5109		
Sampling Date		2019/12/04 00:00		2019/12/04 00:00		2019/12/04 00:00		
COC Number		08475863		08475863		08475863		
	UNITS	TRIAL 4 EXTRACT 4	RDL	TRIAL 8 EXTRACT 4	RDL	BLANK EXTRACT 4	RDL	QC Batch

Calculated Parameters								
Leachable Extraction Volume	mL	30.0		30.0		30.0		9762778
Leachable Aluminum (Al)	mg/kg	541	0.030	683	0.075	0.687	0.015	9762777
Leachable Antimony (Sb)	mg/kg	0.0410	0.0012	0.0504	0.0030	0.0151	0.00060	9762777
Leachable Arsenic (As)	mg/kg	1.02	0.0012	1.34	0.0030	0.00104	0.00060	9762777
Leachable Barium (Ba)	mg/kg	11.1	0.0012	14.7	0.0030	0.0512	0.00060	9762777
Leachable Beryllium (Be)	mg/kg	0.124	0.00060	0.184	0.0015	<0.00030	0.00030	9762777
Leachable Bismuth (Bi)	mg/kg	0.0866	0.00030	0.457	0.00075	0.00047	0.00015	9762777
Leachable Boron (B)	mg/kg	<3.0	3.0	<7.5	7.5	<1.5	1.5	9762777
Leachable Cadmium (Cd)	mg/kg	0.652	0.00030	1.91	0.00075	<0.00015	0.00015	9762777
Leachable Cesium (Cs)	mg/kg	0.0242	0.0030	0.0112	0.0075	<0.0015	0.0015	9762777
Leachable Chromium (Cr)	mg/kg	1.41	0.0060	1.38	0.015	0.215	0.0030	9762777
Leachable Cobalt (Co)	mg/kg	1.65	0.00030	2.41	0.00075	0.00308	0.00015	9762777
Leachable Copper (Cu)	mg/kg	6.05	0.0030	6.04	0.0075	0.0619	0.0015	9762777
Leachable Iron (Fe)	mg/kg	3950	0.060	5030	0.15	1.44	0.030	9762777
Leachable Lanthanum (La)	mg/kg	1.88	0.0030	3.11	0.0075	<0.0015	0.0015	9762777
Leachable Lead (Pb)	mg/kg	11.2	0.00030	20.3	0.00075	0.00423	0.00015	9762777
Leachable Lithium (Li)	mg/kg	1.85	0.030	2.63	0.075	<0.015	0.015	9762777
Leachable Manganese (Mn)	mg/kg	42.7	0.0030	51.6	0.0075	0.0395	0.0015	9762777
Leachable Molybdenum (Mo)	mg/kg	0.117	0.0030	0.135	0.0075	0.0191	0.0015	9762777
Leachable Nickel (Ni)	mg/kg	3.07	0.0012	4.92	0.0030	0.128	0.00060	9762777
Leachable Phosphorus (P)	mg/kg	10.5	0.12	7.98	0.30	0.234	0.060	9762777
Leachable Rubidium (Rb)	mg/kg	0.393	0.0030	0.276	0.0075	<0.0015	0.0015	9762777
Leachable Selenium (Se)	mg/kg	0.0308	0.0024	0.0630	0.0060	<0.0012	0.0012	9762777
Leachable Silicon (Si)	mg/kg	792	6.0	782	15	<3.0	3.0	9762777
Leachable Silver (Ag)	mg/kg	0.102	0.00030	0.0975	0.00075	0.00051	0.00015	9762777
Leachable Strontium (Sr)	mg/kg	0.851	0.0030	1.18	0.0075	0.0029	0.0015	9762777
Leachable Tellurium (Te)	mg/kg	<0.0012	0.0012	<0.0030	0.0030	<0.00060	0.00060	9762777
Leachable Thallium (Tl)	mg/kg	0.00686	0.00012	0.00595	0.00030	<0.000060	0.000060	9762777
Leachable Thorium (Th)	mg/kg	0.418	0.00030	0.285	0.00075	<0.00015	0.00015	9762777
Leachable Tin (Sn)	mg/kg	<0.012	0.012	<0.030	0.030	0.0077	0.0060	9762777
Leachable Titanium (Ti)	mg/kg	4.89	0.030	3.48	0.075	0.050	0.015	9762777

RDL = Reportable Detection Limit

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VERITAS

BV Labs Job #: B9A5746

Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

METALS BOUND TO FE & MN OXIDES TESSIER (SOLID)

BV Labs ID		XC2859		XC2865		XC5109		
Sampling Date		2019/12/04 00:00		2019/12/04 00:00		2019/12/04 00:00		
COC Number		08475863		08475863		08475863		
	UNITS	TRIAL 4 EXTRACT 4	RDL	TRIAL 8 EXTRACT 4	RDL	BLANK EXTRACT 4	RDL	QC Batch
Leachable Tungsten (W)	mg/kg	0.0410	0.00060	0.0390	0.0015	0.00145	0.00030	9762777
Leachable Uranium (U)	mg/kg	0.424	0.00012	0.524	0.00030	0.000060	0.000060	9762777
Leachable Vanadium (V)	mg/kg	2.28	0.012	2.97	0.030	<0.0060	0.0060	9762777
Leachable Zinc (Zn)	mg/kg	136	0.0060	259	0.015	0.0727	0.0030	9762777
Leachable Zirconium (Zr)	mg/kg	2.22	0.0060	1.99	0.015	0.0281	0.0030	9762777
Leachable Calcium (Ca)	mg/kg	148	3.0	223	7.5	<1.5	1.5	9762777
Leachable Magnesium (Mg)	mg/kg	533	3.0	667	7.5	<1.5	1.5	9762777
Leachable Potassium (K)	mg/kg	52.1	3.0	69.5	7.5	<1.5	1.5	9762777
Leachable Sodium (Na)	mg/kg	3940	3.0	4180	7.5	27.2	1.5	9762777
Leachable Mercury (Hg)	mg/kg	0.0038	0.0030	<0.0075	0.0075	<0.0015	0.0015	9762777
Leachable Sulphur (S)	mg/kg	<600	600	<1500	1500	<300	300	9762777
Dissolved Metals by ICPMS								
MEND Extract Aluminum (Al)	ug/L	18000	1.0	22800	2.5	22.9	0.50	9713829
MEND Extract Antimony (Sb)	ug/L	1.37	0.040	1.68	0.10	0.503	0.020	9713829
MEND Extract Arsenic (As)	ug/L	33.9	0.040	44.7	0.10	0.035	0.020	9713829
MEND Extract Barium (Ba)	ug/L	370	0.040	489	0.10	1.71	0.020	9713829
MEND Extract Beryllium (Be)	ug/L	4.13	0.020	6.14	0.050	<0.010	0.010	9713829
MEND Extract Bismuth (Bi)	ug/L	2.89	0.010	15.2	0.025	0.0155	0.0050	9713829
MEND Extract Boron (B)	ug/L	<100	100	<250	250	<50	50	9713829
MEND Extract Cadmium (Cd)	ug/L	21.7	0.010	63.7	0.025	<0.0050	0.0050	9713829
MEND Extract Cesium (Cs)	ug/L	0.81	0.10	0.37	0.25	<0.050	0.050	9713829
MEND Extract Chromium (Cr)	ug/L	46.9	0.20	45.9	0.50	7.17	0.10	9713829
MEND Extract Cobalt (Co)	ug/L	54.9	0.010	80.2	0.025	0.103	0.0050	9713829
MEND Extract Copper (Cu)	ug/L	202	0.10	201	0.25	2.06	0.050	9713829
MEND Extract Iron (Fe)	ug/L	132000	2.0	168000	5.0	48.2	1.0	9713829
MEND Extract Lanthanum (La)	ug/L	62.6	0.10	104	0.25	<0.050	0.050	9713829
MEND Extract Lead (Pb)	ug/L	374	0.010	678	0.025	0.141	0.0050	9713829
MEND Extract Lithium (Li)	ug/L	61.8	1.0	87.7	2.5	<0.50	0.50	9713829
MEND Extract Manganese (Mn)	ug/L	1420	0.10	1720	0.25	1.32	0.050	9713829
MEND Extract Molybdenum (Mo)	ug/L	3.90	0.10	4.48	0.25	0.635	0.050	9713829
MEND Extract Nickel (Ni)	ug/L	102	0.040	164	0.10	4.27	0.020	9713829
MEND Extract Phosphorus (P)	ug/L	349	4.0	266	10	7.8	2.0	9713829
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B9A5746
Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

METALS BOUND TO FE & MN OXIDES TESSIER (SOLID)

BV Labs ID		XC2859		XC2865		XC5109		
Sampling Date		2019/12/04 00:00		2019/12/04 00:00		2019/12/04 00:00		
COC Number		08475863		08475863		08475863		
	UNITS	TRIAL 4 EXTRACT 4	RDL	TRIAL 8 EXTRACT 4	RDL	BLANK EXTRACT 4	RDL	QC Batch
MEND Extract Rubidium (Rb)	ug/L	13.1	0.10	9.19	0.25	<0.050	0.050	9713829
MEND Extract Selenium (Se)	ug/L	1.03	0.080	2.10	0.20	<0.040	0.040	9713829
MEND Extract Silicon (Si)	ug/L	26400	200	26100	500	<100	100	9713829
MEND Extract Silver (Ag)	ug/L	3.41	0.010	3.25	0.025	0.0170	0.0050	9713829
MEND Extract Strontium (Sr)	ug/L	28.4	0.10	39.5	0.25	0.098	0.050	9713829
MEND Extract Tellurium (Te)	ug/L	<0.040	0.040	<0.10	0.10	<0.020	0.020	9713829
MEND Extract Thallium (Tl)	ug/L	0.229	0.0040	0.198	0.010	<0.0020	0.0020	9713829
MEND Extract Thorium (Th)	ug/L	13.9	0.010	9.51	0.025	<0.0050	0.0050	9713829
MEND Extract Tin (Sn)	ug/L	<0.40	0.40	<1.0	1.0	0.26	0.20	9713829
MEND Extract Titanium (Ti)	ug/L	163	1.0	116	2.5	1.66	0.50	9713829
MEND Extract Tungsten (W)	ug/L	1.37	0.020	1.30	0.050	0.048	0.010	9713829
MEND Extract Uranium (U)	ug/L	14.1	0.0040	17.5	0.010	0.0020	0.0020	9713829
MEND Extract Vanadium (V)	ug/L	76.0	0.40	99.0	1.0	<0.20	0.20	9713829
MEND Extract Zinc (Zn)	ug/L	4530	0.20	8620	0.50	2.42	0.10	9713829
MEND Extract Zirconium (Zr)	ug/L	74.1	0.20	66.2	0.50	0.94	0.10	9713829
MEND Extract Calcium (Ca)	ug/L	4950	100	7430	250	<50	50	9713829
MEND Extract Magnesium (Mg)	ug/L	17800	100	22200	250	<50	50	9713829
MEND Extract Potassium (K)	ug/L	1740	100	2320	250	<50	50	9713829
MEND Extract Sodium (Na)	ug/L	131000	100	139000	250	907	50	9713829
MEND Extract Mercury (Hg)	ug/L	0.13	0.10	<0.25	0.25	<0.050	0.050	9713829
MEND Extract Sulphur (S)	ug/L	<20000	20000	<50000	50000	<10000	10000	9713829
RDL = Reportable Detection Limit								

**METALLS BOUND IN ORGANICS BY TESSIER (SOLID)**

BV Labs ID		XC2860		XC2866		XC5110		
Sampling Date		2019/12/04 00:00		2019/12/04 00:00		2019/12/04 00:00		
COC Number		08475863		08475863		08475863		
	UNITS	TRIAL 4 EXTRACT 5	RDL	TRIAL 8 EXTRACT 5	RDL	BLANK EXTRACT 5	RDL	QC Batch

Calculated Parameters								
Leachable Extraction Volume	mL	30.0		30.0		30.0		9762778
Leachable Aluminum (Al)	mg/kg	715	0.075	1110	0.15	0.390	0.015	9762777
Leachable Antimony (Sb)	mg/kg	0.0149	0.0030	0.0313	0.0060	0.00083	0.00060	9762777
Leachable Arsenic (As)	mg/kg	0.452	0.0030	0.729	0.0060	0.00111	0.00060	9762777
Leachable Barium (Ba)	mg/kg	3.81	0.0030	3.95	0.0060	0.0130	0.00060	9762777
Leachable Beryllium (Be)	mg/kg	0.0144	0.0015	0.0260	0.0030	0.00048	0.00030	9762777
Leachable Bismuth (Bi)	mg/kg	0.0142	0.00075	0.0798	0.0015	0.00084	0.00015	9762777
Leachable Boron (B)	mg/kg	<7.5	7.5	<15	15	<1.5	1.5	9762777
Leachable Cadmium (Cd)	mg/kg	0.0489	0.00075	0.0754	0.0015	0.00065	0.00015	9762777
Leachable Cesium (Cs)	mg/kg	0.0763	0.0075	0.056	0.015	<0.0015	0.0015	9762777
Leachable Chromium (Cr)	mg/kg	0.700	0.015	1.65	0.030	0.0440	0.0030	9762777
Leachable Cobalt (Co)	mg/kg	0.960	0.00075	1.94	0.0015	0.00370	0.00015	9762777
Leachable Copper (Cu)	mg/kg	11.8	0.0075	25.1	0.015	0.0306	0.0015	9762777
Leachable Iron (Fe)	mg/kg	579	0.15	868	0.30	0.456	0.030	9762777
Leachable Lanthanum (La)	mg/kg	3.81	0.0075	6.25	0.015	<0.0015	0.0015	9762777
Leachable Lead (Pb)	mg/kg	2.09	0.00075	4.81	0.0015	0.0643	0.00015	9762777
Leachable Lithium (Li)	mg/kg	0.649	0.075	1.14	0.15	<0.015	0.015	9762777
Leachable Manganese (Mn)	mg/kg	8.71	0.0075	13.0	0.015	0.0186	0.0015	9762777
Leachable Molybdenum (Mo)	mg/kg	0.0944	0.0075	0.092	0.015	0.0053	0.0015	9762777
Leachable Nickel (Ni)	mg/kg	1.08	0.0030	2.28	0.0060	0.0405	0.00060	9762777
Leachable Phosphorus (P)	mg/kg	351	0.30	448	0.60	1.98	0.060	9762777
Leachable Rubidium (Rb)	mg/kg	0.559	0.0075	0.525	0.015	<0.0015	0.0015	9762777
Leachable Selenium (Se)	mg/kg	0.127	0.0060	0.385	0.012	<0.0012	0.0012	9762777
Leachable Silicon (Si)	mg/kg	474	15	624	30	<3.0	3.0	9762777
Leachable Silver (Ag)	mg/kg	0.0592	0.00075	0.0468	0.0015	0.00031	0.00015	9762777
Leachable Strontium (Sr)	mg/kg	2.09	0.0075	2.74	0.015	0.0037	0.0015	9762777
Leachable Tellurium (Te)	mg/kg	<0.0030	0.0030	<0.0060	0.0060	<0.00060	0.00060	9762777
Leachable Thallium (Tl)	mg/kg	0.0104	0.00030	0.0165	0.00060	0.000096	0.000060	9762777
Leachable Thorium (Th)	mg/kg	0.617	0.00075	0.970	0.0015	0.00029	0.00015	9762777
Leachable Tin (Sn)	mg/kg	0.306	0.030	0.217	0.060	0.888	0.0060	9762777
Leachable Titanium (Ti)	mg/kg	17.9	0.075	18.0	0.15	0.085	0.015	9762777

RDL = Reportable Detection Limit

**METALLS BOUND IN ORGANICS BY TESSIER (SOLID)**

BV Labs ID		XC2860		XC2866		XC5110		
Sampling Date		2019/12/04 00:00		2019/12/04 00:00		2019/12/04 00:00		
COC Number		08475863		08475863		08475863		
	UNITS	TRIAL 4 EXTRACT 5	RDL	TRIAL 8 EXTRACT 5	RDL	BLANK EXTRACT 5	RDL	QC Batch
Leachable Tungsten (W)	mg/kg	0.0963	0.0015	0.0885	0.0030	0.0157	0.00030	9762777
Leachable Uranium (U)	mg/kg	0.0996	0.00030	0.226	0.00060	0.000204	0.000060	9762777
Leachable Vanadium (V)	mg/kg	1.14	0.030	1.74	0.060	<0.0060	0.0060	9762777
Leachable Zinc (Zn)	mg/kg	20.8	0.015	37.9	0.030	0.286	0.0030	9762777
Leachable Zirconium (Zr)	mg/kg	3.14	0.015	6.07	0.030	0.421	0.0030	9762777
Leachable Calcium (Ca)	mg/kg	831	7.5	1050	15	<1.5	1.5	9762777
Leachable Magnesium (Mg)	mg/kg	238	7.5	385	15	<1.5	1.5	9762777
Leachable Potassium (K)	mg/kg	61.9	7.5	50	15	<1.5	1.5	9762777
Leachable Sodium (Na)	mg/kg	123	7.5	62	15	<1.5	1.5	9762777
Leachable Mercury (Hg)	mg/kg	<0.0075	0.0075	<0.015	0.015	<0.0015	0.0015	9762777
Leachable Sulphur (S)	mg/kg	<1500	1500	<3000	3000	<300	300	9762777
Dissolved Metals by ICPMS								
MEND Extract Aluminum (Al)	ug/L	23800	2.5	37100	5.0	13.0	0.50	9714724
MEND Extract Antimony (Sb)	ug/L	0.50	0.10	1.04	0.20	0.028	0.020	9714724
MEND Extract Arsenic (As)	ug/L	15.1	0.10	24.3	0.20	0.037 (1)	0.020	9714724
MEND Extract Barium (Ba)	ug/L	127	0.10	132	0.20	0.433	0.020	9714724
MEND Extract Beryllium (Be)	ug/L	0.479	0.050	0.87	0.10	0.016	0.010	9714724
MEND Extract Bismuth (Bi)	ug/L	0.475	0.025	2.66	0.050	0.0279	0.0050	9714724
MEND Extract Boron (B)	ug/L	<250	250	<500	500	<50	50	9714724
MEND Extract Cadmium (Cd)	ug/L	1.63	0.025	2.51	0.050	0.0215	0.0050	9714724
MEND Extract Cesium (Cs)	ug/L	2.54	0.25	1.86	0.50	<0.050	0.050	9714724
MEND Extract Chromium (Cr)	ug/L	23.3	0.50	55.1	1.0	1.47	0.10	9714724
MEND Extract Cobalt (Co)	ug/L	32.0	0.025	64.6	0.050	0.123	0.0050	9714724
MEND Extract Copper (Cu)	ug/L	394	0.25	836	0.50	1.02	0.050	9714724
MEND Extract Iron (Fe)	ug/L	19300	5.0	28900	10	15.2	1.0	9714724
MEND Extract Lanthanum (La)	ug/L	127	0.25	208	0.50	<0.050	0.050	9714724
MEND Extract Lead (Pb)	ug/L	69.5	0.025	160	0.050	2.14	0.0050	9714724
MEND Extract Lithium (Li)	ug/L	21.6	2.5	38.1	5.0	<0.50	0.50	9714724
MEND Extract Manganese (Mn)	ug/L	290	0.25	432	0.50	0.619	0.050	9714724
MEND Extract Molybdenum (Mo)	ug/L	3.15	0.25	3.06	0.50	0.177	0.050	9714724
MEND Extract Nickel (Ni)	ug/L	35.9	0.10	76.0	0.20	1.35	0.020	9714724
RDL = Reportable Detection Limit								
(1) Matrix Spike outside acceptance criteria due to sample matrix interference.								

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VERITAS

BV Labs Job #: B9A5746

Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

METALLS BOUND IN ORGANICS BY TESSIER (SOLID)

BV Labs ID		XC2860		XC2866		XC5110		
Sampling Date		2019/12/04 00:00		2019/12/04 00:00		2019/12/04 00:00		
COC Number		08475863		08475863		08475863		
	UNITS	TRIAL 4 EXTRACT 5	RDL	TRIAL 8 EXTRACT 5	RDL	BLANK EXTRACT 5	RDL	QC Batch
MEND Extract Phosphorus (P)	ug/L	11700	10	14900	20	66.1	2.0	9714724
MEND Extract Rubidium (Rb)	ug/L	18.6	0.25	17.5	0.50	<0.050	0.050	9714724
MEND Extract Selenium (Se)	ug/L	4.23	0.20	12.8	0.40	<0.040 (1)	0.040	9714724
MEND Extract Silicon (Si)	ug/L	15800	500	20800	1000	<100	100	9714724
MEND Extract Silver (Ag)	ug/L	1.97	0.025	1.56	0.050	0.0102	0.0050	9714724
MEND Extract Strontium (Sr)	ug/L	69.5	0.25	91.3	0.50	0.123	0.050	9714724
MEND Extract Tellurium (Te)	ug/L	<0.10	0.10	<0.20	0.20	<0.020	0.020	9714724
MEND Extract Thallium (Tl)	ug/L	0.345	0.010	0.551	0.020	0.0032	0.0020	9714724
MEND Extract Thorium (Th)	ug/L	20.6	0.025	32.3	0.050	0.0098	0.0050	9714724
MEND Extract Tin (Sn)	ug/L	10.2	1.0	7.2	2.0	29.6	0.20	9714724
MEND Extract Titanium (Ti)	ug/L	596	2.5	599	5.0	2.82	0.50	9714724
MEND Extract Tungsten (W)	ug/L	3.21	0.050	2.95	0.10	0.524	0.010	9714724
MEND Extract Uranium (U)	ug/L	3.32	0.010	7.54	0.020	0.0068	0.0020	9714724
MEND Extract Vanadium (V)	ug/L	38.1	1.0	57.9	2.0	<0.20	0.20	9714724
MEND Extract Zinc (Zn)	ug/L	692	0.50	1260	1.0	9.53	0.10	9714724
MEND Extract Zirconium (Zr)	ug/L	105	0.50	202	1.0	14.0	0.10	9714724
MEND Extract Calcium (Ca)	ug/L	27700	250	35100	500	<50	50	9714724
MEND Extract Magnesium (Mg)	ug/L	7920	250	12800	500	<50	50	9714724
MEND Extract Potassium (K)	ug/L	2060	250	1680	500	<50	50	9714724
MEND Extract Sodium (Na)	ug/L	4110	250	2050	500	<50	50	9714724
MEND Extract Mercury (Hg)	ug/L	<0.25	0.25	<0.50	0.50	<0.050	0.050	9714724
MEND Extract Sulphur (S)	ug/L	<50000	50000	<100000	100000	<10000	10000	9714724

RDL = Reportable Detection Limit

(1) Matrix Spike outside acceptance criteria due to sample matrix interference.



BUREAU
VERITAS

BV Labs Job #: B9A5746
Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESIDUAL METALS BY TESSIER LEACH (SOLID)

BV Labs ID		XC2861	XC2867		
Sampling Date		2019/12/04 00:00	2019/12/04 00:00		
COC Number		08475863	08475863		
	UNITS	TRIAL 4 EXTRACT 6	TRIAL 8 EXTRACT 6	RDL	QC Batch
Total Metals by ICPMS					
1TMS Iron (Fe)	mg/kg	16400	21000	200	9736768
1TMS Molybdenum (Mo)	mg/kg	0.80	0.97	0.05	9736797
1TMS Silver (Ag)	mg/kg	0.04	0.03	0.02	9736774
1TMS Calcium (Ca)	mg/kg	3400	4600	200	9736768
1TMS Copper (Cu)	mg/kg	9.3	12.3	0.1	9736797
1TMS Lead (Pb)	mg/kg	8.25	9.29	0.02	9736797
1TMS Phosphorus (P)	mg/kg	170	180	10	9736768
1TMS Magnesium (Mg)	mg/kg	6100	8400	200	9736768
1TMS Titanium (Ti)	mg/kg	2770	4080	10	9736768
1TMS Zinc (Zn)	mg/kg	73.5	110	0.2	9736797
1TMS Aluminum (Al)	mg/kg	46800	52600	200	9736768
1TMS Nickel (Ni)	mg/kg	6.9	10.2	0.1	9736797
1TMS Cobalt (Co)	mg/kg	3.3	4.9	0.2	9736797
1TMS Sodium (Na)	mg/kg	6040	8610	20	9736768
1TMS Manganese (Mn)	mg/kg	164	203	2	9736797
1TMS Potassium (K)	mg/kg	32000	32500	200	9736768
1TMS Arsenic (As)	mg/kg	3.9	7.2	0.2	9736797
1TMS Sulphur (S)	mg/kg	<400	<400	400	9736768
1TMS Uranium (U)	mg/kg	2.6	2.7	0.1	9736797
1TMS Thorium (Th)	mg/kg	13.1	14.5	0.1	9736797
1TMS Strontium (Sr)	mg/kg	51	69	1	9736797
1TMS Cadmium (Cd)	mg/kg	<0.02	<0.02	0.02	9736797
1TMS Antimony (Sb)	mg/kg	0.46	0.80	0.02	9736797
1TMS Bismuth (Bi)	mg/kg	0.12	0.38	0.04	9736797
1TMS Vanadium (V)	mg/kg	40	62	1	9736797
1TMS Lanthanum (La)	mg/kg	25.5	35.1	0.1	9736797
1TMS Chromium (Cr)	mg/kg	17	28	1	9736797
1TMS Barium (Ba)	mg/kg	928	983	1	9736797
1TMS Tungsten (W)	mg/kg	1.9	2.6	0.1	9736797
1TMS Cerium (Ce)	mg/kg	52.0	68.8	0.02	9736797
1TMS Tin (Sn)	mg/kg	5.1	6.4	0.1	9736797
RDL = Reportable Detection Limit					



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VERITAS

BV Labs Job #: B9A5746
Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESIDUAL METALS BY TESSIER LEACH (SOLID)

BV Labs ID		XC2861	XC2867		
Sampling Date		2019/12/04 00:00	2019/12/04 00:00		
COC Number		08475863	08475863		
	UNITS	TRIAL 4 EXTRACT 6	TRIAL 8 EXTRACT 6	RDL	QC Batch
1TMS Lithium (Li)	mg/kg	21.0	29.3	0.1	9736797
1TMS Zirconium (Zr)	mg/kg	129	176	0.2	9736797
1TMS Scandium (Sc)	mg/kg	5.3	7.9	0.1	9736797
1TMS Holmium (Ho)	mg/kg	0.4	0.5	0.1	9736797
1TMS Hafnium (Hf)	mg/kg	2.67	2.72	0.02	9736797
1TMS Praseodymium (Pr)	mg/kg	6.2	7.9	0.1	9736797
1TMS Beryllium (Be)	mg/kg	2	3	1	9736797
1TMS Lutetium (Lu)	mg/kg	0.2	0.2	0.1	9736797
1TMS Niobium (Nb)	mg/kg	14.9	18.0	0.04	9736797
1TMS Thallium (Tl)	mg/kg	0.73	0.86	0.05	9736797
1TMS Selenium (Se)	mg/kg	0.3	0.4	0.3	9736797
1TMS Gadolinium (Gd)	mg/kg	2.7	4.1	0.1	9736797
1TMS Thulium (Tm)	mg/kg	0.2	0.2	0.1	9736797
1TMS Dysprosium (Dy)	mg/kg	2.3	2.8	0.1	9736797
1TMS Terbium (Tb)	mg/kg	0.4	0.5	0.1	9736797
1TMS Yttrium (Y)	mg/kg	10.3	12.1	0.1	9736797
1TMS Ytterbium (Yb)	mg/kg	1.3	1.5	0.1	9736797
1TMS Tellurium (Te)	mg/kg	<0.05	<0.05	0.05	9736797
1TMS Tantalum (Ta)	mg/kg	1.5	1.2	0.1	9736797
1TMS Gallium (Ga)	mg/kg	13.9	17.9	0.02	9736797
1TMS Cesium (Cs)	mg/kg	2.1	3.0	0.1	9736797
1TMS Rubidium (Rb)	mg/kg	93.5	107	0.1	9736797
1TMS Neodymium (Nd)	mg/kg	20.3	27.8	0.1	9736797
1TMS Europium (Eu)	mg/kg	0.6	0.6	0.1	9736797
1TMS Samarium (Sm)	mg/kg	4.0	5.2	0.1	9736797
1TMS Erbium (Er)	mg/kg	1.2	1.3	0.1	9736797
1TMS Indium (In)	mg/kg	0.06	0.06	0.01	9736797
1TMS Rhenium (Re)	mg/kg	<0.002	<0.002	0.002	9736797
RDL = Reportable Detection Limit					



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BV Labs Job #: B9A5746
Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF SOIL

BV Labs ID		XB9860	XB9861	XB9862	XB9863	
Sampling Date		2019/12/04 11:00	2019/12/04 11:00	2019/12/04 11:00	2019/12/09 11:45	
COC Number		08475863	08475863	08475863	08475863	
	UNITS	TRIAL 3	TRIAL 4	TRIAL 8	SOIL INOCULUM	QC Batch
External Sublet Analysis						
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	9719219



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BV Labs Job #: B9A5746
Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

BV Labs ID		XC5107		
Sampling Date		2019/12/04 00:00		
COC Number		08475863		
	UNITS	BLANK EXTRACT 2	RDL	QC Batch
Dissolved Metals by ICPMS				
MEND Extract Aluminum (Al)	ug/L	318	100	9711697
MEND Extract Antimony (Sb)	ug/L	<4.0	4.0	9711697
MEND Extract Arsenic (As)	ug/L	<4.0	4.0	9711697
MEND Extract Barium (Ba)	ug/L	<4.0	4.0	9711697
MEND Extract Beryllium (Be)	ug/L	<2.0	2.0	9711697
MEND Extract Bismuth (Bi)	ug/L	<1.0	1.0	9711697
MEND Extract Boron (B)	ug/L	<10000	10000	9711697
MEND Extract Cadmium (Cd)	ug/L	<1.0	1.0	9711697
MEND Extract Cesium (Cs)	ug/L	<10	10	9711697
MEND Extract Chromium (Cr)	ug/L	<20	20	9711697
MEND Extract Cobalt (Co)	ug/L	<1.0	1.0	9711697
MEND Extract Copper (Cu)	ug/L	<10	10	9711697
MEND Extract Iron (Fe)	ug/L	<200	200	9711697
MEND Extract Lanthanum (La)	ug/L	<10	10	9711697
MEND Extract Lead (Pb)	ug/L	<1.0	1.0	9711697
MEND Extract Lithium (Li)	ug/L	<100	100	9711697
MEND Extract Manganese (Mn)	ug/L	<10	10	9711697
MEND Extract Molybdenum (Mo)	ug/L	<10	10	9711697
MEND Extract Nickel (Ni)	ug/L	14.5	4.0	9711697
MEND Extract Phosphorus (P)	ug/L	<400	400	9711697
MEND Extract Rubidium (Rb)	ug/L	<10	10	9711697
MEND Extract Selenium (Se)	ug/L	<8.0	8.0	9711697
MEND Extract Silicon (Si)	ug/L	<20000	20000	9711697
MEND Extract Silver (Ag)	ug/L	<1.0	1.0	9711697
MEND Extract Strontium (Sr)	ug/L	<10	10	9711697
MEND Extract Tellurium (Te)	ug/L	<4.0	4.0	9711697
MEND Extract Thallium (Tl)	ug/L	<0.40	0.40	9711697
MEND Extract Thorium (Th)	ug/L	<1.0	1.0	9711697
MEND Extract Tin (Sn)	ug/L	<40	40	9711697
MEND Extract Titanium (Ti)	ug/L	<100	100	9711697
MEND Extract Tungsten (W)	ug/L	36.5	2.0	9711697
RDL = Reportable Detection Limit				



ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

BV Labs ID		XC5107		
Sampling Date		2019/12/04 00:00		
COC Number		08475863		
	UNITS	BLANK EXTRACT 2	RDL	QC Batch
MEND Extract Uranium (U)	ug/L	<0.40	0.40	9711697
MEND Extract Vanadium (V)	ug/L	<40	40	9711697
MEND Extract Zinc (Zn)	ug/L	57	20	9711697
MEND Extract Zirconium (Zr)	ug/L	35	20	9711697
MEND Extract Calcium (Ca)	ug/L	<10000	10000	9711697
MEND Extract Magnesium (Mg)	ug/L	14300000	10000	9711697
MEND Extract Potassium (K)	ug/L	<10000	10000	9711697
MEND Extract Sodium (Na)	ug/L	126000	10000	9711697
MEND Extract Mercury (Hg)	ug/L	<10	10	9711697
MEND Extract Sulphur (S)	ug/L	<2000000	2000000	9711697
RDL = Reportable Detection Limit				



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.0°C
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Version 2: Report revised to included updated report for AVS/SEM Subcontracted Data. 2020/02/03

EXCHANGEABLE METALS BY TESSIER LEACH (SOLID) Comments

Matrix Spike ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Sample XC2857 [TRIAL 4 EXTRACT 2] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Sample XC2863 [TRIAL 8 EXTRACT 2] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

METALS BOUND TO CARBONATES BY TESSIER (SOLID) Comments

Matrix Spike ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Sample XC2858 [TRIAL 4 EXTRACT 3] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Sample XC2864 [TRIAL 8 EXTRACT 3] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Sample XC5108 [BLANK EXTRACT 3] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

METALS BOUND TO FE & MN OXIDES TESSIER (SOLID) Comments

Sample XC2859 [TRIAL 4 EXTRACT 4] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Sample XC2865 [TRIAL 8 EXTRACT 4] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

METALLS BOUND IN ORGANICS BY TESSIER (SOLID) Comments

Sample XC2860 [TRIAL 4 EXTRACT 5] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Sample XC2866 [TRIAL 8 EXTRACT 5] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID) Comments

Matrix Spike ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Sample XC5107 [BLANK EXTRACT 2] ICP-MS DissMET MEND SFE Extract: RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.



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BV Labs Job #: B9A5746

Report Date: 2020/02/11

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9711697	MEND Extract Aluminum (Al)	2019/12/18	99	80 - 120	98	80 - 120	<0.50	ug/L	6.2	20		
9711697	MEND Extract Antimony (Sb)	2019/12/18	109	80 - 120	103	80 - 120	<0.020	ug/L	NC	20		
9711697	MEND Extract Arsenic (As)	2019/12/18	113	80 - 120	99	80 - 120	<0.020	ug/L	NC	20		
9711697	MEND Extract Barium (Ba)	2019/12/18	102	80 - 120	103	80 - 120	<0.020	ug/L	0.49	20		
9711697	MEND Extract Beryllium (Be)	2019/12/18	99	80 - 120	96	80 - 120	<0.010	ug/L	NC	20		
9711697	MEND Extract Bismuth (Bi)	2019/12/18	96	80 - 120	103	80 - 120	<0.0050	ug/L	NC	20		
9711697	MEND Extract Boron (B)	2019/12/18	113	80 - 120	100	80 - 120	<50	ug/L	NC	20		
9711697	MEND Extract Cadmium (Cd)	2019/12/18	102	80 - 120	103	80 - 120	<0.0050	ug/L	NC	20		
9711697	MEND Extract Calcium (Ca)	2019/12/18	109	80 - 120	106	80 - 120	<50	ug/L	NC	20		
9711697	MEND Extract Cesium (Cs)	2019/12/18	106	80 - 120	99	80 - 120	<0.050	ug/L	NC	20		
9711697	MEND Extract Chromium (Cr)	2019/12/18	98	80 - 120	102	80 - 120	<0.10	ug/L	NC	20		
9711697	MEND Extract Cobalt (Co)	2019/12/18	96	80 - 120	101	80 - 120	<0.0050	ug/L	NC	20		
9711697	MEND Extract Copper (Cu)	2019/12/18	91	80 - 120	100	80 - 120	<0.050	ug/L	12	20		
9711697	MEND Extract Iron (Fe)	2019/12/18	100	80 - 120	109	80 - 120	<1.0	ug/L	NC	20		
9711697	MEND Extract Lanthanum (La)	2019/12/18	104	80 - 120	103	80 - 120	<0.050	ug/L	NC	20		
9711697	MEND Extract Lead (Pb)	2019/12/18	132 (1)	80 - 120	106	80 - 120	<0.0050	ug/L	9.2	20		
9711697	MEND Extract Lithium (Li)	2019/12/18	104	80 - 120	91	80 - 120	<0.50	ug/L	NC	20		
9711697	MEND Extract Magnesium (Mg)	2019/12/18	106	80 - 120	105	80 - 120	<50	ug/L	NC	20		
9711697	MEND Extract Manganese (Mn)	2019/12/18	97	80 - 120	105	80 - 120	<0.050	ug/L	NC	20		
9711697	MEND Extract Mercury (Hg)	2019/12/18	86	80 - 120	99	80 - 120	<0.050	ug/L	NC	N/A		
9711697	MEND Extract Molybdenum (Mo)	2019/12/18	112	80 - 120	102	80 - 120	<0.050	ug/L	NC	20		
9711697	MEND Extract Nickel (Ni)	2019/12/18	101	80 - 120	101	80 - 120	<0.020	ug/L	NC	20		
9711697	MEND Extract Phosphorus (P)	2019/12/18	112	80 - 120	96	80 - 120	<2.0	ug/L	9.5	20		
9711697	MEND Extract Potassium (K)	2019/12/18	107	80 - 120	104	80 - 120	<50	ug/L	NC	20		
9711697	MEND Extract Rubidium (Rb)	2019/12/18	104	80 - 120	103	80 - 120	<0.050	ug/L	NC	20		
9711697	MEND Extract Selenium (Se)	2019/12/18	106	80 - 120	103	80 - 120	<0.040	ug/L	NC	20		
9711697	MEND Extract Silicon (Si)	2019/12/18	110	80 - 120	98	80 - 120	<100	ug/L	NC	20		
9711697	MEND Extract Silver (Ag)	2019/12/18	81	80 - 120	100	80 - 120	<0.0050	ug/L	NC	20		
9711697	MEND Extract Sodium (Na)	2019/12/18	NC	80 - 120	107	80 - 120	<50	ug/L	2.1	20		
9711697	MEND Extract Strontium (Sr)	2019/12/18	110	80 - 120	101	80 - 120	<0.050	ug/L	NC	20		
9711697	MEND Extract Sulphur (S)	2019/12/18	106	80 - 120	102	80 - 120	<10000	ug/L	NC	20		
9711697	MEND Extract Tellurium (Te)	2019/12/18	105	80 - 120	101	80 - 120	<0.020	ug/L	NC	20		

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BV Labs Job #: B9A5746

Report Date: 2020/02/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9711697	MEND Extract Thallium (Tl)	2019/12/18	103	80 - 120	102	80 - 120	<0.0020	ug/L	NC	20		
9711697	MEND Extract Thorium (Th)	2019/12/18	90	80 - 120	100	80 - 120	<0.0050	ug/L	NC	20		
9711697	MEND Extract Tin (Sn)	2019/12/18	105	80 - 120	102	80 - 120	<0.20	ug/L	NC	20		
9711697	MEND Extract Titanium (Ti)	2019/12/18	112	80 - 120	103	80 - 120	<0.50	ug/L	NC	20		
9711697	MEND Extract Tungsten (W)	2019/12/18	143 (1)	80 - 120	102	80 - 120	<0.010	ug/L	2.9	20		
9711697	MEND Extract Uranium (U)	2019/12/18	108	80 - 120	107	80 - 120	<0.0020	ug/L	NC	20		
9711697	MEND Extract Vanadium (V)	2019/12/18	111	80 - 120	102	80 - 120	<0.20	ug/L	NC	20		
9711697	MEND Extract Zinc (Zn)	2019/12/18	348 (1)	80 - 120	108	80 - 120	<0.10	ug/L	3.9	20		
9711697	MEND Extract Zirconium (Zr)	2019/12/18	48 (1)	80 - 120	99	80 - 120	<0.10	ug/L	NC	20		
9713829	MEND Extract Aluminum (Al)	2019/12/19							1.6	20		
9713829	MEND Extract Antimony (Sb)	2019/12/19							6.8	20		
9713829	MEND Extract Arsenic (As)	2019/12/19							NC	20		
9713829	MEND Extract Barium (Ba)	2019/12/19							2.8	20		
9713829	MEND Extract Beryllium (Be)	2019/12/19							NC	20		
9713829	MEND Extract Bismuth (Bi)	2019/12/19							8.0	20		
9713829	MEND Extract Boron (B)	2019/12/19							NC	20		
9713829	MEND Extract Cadmium (Cd)	2019/12/19							NC	20		
9713829	MEND Extract Calcium (Ca)	2019/12/19							NC	20		
9713829	MEND Extract Cesium (Cs)	2019/12/19							NC	20		
9713829	MEND Extract Chromium (Cr)	2019/12/19							1.0	20		
9713829	MEND Extract Cobalt (Co)	2019/12/19							5.6	20		
9713829	MEND Extract Copper (Cu)	2019/12/19							2.5	20		
9713829	MEND Extract Iron (Fe)	2019/12/19							0.19	20		
9713829	MEND Extract Lanthanum (La)	2019/12/19							NC	20		
9713829	MEND Extract Lead (Pb)	2019/12/19							4.6	20		
9713829	MEND Extract Lithium (Li)	2019/12/19							NC	20		
9713829	MEND Extract Magnesium (Mg)	2019/12/19							NC	20		
9713829	MEND Extract Manganese (Mn)	2019/12/19							5.2	20		
9713829	MEND Extract Mercury (Hg)	2019/12/19							NC	N/A		
9713829	MEND Extract Molybdenum (Mo)	2019/12/19							2.4	20		
9713829	MEND Extract Nickel (Ni)	2019/12/19							1.3	20		
9713829	MEND Extract Phosphorus (P)	2019/12/19							13	20		

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QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9713829	MEND Extract Potassium (K)	2019/12/19							NC	20		
9713829	MEND Extract Rubidium (Rb)	2019/12/19							NC	20		
9713829	MEND Extract Selenium (Se)	2019/12/19							NC	20		
9713829	MEND Extract Silicon (Si)	2019/12/19							NC	20		
9713829	MEND Extract Silver (Ag)	2019/12/19							7.3	20		
9713829	MEND Extract Sodium (Na)	2019/12/19							2.4	20		
9713829	MEND Extract Strontium (Sr)	2019/12/19							7.3	20		
9713829	MEND Extract Sulphur (S)	2019/12/19							NC	20		
9713829	MEND Extract Tellurium (Te)	2019/12/19							NC	20		
9713829	MEND Extract Thallium (Tl)	2019/12/19							NC	20		
9713829	MEND Extract Thorium (Th)	2019/12/19							NC	20		
9713829	MEND Extract Tin (Sn)	2019/12/19							4.4	20		
9713829	MEND Extract Titanium (Ti)	2019/12/19							NC	20		
9713829	MEND Extract Tungsten (W)	2019/12/19							8.9	20		
9713829	MEND Extract Uranium (U)	2019/12/19							14	20		
9713829	MEND Extract Vanadium (V)	2019/12/19							NC	20		
9713829	MEND Extract Zinc (Zn)	2019/12/19							2.3	20		
9713829	MEND Extract Zirconium (Zr)	2019/12/19							7.6	20		
9714724	MEND Extract Aluminum (Al)	2019/12/19	105	80 - 120	98	80 - 120	<0.50	ug/L	4.5	20		
9714724	MEND Extract Antimony (Sb)	2019/12/19	104	80 - 120	95	80 - 120	<0.020	ug/L	8.6	20		
9714724	MEND Extract Arsenic (As)	2019/12/19	121 (1)	80 - 120	98	80 - 120	<0.020	ug/L	NC	20		
9714724	MEND Extract Barium (Ba)	2019/12/19	100	80 - 120	95	80 - 120	<0.020	ug/L	6.0	20		
9714724	MEND Extract Beryllium (Be)	2019/12/19	104	80 - 120	100	80 - 120	<0.010	ug/L	19	20		
9714724	MEND Extract Bismuth (Bi)	2019/12/19	101	80 - 120	96	80 - 120	<0.0050	ug/L	3.3	20		
9714724	MEND Extract Boron (B)	2019/12/19	102	80 - 120	94	80 - 120	<50	ug/L	NC	20		
9714724	MEND Extract Cadmium (Cd)	2019/12/19	101	80 - 120	99	80 - 120	<0.0050	ug/L	NC	20		
9714724	MEND Extract Calcium (Ca)	2019/12/19	104	80 - 120	98	80 - 120	<50	ug/L	NC	20		
9714724	MEND Extract Cesium (Cs)	2019/12/19	96	80 - 120	92	80 - 120	<0.050	ug/L	NC	20		
9714724	MEND Extract Chromium (Cr)	2019/12/19	109	80 - 120	102	80 - 120	<0.10	ug/L	0.43	20		
9714724	MEND Extract Cobalt (Co)	2019/12/19	106	80 - 120	98	80 - 120	<0.0050	ug/L	1.7	20		
9714724	MEND Extract Copper (Cu)	2019/12/19	108	80 - 120	100	80 - 120	<0.050	ug/L	1.8	20		
9714724	MEND Extract Iron (Fe)	2019/12/19	106	80 - 120	99	80 - 120	<1.0	ug/L	2.0	20		

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BV Labs Job #: B9A5746

Report Date: 2020/02/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9714724	MEND Extract Lanthanum (La)	2019/12/19	101	80 - 120	96	80 - 120	<0.050	ug/L	NC	20		
9714724	MEND Extract Lead (Pb)	2019/12/19	102	80 - 120	99	80 - 120	<0.0050	ug/L	0.36	20		
9714724	MEND Extract Lithium (Li)	2019/12/19	98	80 - 120	96	80 - 120	<0.50	ug/L	NC	20		
9714724	MEND Extract Magnesium (Mg)	2019/12/19	113	80 - 120	106	80 - 120	<50	ug/L	NC	20		
9714724	MEND Extract Manganese (Mn)	2019/12/19	105	80 - 120	98	80 - 120	<0.050	ug/L	2.8	20		
9714724	MEND Extract Mercury (Hg)	2019/12/19	92	80 - 120	92	80 - 120	<0.050	ug/L	NC	N/A		
9714724	MEND Extract Molybdenum (Mo)	2019/12/19	103	80 - 120	97	80 - 120	<0.050	ug/L	8.0	20		
9714724	MEND Extract Nickel (Ni)	2019/12/19	110	80 - 120	101	80 - 120	<0.020	ug/L	3.7	20		
9714724	MEND Extract Phosphorus (P)	2019/12/19	120	80 - 120	97	80 - 120	<2.0	ug/L	3.6	20		
9714724	MEND Extract Potassium (K)	2019/12/19	105	80 - 120	99	80 - 120	<50	ug/L	1.8	20		
9714724	MEND Extract Rubidium (Rb)	2019/12/19	99	80 - 120	95	80 - 120	<0.050	ug/L	NC	20		
9714724	MEND Extract Selenium (Se)	2019/12/19	121 (1)	80 - 120	102	80 - 120	<0.040	ug/L	NC	20		
9714724	MEND Extract Silicon (Si)	2019/12/19	93	80 - 120	91	80 - 120	<100	ug/L	NC	20		
9714724	MEND Extract Silver (Ag)	2019/12/19	108	80 - 120	101	80 - 120	<0.0050	ug/L	10	20		
9714724	MEND Extract Sodium (Na)	2019/12/19	113	80 - 120	108	80 - 120	<50	ug/L	NC	20		
9714724	MEND Extract Strontium (Sr)	2019/12/19	96	80 - 120	92	80 - 120	<0.050	ug/L	16	20		
9714724	MEND Extract Sulphur (S)	2019/12/19	98	80 - 120	96	80 - 120	<10000	ug/L	NC	20		
9714724	MEND Extract Tellurium (Te)	2019/12/19	105	80 - 120	92	80 - 120	<0.020	ug/L	NC	20		
9714724	MEND Extract Thallium (Tl)	2019/12/19	101	80 - 120	96	80 - 120	<0.0020	ug/L	NC	20		
9714724	MEND Extract Thorium (Th)	2019/12/19	100	80 - 120	96	80 - 120	<0.0050	ug/L	4.0	20		
9714724	MEND Extract Tin (Sn)	2019/12/19	NC	80 - 120	101	80 - 120	<0.20	ug/L	1.4	20		
9714724	MEND Extract Titanium (Ti)	2019/12/19	103	80 - 120	98	80 - 120	<0.50	ug/L	14	20		
9714724	MEND Extract Tungsten (W)	2019/12/19	107	80 - 120	101	80 - 120	<0.010	ug/L	3.4	20		
9714724	MEND Extract Uranium (U)	2019/12/19	103	80 - 120	101	80 - 120	<0.0020	ug/L	4.3	20		
9714724	MEND Extract Vanadium (V)	2019/12/19	107	80 - 120	101	80 - 120	<0.20	ug/L	NC	20		
9714724	MEND Extract Zinc (Zn)	2019/12/19	105	80 - 120	102	80 - 120	<0.10	ug/L	0.60	20		
9714724	MEND Extract Zirconium (Zr)	2019/12/19	NC	80 - 120	94	80 - 120	<0.10	ug/L	11	20		
9736768	1TMS Aluminum (Al)	2020/01/17			8.3	N/A	<200	mg/kg			8.9	N/A
9736768	1TMS Calcium (Ca)	2020/01/17			0.14	N/A	<200	mg/kg			0.28	N/A
9736768	1TMS Iron (Fe)	2020/01/17			20	N/A	<200	mg/kg			6.4	N/A
9736768	1TMS Magnesium (Mg)	2020/01/17			0.27	N/A	<200	mg/kg			0.32	N/A
9736768	1TMS Phosphorus (P)	2020/01/17			0.020	N/A	<10	mg/kg			0.043	N/A

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BV Labs Job #: B9A5746

Report Date: 2020/02/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9736768	1TMS Potassium (K)	2020/01/17			0.20	N/A	<200	mg/kg			0.45	N/A
9736768	1TMS Sodium (Na)	2020/01/17			0.085	N/A	<20	mg/kg			0.11	N/A
9736768	1TMS Sulphur (S)	2020/01/17			<0.040	N/A	<400	mg/kg			0.050	N/A
9736768	1TMS Titanium (Ti)	2020/01/17			0.89	N/A	<10	mg/kg			0.93	N/A
9736774	1TMS Silver (Ag)	2020/01/17			144	N/A	<0.02	mg/kg			27	N/A
9736797	1TMS Antimony (Sb)	2020/01/17			0.65	N/A	<0.02	mg/kg			0.58	N/A
9736797	1TMS Arsenic (As)	2020/01/17			17	N/A	<0.2	mg/kg			10	N/A
9736797	1TMS Barium (Ba)	2020/01/17			358	N/A	<1	mg/kg			142	N/A
9736797	1TMS Beryllium (Be)	2020/01/17			2.0	N/A	<1	mg/kg			<1.0	N/A
9736797	1TMS Bismuth (Bi)	2020/01/17			0.17	N/A	<0.04	mg/kg			0.36	N/A
9736797	1TMS Cadmium (Cd)	2020/01/17					<0.02	mg/kg				
9736797	1TMS Cerium (Ce)	2020/01/17			26	N/A	<0.02	mg/kg			46	N/A
9736797	1TMS Cesium (Cs)	2020/01/17			2.4	N/A	<0.1	mg/kg			6.0	N/A
9736797	1TMS Chromium (Cr)	2020/01/17			611	N/A	<1	mg/kg			100	N/A
9736797	1TMS Cobalt (Co)	2020/01/17			86	N/A	<0.2	mg/kg			7.3	N/A
9736797	1TMS Copper (Cu)	2020/01/17			780	N/A	<0.1	mg/kg			32	N/A
9736797	1TMS Dysprosium (Dy)	2020/01/17			2.6	N/A	<0.1	mg/kg			2.3	N/A
9736797	1TMS Erbium (Er)	2020/01/17			1.6	N/A	<0.1	mg/kg			1.3	N/A
9736797	1TMS Europium (Eu)	2020/01/17			1.6	N/A	<0.1	mg/kg			1.3	N/A
9736797	1TMS Gadolinium (Gd)	2020/01/17			2.5	N/A	<0.1	mg/kg			2.7	N/A
9736797	1TMS Gallium (Ga)	2020/01/17			23	N/A	<0.02	mg/kg			25	N/A
9736797	1TMS Hafnium (Hf)	2020/01/17			3.8	N/A	<0.02	mg/kg			4.1	N/A
9736797	1TMS Holmium (Ho)	2020/01/17			0.50	N/A	<0.1	mg/kg			0.50	N/A
9736797	1TMS Indium (In)	2020/01/17			0.090	N/A	<0.01	mg/kg			0.080	N/A
9736797	1TMS Lanthanum (La)	2020/01/17			14	N/A	<0.1	mg/kg			21	N/A
9736797	1TMS Lead (Pb)	2020/01/17			14	N/A	0.03, RDL=0.02	mg/kg			25	N/A
9736797	1TMS Lithium (Li)	2020/01/17			15	N/A	0.1, RDL=0.1	mg/kg			36	N/A
9736797	1TMS Lutetium (Lu)	2020/01/17			0.20	N/A	<0.1	mg/kg			0.20	N/A
9736797	1TMS Manganese (Mn)	2020/01/17			405	N/A	<2	mg/kg			486	N/A
9736797	1TMS Molybdenum (Mo)	2020/01/17			1.5	N/A	<0.05	mg/kg			2.1	N/A
9736797	1TMS Neodymium (Nd)	2020/01/17			12	N/A	<0.1	mg/kg			17	N/A
9736797	1TMS Nickel (Ni)	2020/01/17			442	N/A	<0.1	mg/kg			42	N/A



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BV Labs Job #: B9A5746

Report Date: 2020/02/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9736797	1TMS Niobium (Nb)	2020/01/17			14	N/A	<0.04	mg/kg			19	N/A
9736797	1TMS Praseodymium (Pr)	2020/01/17			3.2	N/A	<0.1	mg/kg			5.1	N/A
9736797	1TMS Rhenium (Re)	2020/01/17					<0.002	mg/kg				
9736797	1TMS Rubidium (Rb)	2020/01/17			23	N/A	<0.1	mg/kg			58	N/A
9736797	1TMS Samarium (Sm)	2020/01/17			2.2	N/A	<0.1	mg/kg			3.2	N/A
9736797	1TMS Scandium (Sc)	2020/01/17			57	N/A	0.1, RDL=0.1	mg/kg			12	N/A
9736797	1TMS Selenium (Se)	2020/01/17			1.5	N/A	0.8, RDL=0.3	mg/kg			2.6	N/A
9736797	1TMS Strontium (Sr)	2020/01/17			58	N/A	<1	mg/kg			46	N/A
9736797	1TMS Tantalum (Ta)	2020/01/17			1.0	N/A	<0.1	mg/kg			1.4	N/A
9736797	1TMS Tellurium (Te)	2020/01/17			0.15	N/A	<0.05	mg/kg			0.060	N/A
9736797	1TMS Terbium (Tb)	2020/01/17			0.40	N/A	<0.1	mg/kg			0.40	N/A
9736797	1TMS Thallium (Tl)	2020/01/17			0.15	N/A	<0.05	mg/kg			0.35	N/A
9736797	1TMS Thorium (Th)	2020/01/17			8.1	N/A	<0.1	mg/kg			17	N/A
9736797	1TMS Thulium (Tm)	2020/01/17			0.20	N/A	<0.1	mg/kg			0.20	N/A
9736797	1TMS Tin (Sn)	2020/01/17			2.3	N/A	<0.1	mg/kg			3.8	N/A
9736797	1TMS Tungsten (W)	2020/01/17			1.0	N/A	<0.1	mg/kg			1.9	N/A
9736797	1TMS Uranium (U)	2020/01/17			1.8	N/A	<0.1	mg/kg			2.9	N/A
9736797	1TMS Vanadium (V)	2020/01/17			271	N/A	<1	mg/kg			163	N/A
9736797	1TMS Ytterbium (Yb)	2020/01/17			1.4	N/A	<0.1	mg/kg			1.3	N/A
9736797	1TMS Yttrium (Y)	2020/01/17			10	N/A	<0.1	mg/kg			10	N/A
9736797	1TMS Zinc (Zn)	2020/01/17			40	N/A	<0.2	mg/kg			42	N/A



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BV Labs Job #: B9A5746

Report Date: 2020/02/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9736797	1TMS Zirconium (Zr)	2020/01/17			123	N/A	<0.2	mg/kg			145	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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VERITAS

BV Labs Job #: B9A5746
Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Bonnie Tsang, Lab Technician

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Jennifer Villocero, Project Solutions Representative

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

** please call
306-260-6006
for confirmation of arrival.*

CHAIN OF CUSTODY R

08475863

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page ____ of ____

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days	
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02		
Phone:		Phone:	(867) 668-6463 vfriesen@alexcoenv.com	Site Location:	Kudz Ze Kayah		
Email:		Email:	agault@alexcoenv.com kpiecowye@alexcoenv.com	Site #:			
				Sampled By:		Date Required:	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		Analysis Requested (Grid for analysis requests)		LABORATORY USE ONLY CUSTODY SEAL: Y / N Present Intact COOLING MEDIA PRESENT: Y / N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Testier 5 step sequential extraction	AVS/SBM	
1 Trial 3		04-Dec-19	11:00	Soil	X		
2 Trial 4		04-Dec-19	11:00	Soil	X	X	
3 Trial 8		04-Dec-19	11:00	Soil	X	X	
4 Soil Inoculum		09-Dec-19	11:45	Soil	X		
5							
6							
7							
8							
9							
10							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
<i>[Signature]</i>		2019/12/07	12:00	<i>[Signature]</i>			

1361

CS-3
I-3

Temp: 12 / 12 / 12

KEW OKOVH

2019/12/10 08:10 Temp: 6.6, 7



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/01/14
 Report #: R2833490
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C001490

Received: 2020/01/08, 12:48

Sample Matrix: Water
 # Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	2	N/A	2020/01/13	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	2	N/A	2020/01/13	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	2	N/A	2020/01/13	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	2	N/A	2020/01/14	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	2	N/A	2020/01/11	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	2	N/A	2020/01/10	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S) (1)	2	N/A	2020/01/13	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	2	N/A	2020/01/14	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	2	N/A	2020/01/14	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	2	N/A	2020/01/14	BBY WI-00033	Auto Calc
Ion Balance (1)	2	N/A	2020/01/14	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	2	N/A	2020/01/14	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	2	N/A	2020/01/14	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	2	N/A	2020/01/13	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	2	N/A	2020/01/14	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	2	N/A	2020/01/14	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	2	N/A	2020/01/14	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	2	N/A	2020/01/11	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	2	N/A	2020/01/11	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	2	N/A	2020/01/11	BBY WI-00033	Auto Calc
Orthophosphate by Konelab (low level) (1)	2	N/A	2020/01/11	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	2	N/A	2020/01/13	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/14
Report #: R2833490
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C001490

Received: 2020/01/08, 12:48

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XF2015		XF2016		
Sampling Date		2020/01/08 10:30		2020/01/08 12:15		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	TRIAL #1	RDL	TRIAL #5	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	7.6	N/A	8.6	N/A	9729845
Cation Sum	meq/L	8.8	N/A	9.2	N/A	9729845
Ion Balance	N/A	1.2	0.010	1.1	0.010	9729684
Ion Balance (% Difference)	%	7.3	N/A	3.4	N/A	9729685
Nitrate (N)	mg/L	1.11	0.0020	0.223	0.020	9729849
Sulphide (as H ₂ S)	mg/L	<0.0018	0.0018	<0.0019	0.0019	9729844
Misc. Inorganics						
Fluoride (F)	mg/L	0.630	0.010	0.650	0.010	9731703
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	<0.050	0.050	9731214
Dissolved Organic Carbon (C)	mg/L	2.6	0.50	4.6	0.50	9732612
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	9732447
Alkalinity (Total as CaCO ₃)	mg/L	79.0	0.50	100	0.50	9732631
Acidity (pH 8.3)	mg/L	1.5	1.0	5.3	1.0	9732447
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	9732631
Bicarbonate (HCO ₃)	mg/L	96.3	0.50	122	0.50	9732631
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	9732631
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	9732631
Anions						
Orthophosphate (P)	mg/L	0.72 (1)	0.010	0.40	0.0010	9731732
Total Sulphide	mg/L	<0.0018	0.0018	<0.0018	0.0018	9732329
Dissolved Chloride (Cl)	mg/L	54	0.50	54	0.50	9732908
Dissolved Sulphate (SO ₄)	mg/L	210 (1)	5.0	230 (1)	5.0	9732908
Nutrients						
Total Ammonia (N)	mg/L	0.014	0.0050	0.039	0.0050	9733095
Nitrate plus Nitrite (N)	mg/L	1.11	0.0020	3.58 (1)	0.010	9731710
Nitrite (N)	mg/L	<0.0020	0.0020	3.36 (1)	0.020	9731711
RDL = Reportable Detection Limit						
N/A = Not Applicable						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						

**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XF2015	XF2016		
Sampling Date		2020/01/08 10:30	2020/01/08 12:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #5	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	373	391	0.50	9729620
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00110	0.00848	0.00050	9732737
Dissolved Antimony (Sb)	mg/L	0.0237	0.0171	0.000020	9732737
Dissolved Arsenic (As)	mg/L	0.0483	0.0387	0.000020	9732737
Dissolved Barium (Ba)	mg/L	0.0809	0.0556	0.000020	9732737
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9732737
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9732737
Dissolved Boron (B)	mg/L	0.037	0.036	0.010	9732737
Dissolved Cadmium (Cd)	mg/L	0.00165	0.00211	0.0000050	9732737
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9732737
Dissolved Cobalt (Co)	mg/L	0.000232	0.000156	0.0000050	9732737
Dissolved Copper (Cu)	mg/L	0.00513	0.00470	0.000050	9732737
Dissolved Iron (Fe)	mg/L	0.0288	0.0100	0.0010	9732737
Dissolved Lead (Pb)	mg/L	0.0000202	0.000180	0.0000050	9732737
Dissolved Lithium (Li)	mg/L	0.0130	0.0123	0.00050	9732737
Dissolved Manganese (Mn)	mg/L	0.0560	0.0172	0.000050	9732737
Dissolved Molybdenum (Mo)	mg/L	0.00244	0.00143	0.000050	9732737
Dissolved Nickel (Ni)	mg/L	0.0122	0.0129	0.000020	9732737
Dissolved Selenium (Se)	mg/L	0.00731	0.00751	0.000040	9732737
Dissolved Silicon (Si)	mg/L	1.22	1.06	0.050	9732737
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9732737
Dissolved Strontium (Sr)	mg/L	0.539	0.621	0.000050	9732737
Dissolved Thallium (Tl)	mg/L	0.000431	0.000372	0.0000020	9732737
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9732737
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9732737
Dissolved Uranium (U)	mg/L	0.0353	0.0271	0.0000020	9732737
Dissolved Vanadium (V)	mg/L	0.00043	0.00025	0.00020	9732737
Dissolved Zinc (Zn)	mg/L	0.121	0.275	0.00010	9732737
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9732737
Dissolved Calcium (Ca)	mg/L	118	126	0.050	9729846
Dissolved Magnesium (Mg)	mg/L	18.8	18.6	0.050	9729846
RDL = Reportable Detection Limit					



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF2015	XF2016		
Sampling Date		2020/01/08 10:30	2020/01/08 12:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #5	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.31	7.08	0.050	9729846
Dissolved Sodium (Na)	mg/L	26.8	26.6	0.050	9729846
Dissolved Sulphur (S)	mg/L	89.4	87.5	3.0	9729846
RDL = Reportable Detection Limit					

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VERITASBV Labs Job #: C001490
Report Date: 2020/01/14ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XF2015	XF2016		
Sampling Date		2020/01/08 10:30	2020/01/08 12:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #5	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	373	390	0.50	9729619
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00231	0.0104	0.00050	9732713
Total Antimony (Sb)	mg/L	0.0238	0.0177	0.000020	9732713
Total Arsenic (As)	mg/L	0.0495	0.0499	0.000020	9732713
Total Barium (Ba)	mg/L	0.0827	0.0607	0.000020	9732713
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9732713
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000068	0.0000050	9732713
Total Boron (B)	mg/L	0.037	0.036	0.010	9732713
Total Cadmium (Cd)	mg/L	0.00173	0.00233	0.0000050	9732713
Total Chromium (Cr)	mg/L	<0.00010	0.00025	0.00010	9732713
Total Cobalt (Co)	mg/L	0.000256	0.000643	0.0000050	9732713
Total Copper (Cu)	mg/L	0.00554	0.00571	0.000050	9732713
Total Iron (Fe)	mg/L	0.133	0.769	0.0010	9732713
Total Lead (Pb)	mg/L	0.000114	0.00639	0.0000050	9732713
Total Lithium (Li)	mg/L	0.0132	0.0124	0.00050	9732713
Total Manganese (Mn)	mg/L	0.0559	0.0368	0.000050	9732713
Total Molybdenum (Mo)	mg/L	0.00246	0.00145	0.000050	9732713
Total Nickel (Ni)	mg/L	0.0122	0.0130	0.000020	9732713
Total Selenium (Se)	mg/L	0.00701	0.00773	0.000040	9732713
Total Silicon (Si)	mg/L	1.23	1.05	0.050	9732713
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9732713
Total Strontium (Sr)	mg/L	0.551	0.619	0.000050	9732713
Total Thallium (Tl)	mg/L	0.000427	0.000379	0.0000020	9732713
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9732713
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9732713
Total Uranium (U)	mg/L	0.0355	0.0317	0.0000020	9732713
Total Vanadium (V)	mg/L	0.00047	0.00047	0.00020	9732713
Total Zinc (Zn)	mg/L	0.130	0.291	0.00010	9732713
Total Zirconium (Zr)	mg/L	<0.00010	0.00016	0.00010	9732713
Total Calcium (Ca)	mg/L	118	126	0.050	9729698
Total Magnesium (Mg)	mg/L	18.8	18.2	0.050	9729698
RDL = Reportable Detection Limit					



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BV Labs Job #: C001490
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XF2015	XF2016		
Sampling Date		2020/01/08 10:30	2020/01/08 12:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #5	RDL	QC Batch
Total Potassium (K)	mg/L	8.25	7.04	0.050	9729698
Total Sodium (Na)	mg/L	26.7	26.4	0.050	9729698
Total Sulphur (S)	mg/L	89.0	88.9	3.0	9729698
RDL = Reportable Detection Limit					



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BV Labs Job #: C001490

Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XF2015
Sample ID: TRIAL #1
Matrix: Water

Collected: 2020/01/08
Shipped: 2020/01/08
Received: 2020/01/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9732447	N/A	2020/01/13	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9732631	N/A	2020/01/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9732908	N/A	2020/01/13	Balwinder Bassi
Carbon (DOC)	TECH	9732612	N/A	2020/01/14	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9731703	N/A	2020/01/11	Edwin Lamigo
Ferrous Iron (Dissolved)	SPEC	9731214	N/A	2020/01/10	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9729844	N/A	2020/01/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9729619	N/A	2020/01/14	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9729620	N/A	2020/01/14	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9729684	N/A	2020/01/14	Automated Statchk
Ion Balance	CALC	9729685	N/A	2020/01/14	Automated Statchk
Sum of cations, anions	CALC	9729845	N/A	2020/01/14	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9729846	N/A	2020/01/14	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9732737	N/A	2020/01/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9729698	N/A	2020/01/14	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9732713	N/A	2020/01/14	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9733095	N/A	2020/01/14	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9731710	N/A	2020/01/11	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9731711	N/A	2020/01/11	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9729849	N/A	2020/01/11	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9731732	N/A	2020/01/11	Mauro Oselin
Total Sulphide	SPEC	9732329	N/A	2020/01/13	Jennifer Mee

BV Labs ID: XF2015 Dup
Sample ID: TRIAL #1
Matrix: Water

Collected: 2020/01/08
Shipped: 2020/01/08
Received: 2020/01/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ferrous Iron (Dissolved)	SPEC	9731214	N/A	2020/01/10	Preetleen Kathuria

BV Labs ID: XF2016
Sample ID: TRIAL #5
Matrix: Water

Collected: 2020/01/08
Shipped: 2020/01/08
Received: 2020/01/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9732447	N/A	2020/01/13	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9732631	N/A	2020/01/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9732908	N/A	2020/01/13	Balwinder Bassi
Carbon (DOC)	TECH	9732612	N/A	2020/01/14	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9731703	N/A	2020/01/11	Edwin Lamigo
Ferrous Iron (Dissolved)	SPEC	9731214	N/A	2020/01/10	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9729844	N/A	2020/01/13	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9729619	N/A	2020/01/14	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9729620	N/A	2020/01/14	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9729684	N/A	2020/01/14	Automated Statchk
Ion Balance	CALC	9729685	N/A	2020/01/14	Automated Statchk



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BV Labs Job #: C001490
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XF2016
Sample ID: TRIAL #5
Matrix: Water

Collected: 2020/01/08
Shipped: 2020/01/08
Received: 2020/01/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9729845	N/A	2020/01/14	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9729846	N/A	2020/01/14	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9732737	N/A	2020/01/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9729698	N/A	2020/01/14	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9732713	N/A	2020/01/14	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9733095	N/A	2020/01/14	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9731710	N/A	2020/01/11	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9731711	N/A	2020/01/11	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9729849	N/A	2020/01/11	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9731732	N/A	2020/01/11	Mauro Oselin
Total Sulphide	SPEC	9732329	N/A	2020/01/13	Jennifer Mee



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.7°C
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Results relate only to the items tested.

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BV Labs Job #: C001490

Report Date: 2020/01/14

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9731214	HCl Preserved Iron (Fe+2 Ferrous)	2020/01/10	95	80 - 120	99	90 - 110	<0.050	mg/L	NC	20
9731703	Fluoride (F)	2020/01/11	97	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
9731710	Nitrate plus Nitrite (N)	2020/01/11			106	80 - 120	<0.0020	mg/L		
9731711	Nitrite (N)	2020/01/11			103	80 - 120	<0.0020	mg/L		
9731732	Orthophosphate (P)	2020/01/11	102	80 - 120	94	80 - 120	<0.0010	mg/L	NC	20
9732329	Total Sulphide	2020/01/13	81	80 - 120	106	80 - 120	<0.0018	mg/L	NC	20
9732447	Acidity (pH 4.5)	2020/01/13					<1.0	mg/L	NC	20
9732447	Acidity (pH 8.3)	2020/01/13			96	80 - 120	<1.0	mg/L	NC	20
9732612	Dissolved Organic Carbon (C)	2020/01/14	100	80 - 120	106	80 - 120	<0.50	mg/L	2.9	20
9732631	Alkalinity (PP as CaCO ₃)	2020/01/13					<0.50	mg/L	NC	20
9732631	Alkalinity (Total as CaCO ₃)	2020/01/13	88	80 - 120	92	80 - 120	<0.50	mg/L	NC	20
9732631	Bicarbonate (HCO ₃)	2020/01/13					<0.50	mg/L	NC	20
9732631	Carbonate (CO ₃)	2020/01/13					<0.50	mg/L	NC	20
9732631	Hydroxide (OH)	2020/01/13					<0.50	mg/L	NC	20
9732713	Total Aluminum (Al)	2020/01/14	101	80 - 120	100	80 - 120	<0.00050	mg/L	5.3	20
9732713	Total Antimony (Sb)	2020/01/14	NC	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9732713	Total Arsenic (As)	2020/01/14	NC	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9732713	Total Barium (Ba)	2020/01/14	NC	80 - 120	100	80 - 120	<0.000020	mg/L	14	20
9732713	Total Beryllium (Be)	2020/01/14	100	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9732713	Total Bismuth (Bi)	2020/01/14	101	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9732713	Total Boron (B)	2020/01/14	102	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
9732713	Total Cadmium (Cd)	2020/01/14	101	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9732713	Total Chromium (Cr)	2020/01/14	99	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9732713	Total Cobalt (Co)	2020/01/14	94	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9732713	Total Copper (Cu)	2020/01/14	NC	80 - 120	95	80 - 120	<0.000050	mg/L	13	20
9732713	Total Iron (Fe)	2020/01/14	102	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
9732713	Total Lead (Pb)	2020/01/14	101	80 - 120	102	80 - 120	<0.0000050	mg/L	5.3	20
9732713	Total Lithium (Li)	2020/01/14	107	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9732713	Total Manganese (Mn)	2020/01/14	NC	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9732713	Total Molybdenum (Mo)	2020/01/14	111	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9732713	Total Nickel (Ni)	2020/01/14	95	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9732713	Total Selenium (Se)	2020/01/14	106	80 - 120	102	80 - 120	<0.000040	mg/L	NC	20

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BV Labs Job #: C001490

Report Date: 2020/01/14

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9732713	Total Silicon (Si)	2020/01/14	103	80 - 120	103	80 - 120	<0.050	mg/L	NC	20
9732713	Total Silver (Ag)	2020/01/14	100	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9732713	Total Strontium (Sr)	2020/01/14	NC	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9732713	Total Thallium (Tl)	2020/01/14	104	80 - 120	101	80 - 120	<0.0000020	mg/L	18	20
9732713	Total Tin (Sn)	2020/01/14	104	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9732713	Total Titanium (Ti)	2020/01/14	101	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9732713	Total Uranium (U)	2020/01/14	102	80 - 120	102	80 - 120	<0.0000020	mg/L	18	20
9732713	Total Vanadium (V)	2020/01/14	102	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9732713	Total Zinc (Zn)	2020/01/14	NC	80 - 120	100	80 - 120	<0.00010	mg/L	2.2	20
9732713	Total Zirconium (Zr)	2020/01/14	109	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9732737	Dissolved Aluminum (Al)	2020/01/13	105	80 - 120	98	80 - 120	<0.00050	mg/L	0.092	20
9732737	Dissolved Antimony (Sb)	2020/01/13	107	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9732737	Dissolved Arsenic (As)	2020/01/13	106	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9732737	Dissolved Barium (Ba)	2020/01/13	105	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9732737	Dissolved Beryllium (Be)	2020/01/13	106	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9732737	Dissolved Bismuth (Bi)	2020/01/13	108	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9732737	Dissolved Boron (B)	2020/01/13	105	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
9732737	Dissolved Cadmium (Cd)	2020/01/13	108	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9732737	Dissolved Chromium (Cr)	2020/01/13	104	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9732737	Dissolved Cobalt (Co)	2020/01/13	102	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9732737	Dissolved Copper (Cu)	2020/01/13	102	80 - 120	95	80 - 120	<0.000050	mg/L	0.54	20
9732737	Dissolved Iron (Fe)	2020/01/13	108	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
9732737	Dissolved Lead (Pb)	2020/01/13	108	80 - 120	102	80 - 120	<0.0000050	mg/L	1.9	20
9732737	Dissolved Lithium (Li)	2020/01/13	105	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9732737	Dissolved Manganese (Mn)	2020/01/13	104	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9732737	Dissolved Molybdenum (Mo)	2020/01/13	109	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9732737	Dissolved Nickel (Ni)	2020/01/13	106	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9732737	Dissolved Selenium (Se)	2020/01/13	110	80 - 120	101	80 - 120	<0.000040	mg/L	NC	20
9732737	Dissolved Silicon (Si)	2020/01/13	103	80 - 120	98	80 - 120	<0.050	mg/L	NC	20
9732737	Dissolved Silver (Ag)	2020/01/13	107	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9732737	Dissolved Strontium (Sr)	2020/01/13	106	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9732737	Dissolved Thallium (Tl)	2020/01/13	108	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20



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BV Labs Job #: C001490

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QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9732737	Dissolved Tin (Sn)	2020/01/13	108	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9732737	Dissolved Titanium (Ti)	2020/01/13	103	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9732737	Dissolved Uranium (U)	2020/01/13	105	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9732737	Dissolved Vanadium (V)	2020/01/13	105	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9732737	Dissolved Zinc (Zn)	2020/01/13	108	80 - 120	100	80 - 120	<0.00010	mg/L	3.6	20
9732737	Dissolved Zirconium (Zr)	2020/01/13	107	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9732908	Dissolved Chloride (Cl)	2020/01/13	92	80 - 120	103	80 - 120	<0.50	mg/L	NC	20
9732908	Dissolved Sulphate (SO4)	2020/01/13	89	80 - 120	99	80 - 120	<0.50	mg/L	NC	20
9733095	Total Ammonia (N)	2020/01/14	NC	80 - 120	104	80 - 120	<0.0050	mg/L	1.1	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).



BUREAU
VERITAS

BV Labs Job #: C001490
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Harry (Peng) Liang, Senior Analyst

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name: BMC MINERALS LTD.	Company Name: ALEXCO ENVIRONMENTAL GROUP	Quotation #: B60751	☒ Regular TAT 5 days (Most analyses)													
Contact Name:	Contact Name: Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS													
Address: 530-1130 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-02	Rush TAT (Surcharges will be applied)													
Vancouver, BC PC: V6E 4A4	Whitehorse, YK PC: V1A 2V3	Site Location: Kudz Ze Kayah	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days													
Phone:	Phone: (867) 668-6463 vfriesen@contangostrategies.com	Site #:	Date Required:													
Email:	Email: agault@alexcoresource.com kpiewowye@contangostrategies.com	Sampled By:														
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL Present: 9 Intact: 9 COOLING MEDIA PRESENT: 1, 2, 1 COMMENTS										
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1 Trial #1		08-Jan-20	10:30	Water	X	X	X	X	X	X	X	X	X	X	10	
2 Trial #5		08-Jan-20	12:15	Water	X	X	X	X	X	X	X	X	X	X	10	
3																
4																
5																
6																
7																
8																
9																
10																

Received in Saskatoon
 By: Patricia Russell
 I-N
 JAN 13 2020 12:48
 CS-N
 Temp: 10 / 10 / 9

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
	2020/01/08	12:48		2020/01/09	08:40

08-Jan-20 12:48
 Safiann Maiter

C001490
 SBZ INS-0188



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/01/22
 Report #: R2836366
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C002917

Received: 2020/01/15, 14:02

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	4	N/A	2020/01/17	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	4	N/A	2020/01/20	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	2	N/A	2020/01/17	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Low level chloride/sulphate by AC (1)	2	N/A	2020/01/20	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	4	N/A	2020/01/20	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	4	N/A	2020/01/17	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	4	N/A	2020/01/17	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	4	N/A	2020/01/20		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	4	N/A	2020/01/20	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	4	N/A	2020/01/20	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	4	N/A	2020/01/21	BBY WI-00033	Auto Calc
Ion Balance (1)	4	N/A	2020/01/21	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	4	N/A	2020/01/20	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	4	N/A	2020/01/20	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	4	N/A	2020/01/18	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	4	N/A	2020/01/20	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	4	N/A	2020/01/18	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	4	N/A	2020/01/17	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	4	N/A	2020/01/17	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	4	N/A	2020/01/17	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	4	N/A	2020/01/17	BBY WI-00033	Auto Calc
Orthophosphate by Konelab (low level) (1)	4	N/A	2020/01/17	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	4	N/A	2020/01/20	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/22
Report #: R2836366
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C002917

Received: 2020/01/15, 14:02

data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XF8152		XF8153		XF8154		XF8155		
Sampling Date		2020/01/15 10:10		2020/01/15 10:30		2020/01/15 13:00		2020/01/15 11:00		
COC Number		1 of 1		1 of 1		1 of 1		1 of 1		
	UNITS	TRIAL #1	RDL	TRIAL #2	RDL	TRIAL #5	RDL	TRIAL #6	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.8	N/A	11	N/A	11	N/A	8.0	N/A	9736025
Cation Sum	meq/L	8.3	N/A	8.6	N/A	8.7	N/A	8.3	N/A	9736025
Ion Balance	N/A	0.94	0.010	0.81	0.010	0.82	0.010	1.0	0.010	9736003
Ion Balance (% Difference)	%	3.0	N/A	10	N/A	9.8	N/A	2.4	N/A	9736005
Nitrate (N)	mg/L	1.23	0.0020	<0.0020	0.0020	0.127	0.020	<0.0020	0.0020	9736026
Sulphide (as H ₂ S)	mg/L	<0.0020	0.0020	1.7	0.038	<0.0020	0.0020	<0.0020	0.0020	9735474

Misc. Inorganics

Fluoride (F)	mg/L	0.620	0.010	0.610	0.010	0.650	0.010	0.670	0.010	9737071
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	0.51	0.050	<0.050	0.050	<0.050	0.050	9736974
Dissolved Organic Carbon (C)	mg/L	2.9	0.50	24 (1)	1.0	4.3	0.50	26 (2)	1.0	9736485
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9737353
Alkalinity (Total as CaCO ₃)	mg/L	90.9	0.50	113	0.50	109	0.50	110	0.50	9738342
Acidity (pH 8.3)	mg/L	1.5	1.0	10.2	1.0	4.8	1.0	5.5	1.0	9737353
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9738342
Bicarbonate (HCO ₃)	mg/L	111	0.50	138	0.50	133	0.50	134	0.50	9738342
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9738342
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9738342

Anions

Orthophosphate (P)	mg/L	0.72 (2)	0.010	0.97 (2)	0.010	0.41	0.0010	0.89 (2)	0.010	9737278
Total Sulphide	mg/L	<0.0018	0.0018	1.6 (2)	0.036	<0.0018	0.0018	<0.0018	0.0018	9738452
Dissolved Chloride (Cl)	mg/L	62	0.50	69	0.50	57	0.50	57	0.50	9737348
Dissolved Sulphate (SO ₄)	mg/L	240 (2)	5.0	300 (2)	5.0	310 (2)	5.0	200	0.50	9737348

Nutrients

Total Ammonia (N)	mg/L	<0.0050	0.0050	0.021	0.0050	0.014	0.0050	0.014	0.0050	9736653
Nitrate plus Nitrite (N)	mg/L	1.23	0.0020	0.0042	0.0020	3.50 (2)	0.010	<0.0020	0.0020	9737323
Nitrite (N)	mg/L	<0.0020	0.0020	0.0049	0.0020	3.37 (2)	0.020	<0.0020	0.0020	9737324

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to sample matrix.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: C002917
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF8152	XF8153	XF8154	XF8155		
Sampling Date		2020/01/15 10:10	2020/01/15 10:30	2020/01/15 13:00	2020/01/15 11:00		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	347	364	369	348	0.50	9735837
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00110	0.00208	0.00174	0.00069	0.00050	9737063
Dissolved Antimony (Sb)	mg/L	0.0236	0.00187	0.0169	0.104	0.000020	9737063
Dissolved Arsenic (As)	mg/L	0.0457	0.0328	0.0370	0.304	0.000020	9737063
Dissolved Barium (Ba)	mg/L	0.0797	0.0815	0.0542	0.0819	0.000020	9737063
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9737063
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9737063
Dissolved Boron (B)	mg/L	0.034	0.036	0.035	0.036	0.010	9737063
Dissolved Cadmium (Cd)	mg/L	0.00164	0.000121	0.00214	0.00832	0.0000050	9737063
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9737063
Dissolved Cobalt (Co)	mg/L	0.000265	0.00210	0.000160	0.00136	0.0000050	9737063
Dissolved Copper (Cu)	mg/L	0.00534	0.000506	0.00506	0.0136	0.000050	9737063
Dissolved Iron (Fe)	mg/L	0.0100	0.367	0.0080	0.0019	0.0010	9737063
Dissolved Lead (Pb)	mg/L	0.0000297	0.0000378	0.000188	0.000118	0.0000050	9737063
Dissolved Lithium (Li)	mg/L	0.0111	0.0105	0.0107	0.0114	0.00050	9737063
Dissolved Manganese (Mn)	mg/L	0.0516	0.275	0.0171	0.0877	0.000050	9737063
Dissolved Molybdenum (Mo)	mg/L	0.00239	0.000854	0.00138	0.00161	0.000050	9737063
Dissolved Nickel (Ni)	mg/L	0.0120	0.00704	0.0125	0.0434	0.000020	9737063
Dissolved Selenium (Se)	mg/L	0.00712	0.0111	0.00749	0.0289	0.000040	9737063
Dissolved Silicon (Si)	mg/L	1.06	1.06	0.936	1.09	0.050	9737063
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9737063
Dissolved Strontium (Sr)	mg/L	0.491	0.513	0.554	0.577	0.000050	9737063
Dissolved Thallium (Tl)	mg/L	0.000424	0.0000609	0.000359	0.000607	0.0000020	9737063
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9737063
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9737063
Dissolved Uranium (U)	mg/L	0.0365	0.0149	0.0278	0.175	0.0000020	9737063
Dissolved Vanadium (V)	mg/L	0.00046	0.00022	0.00029	0.00035	0.00020	9737063
Dissolved Zinc (Zn)	mg/L	0.115	0.0294	0.273	0.879	0.00010	9737063
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9737063
Dissolved Calcium (Ca)	mg/L	108	115	117	110	0.050	9736007
Dissolved Magnesium (Mg)	mg/L	18.7	18.4	18.3	17.9	0.050	9736007
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF8152	XF8153	XF8154	XF8155		
Sampling Date		2020/01/15 10:10	2020/01/15 10:30	2020/01/15 13:00	2020/01/15 11:00		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.07	7.27	6.91	8.38	0.050	9736007
Dissolved Sodium (Na)	mg/L	26.2	26.3	25.8	26.4	0.050	9736007
Dissolved Sulphur (S)	mg/L	84.6	89.7	82.7	80.7	3.0	9736007
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: C002917
Report Date: 2020/01/22ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XF8152	XF8153	XF8154	XF8155		
Sampling Date		2020/01/15 10:10	2020/01/15 10:30	2020/01/15 13:00	2020/01/15 11:00		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	358	364	379	353	0.50	9735836
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00201	0.00268	0.00891	0.00106	0.00050	9737069
Total Antimony (Sb)	mg/L	0.0237	0.00256	0.0174	0.104	0.000020	9737069
Total Arsenic (As)	mg/L	0.0462	0.0318	0.0447	0.303	0.000020	9737069
Total Barium (Ba)	mg/L	0.0795	0.0838	0.0593	0.0818	0.000020	9737069
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9737069
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000064	<0.0000050	0.0000050	9737069
Total Boron (B)	mg/L	0.035	0.035	0.035	0.035	0.010	9737069
Total Cadmium (Cd)	mg/L	0.00169	0.000314	0.00230	0.00856	0.0000050	9737069
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00017	<0.00010	0.00010	9737069
Total Cobalt (Co)	mg/L	0.000327	0.00210	0.000378	0.00676	0.0000050	9737069
Total Copper (Cu)	mg/L	0.00550	0.000677	0.00573	0.0170	0.000050	9737069
Total Iron (Fe)	mg/L	0.0390	0.364	0.526	0.0082	0.0010	9737069
Total Lead (Pb)	mg/L	0.000177	0.0000909	0.00547	0.00128	0.0000050	9737069
Total Lithium (Li)	mg/L	0.0111	0.0107	0.0108	0.0110	0.00050	9737069
Total Manganese (Mn)	mg/L	0.0530	0.277	0.0265	0.153	0.000050	9737069
Total Molybdenum (Mo)	mg/L	0.00247	0.000869	0.00141	0.00169	0.000050	9737069
Total Nickel (Ni)	mg/L	0.0118	0.00719	0.0129	0.0427	0.000020	9737069
Total Selenium (Se)	mg/L	0.00716	0.0126	0.00762	0.0305	0.000040	9737069
Total Silicon (Si)	mg/L	1.08	1.04	0.949	1.10	0.050	9737069
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9737069
Total Strontium (Sr)	mg/L	0.492	0.516	0.558	0.564	0.000050	9737069
Total Thallium (Tl)	mg/L	0.000425	0.000117	0.000364	0.000607	0.0000020	9737069
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9737069
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9737069
Total Uranium (U)	mg/L	0.0361	0.0166	0.0313	0.183	0.0000020	9737069
Total Vanadium (V)	mg/L	0.00043	0.00020	0.00041	0.00027	0.00020	9737069
Total Zinc (Zn)	mg/L	0.118	0.0643	0.290	0.877	0.00010	9737069
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00013	<0.00010	0.00010	9737069
Total Calcium (Ca)	mg/L	113	115	121	112	0.050	9736009
Total Magnesium (Mg)	mg/L	18.7	18.7	18.5	18.0	0.050	9736009
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XF8152	XF8153	XF8154	XF8155		
Sampling Date		2020/01/15 10:10	2020/01/15 10:30	2020/01/15 13:00	2020/01/15 11:00		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch
Total Potassium (K)	mg/L	8.03	7.39	6.99	8.36	0.050	9736009
Total Sodium (Na)	mg/L	26.0	26.4	26.4	26.5	0.050	9736009
Total Sulphur (S)	mg/L	84.3	92.4	83.3	79.7	3.0	9736009
RDL = Reportable Detection Limit							



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BV Labs Job #: C002917
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XF8152
Sample ID: TRIAL #1
Matrix: Water

Collected: 2020/01/15
Shipped: 2020/01/15
Received: 2020/01/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9737353	N/A	2020/01/17	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9738342	N/A	2020/01/20	Coco Guo
Low level chloride/sulphate by AC	KONE	9737348	N/A	2020/01/17	Balwinder Bassi
Carbon (DOC)	TECH	9736485	N/A	2020/01/20	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9737071	N/A	2020/01/17	Edwin Lamigo
Ferrous Iron (Dissolved)	SPEC	9736974	N/A	2020/01/17	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9735474	N/A	2020/01/20	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9735836	N/A	2020/01/20	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9735837	N/A	2020/01/20	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9736003	N/A	2020/01/21	Automated Statchk
Ion Balance	CALC	9736005	N/A	2020/01/21	Automated Statchk
Sum of cations, anions	CALC	9736025	N/A	2020/01/20	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9736007	N/A	2020/01/20	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9737063	N/A	2020/01/18	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9736009	N/A	2020/01/20	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9737069	N/A	2020/01/18	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9736653	N/A	2020/01/17	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9737323	N/A	2020/01/17	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9737324	N/A	2020/01/17	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9736026	N/A	2020/01/17	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9737278	N/A	2020/01/17	Beatriz Ortega
Total Sulphide	SPEC	9738452	N/A	2020/01/20	Jennifer Mee

BV Labs ID: XF8152 Dup
Sample ID: TRIAL #1
Matrix: Water

Collected: 2020/01/15
Shipped: 2020/01/15
Received: 2020/01/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbon (DOC)	TECH	9736485	N/A	2020/01/20	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9736974	N/A	2020/01/17	Preetleen Kathuria
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9737063	N/A	2020/01/18	Valentina Balada

BV Labs ID: XF8153
Sample ID: TRIAL #2
Matrix: Water

Collected: 2020/01/15
Shipped: 2020/01/15
Received: 2020/01/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9737353	N/A	2020/01/17	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9738342	N/A	2020/01/20	Coco Guo
Low level chloride/sulphate by AC	KONE	9737348	N/A	2020/01/20	Balwinder Bassi
Carbon (DOC)	TECH	9736485	N/A	2020/01/20	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9737071	N/A	2020/01/17	Edwin Lamigo
Ferrous Iron (Dissolved)	SPEC	9736974	N/A	2020/01/17	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9735474	N/A	2020/01/20	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9735836	N/A	2020/01/20	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9735837	N/A	2020/01/20	Automated Statchk



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BV Labs Job #: C002917
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XF8153
Sample ID: TRIAL #2
Matrix: Water

Collected: 2020/01/15
Shipped: 2020/01/15
Received: 2020/01/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9736003	N/A	2020/01/21	Automated Statchk
Ion Balance	CALC	9736005	N/A	2020/01/21	Automated Statchk
Sum of cations, anions	CALC	9736025	N/A	2020/01/20	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9736007	N/A	2020/01/20	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9737063	N/A	2020/01/18	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9736009	N/A	2020/01/20	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9737069	N/A	2020/01/18	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9736653	N/A	2020/01/17	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9737323	N/A	2020/01/17	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9737324	N/A	2020/01/17	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9736026	N/A	2020/01/17	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9737278	N/A	2020/01/17	Beatriz Ortega
Total Sulphide	SPEC	9738452	N/A	2020/01/20	Jennifer Mee

BV Labs ID: XF8154
Sample ID: TRIAL #5
Matrix: Water

Collected: 2020/01/15
Shipped: 2020/01/15
Received: 2020/01/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9737353	N/A	2020/01/17	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9738342	N/A	2020/01/20	Coco Guo
Low level chloride/sulphate by AC	KONE	9737348	N/A	2020/01/20	Balwinder Bassi
Carbon (DOC)	TECH	9736485	N/A	2020/01/20	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9737071	N/A	2020/01/17	Edwin Lamigo
Ferrous Iron (Dissolved)	SPEC	9736974	N/A	2020/01/17	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9735474	N/A	2020/01/20	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9735836	N/A	2020/01/20	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9735837	N/A	2020/01/20	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9736003	N/A	2020/01/21	Automated Statchk
Ion Balance	CALC	9736005	N/A	2020/01/21	Automated Statchk
Sum of cations, anions	CALC	9736025	N/A	2020/01/20	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9736007	N/A	2020/01/20	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9737063	N/A	2020/01/18	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9736009	N/A	2020/01/20	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9737069	N/A	2020/01/18	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9736653	N/A	2020/01/17	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9737323	N/A	2020/01/17	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9737324	N/A	2020/01/17	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9736026	N/A	2020/01/17	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9737278	N/A	2020/01/17	Beatriz Ortega
Total Sulphide	SPEC	9738452	N/A	2020/01/20	Jennifer Mee



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BV Labs Job #: C002917
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XF8154 Dup
Sample ID: TRIAL #5
Matrix: Water

Collected: 2020/01/15
Shipped: 2020/01/15
Received: 2020/01/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N Low Level (Preserved)	KONE/COL	9736653	N/A	2020/01/17	Fadia Mostafa

BV Labs ID: XF8155
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/01/15
Shipped: 2020/01/15
Received: 2020/01/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9737353	N/A	2020/01/17	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9738342	N/A	2020/01/20	Coco Guo
Low level chloride/sulphate by AC	KONE	9737348	N/A	2020/01/17	Balwinder Bassi
Carbon (DOC)	TECH	9736485	N/A	2020/01/20	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9737071	N/A	2020/01/17	Edwin Lamigo
Ferrous Iron (Dissolved)	SPEC	9736974	N/A	2020/01/17	Preetleen Kathuria
Sulphide (as H ₂ S)	CALC	9735474	N/A	2020/01/20	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9735836	N/A	2020/01/20	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9735837	N/A	2020/01/20	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9736003	N/A	2020/01/21	Automated Statchk
Ion Balance	CALC	9736005	N/A	2020/01/21	Automated Statchk
Sum of cations, anions	CALC	9736025	N/A	2020/01/20	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9736007	N/A	2020/01/20	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9737063	N/A	2020/01/18	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9736009	N/A	2020/01/20	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9737069	N/A	2020/01/18	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9736653	N/A	2020/01/17	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9737323	N/A	2020/01/17	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9737324	N/A	2020/01/17	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9736026	N/A	2020/01/17	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9737278	N/A	2020/01/17	Beatriz Ortega
Total Sulphide	SPEC	9738452	N/A	2020/01/20	Jennifer Mee

BV Labs ID: XF8155 Dup
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/01/15
Shipped: 2020/01/15
Received: 2020/01/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Low level chloride/sulphate by AC	KONE	9737348	N/A	2020/01/17	Balwinder Bassi
Fluoride - Low Level	ISE/ISE	9737071	N/A	2020/01/17	Edwin Lamigo



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	11.7°C
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Results relate only to the items tested.



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BV Labs Job #: C002917

Report Date: 2020/01/22

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9736485	Dissolved Organic Carbon (C)	2020/01/20	101	80 - 120	101	80 - 120	<0.50	mg/L	4.5	20
9736653	Total Ammonia (N)	2020/01/17	101	80 - 120	107	80 - 120	<0.0050	mg/L	1.3	20
9736974	HCl Preserved Iron (Fe+2 Ferrous)	2020/01/17			98	90 - 110	<0.050	mg/L	NC	20
9737063	Dissolved Aluminum (Al)	2020/01/18	98	80 - 120	95	80 - 120	<0.00050	mg/L	0.33	20
9737063	Dissolved Antimony (Sb)	2020/01/18	NC	80 - 120	100	80 - 120	<0.000020	mg/L	1.5	20
9737063	Dissolved Arsenic (As)	2020/01/18	99	80 - 120	97	80 - 120	<0.000020	mg/L	0.18	20
9737063	Dissolved Barium (Ba)	2020/01/18	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.87	20
9737063	Dissolved Beryllium (Be)	2020/01/18	90	80 - 120	92	80 - 120	<0.000010	mg/L	NC	20
9737063	Dissolved Bismuth (Bi)	2020/01/18	97	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9737063	Dissolved Boron (B)	2020/01/18	96	80 - 120	97	80 - 120	<0.010	mg/L	2.5	20
9737063	Dissolved Cadmium (Cd)	2020/01/18	100	80 - 120	100	80 - 120	<0.0000050	mg/L	0.24	20
9737063	Dissolved Chromium (Cr)	2020/01/18	99	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9737063	Dissolved Cobalt (Co)	2020/01/18	95	80 - 120	97	80 - 120	<0.0000050	mg/L	0.38	20
9737063	Dissolved Copper (Cu)	2020/01/18	92	80 - 120	97	80 - 120	<0.000050	mg/L	1.6	20
9737063	Dissolved Iron (Fe)	2020/01/18	103	80 - 120	105	80 - 120	<0.0010	mg/L	0.54	20
9737063	Dissolved Lead (Pb)	2020/01/18	101	80 - 120	103	80 - 120	<0.0000050	mg/L	1.7	20
9737063	Dissolved Lithium (Li)	2020/01/18	86	80 - 120	89	80 - 120	<0.00050	mg/L	0.65	20
9737063	Dissolved Manganese (Mn)	2020/01/18	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.12	20
9737063	Dissolved Molybdenum (Mo)	2020/01/18	107	80 - 120	100	80 - 120	<0.000050	mg/L	1.3	20
9737063	Dissolved Nickel (Ni)	2020/01/18	92	80 - 120	97	80 - 120	<0.000020	mg/L	2.4	20
9737063	Dissolved Selenium (Se)	2020/01/18	100	80 - 120	97	80 - 120	<0.000040	mg/L	1.8	20
9737063	Dissolved Silicon (Si)	2020/01/18	94	80 - 120	96	80 - 120	<0.050	mg/L	0.043	20
9737063	Dissolved Silver (Ag)	2020/01/18	97	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9737063	Dissolved Strontium (Sr)	2020/01/18	NC	80 - 120	96	80 - 120	<0.000050	mg/L	0.99	20
9737063	Dissolved Thallium (Tl)	2020/01/18	104	80 - 120	103	80 - 120	<0.0000020	mg/L	2.4	20
9737063	Dissolved Tin (Sn)	2020/01/18	102	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9737063	Dissolved Titanium (Ti)	2020/01/18	100	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9737063	Dissolved Uranium (U)	2020/01/18	106	80 - 120	104	80 - 120	0.0000021, RDL=0.0000020 (1)	mg/L	0.67	20
9737063	Dissolved Vanadium (V)	2020/01/18	101	80 - 120	98	80 - 120	<0.00020	mg/L	1.2	20
9737063	Dissolved Zinc (Zn)	2020/01/18	NC	80 - 120	101	80 - 120	<0.00010	mg/L	1.3	20
9737063	Dissolved Zirconium (Zr)	2020/01/18	104	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20

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BV Labs Job #: C002917

Report Date: 2020/01/22

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9737069	Total Aluminum (Al)	2020/01/18	93	80 - 120	95	80 - 120	<0.00050	mg/L	0.054	20
9737069	Total Antimony (Sb)	2020/01/18	101	80 - 120	100	80 - 120	<0.000020	mg/L	5.4	20
9737069	Total Arsenic (As)	2020/01/18	99	80 - 120	96	80 - 120	<0.000020	mg/L	5.8	20
9737069	Total Barium (Ba)	2020/01/18	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.46	20
9737069	Total Beryllium (Be)	2020/01/18	93	80 - 120	93	80 - 120	<0.000010	mg/L	6.8	20
9737069	Total Bismuth (Bi)	2020/01/18	100	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9737069	Total Boron (B)	2020/01/18	96	80 - 120	96	80 - 120	<0.010	mg/L	NC	20
9737069	Total Cadmium (Cd)	2020/01/18	101	80 - 120	99	80 - 120	<0.0000050	mg/L	6.2	20
9737069	Total Chromium (Cr)	2020/01/18	99	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9737069	Total Cobalt (Co)	2020/01/18	96	80 - 120	96	80 - 120	<0.0000050	mg/L	0.085	20
9737069	Total Copper (Cu)	2020/01/18	95	80 - 120	96	80 - 120	<0.000050	mg/L	0.68	20
9737069	Total Iron (Fe)	2020/01/18	98	80 - 120	104	80 - 120	<0.0010	mg/L	0.48	20
9737069	Total Lead (Pb)	2020/01/18	103	80 - 120	105	80 - 120	<0.0000050	mg/L	2.8	20
9737069	Total Lithium (Li)	2020/01/18	88	80 - 120	91	80 - 120	<0.00050	mg/L	0.59	20
9737069	Total Manganese (Mn)	2020/01/18	NC	80 - 120	98	80 - 120	<0.000050	mg/L	1.5	20
9737069	Total Molybdenum (Mo)	2020/01/18	107	80 - 120	99	80 - 120	<0.000050	mg/L	1.0	20
9737069	Total Nickel (Ni)	2020/01/18	95	80 - 120	97	80 - 120	<0.000020	mg/L	0.35	20
9737069	Total Selenium (Se)	2020/01/18	100	80 - 120	97	80 - 120	<0.000040	mg/L	0.17	20
9737069	Total Silicon (Si)	2020/01/18	NC	80 - 120	94	80 - 120	<0.050	mg/L	1.4	20
9737069	Total Silver (Ag)	2020/01/18	97	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
9737069	Total Strontium (Sr)	2020/01/18	NC	80 - 120	94	80 - 120	<0.000050	mg/L	1.7	20
9737069	Total Thallium (Tl)	2020/01/18	103	80 - 120	102	80 - 120	<0.0000020	mg/L	16	20
9737069	Total Tin (Sn)	2020/01/18	101	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9737069	Total Titanium (Ti)	2020/01/18	99	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9737069	Total Uranium (U)	2020/01/18	106	80 - 120	105	80 - 120	<0.0000020	mg/L	0.16	20
9737069	Total Vanadium (V)	2020/01/18	100	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9737069	Total Zinc (Zn)	2020/01/18	NC	80 - 120	101	80 - 120	<0.00010	mg/L	0.22	20
9737069	Total Zirconium (Zr)	2020/01/18	103	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9737071	Fluoride (F)	2020/01/17	NC	80 - 120	104	80 - 120	<0.010	mg/L	0	20
9737278	Orthophosphate (P)	2020/01/17			98	80 - 120	0.0011, RDL=0.0010	mg/L		
9737323	Nitrate plus Nitrite (N)	2020/01/17			107	80 - 120	<0.0020	mg/L		
9737324	Nitrite (N)	2020/01/17			104	80 - 120	<0.0020	mg/L		



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BV Labs Job #: C002917

Report Date: 2020/01/22

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9737348	Dissolved Chloride (Cl)	2020/01/17	NC	80 - 120	103	80 - 120	<0.50	mg/L	1.6	20
9737348	Dissolved Sulphate (SO4)	2020/01/17	NC	80 - 120	105	80 - 120	<0.50	mg/L	13	20
9737353	Acidity (pH 4.5)	2020/01/17					<1.0	mg/L		
9737353	Acidity (pH 8.3)	2020/01/17			99	80 - 120	<1.0	mg/L		
9738342	Alkalinity (PP as CaCO3)	2020/01/20					<0.50	mg/L	NC	20
9738342	Alkalinity (Total as CaCO3)	2020/01/20	NC	80 - 120	94	80 - 120	<0.50	mg/L	1.4	20
9738342	Bicarbonate (HCO3)	2020/01/20					<0.50	mg/L	1.4	20
9738342	Carbonate (CO3)	2020/01/20					<0.50	mg/L	NC	20
9738342	Hydroxide (OH)	2020/01/20					<0.50	mg/L	NC	20
9738452	Total Sulphide	2020/01/20	NC	80 - 120	109	80 - 120	<0.0018	mg/L	5.0	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

(1) Method Blank exceeds acceptance limits for (Uranium) - $2 \times$ RDL acceptable for low level metals determination.



BUREAU
VERITAS

BV Labs Job #: C002917
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS										
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days										
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02	Date Required:										
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah											
Email:		Email:	agault@alexcoresource.com kpiecowye@contangostrategies.com	Sampled By:												
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) <u>USE SCENARIO # 12485</u>		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL Y/N Present Intact COOLING MEDIA PRESENT Y/N COMMENTS										
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1 Trial #1		15-Jan-20	10:10	Water	X	X	X	X	X	X	X	X	X	X	10	
2 Trial #2		15-Jan-20	10:30	Water	X	X	X	X	X	X	X	X	X	X	10	
3 Trial #5		15-Jan-20	13:00	Water	X	X	X	X	X	X	X	X	X	X	10	
4 Trial #6		15-Jan-20	11:00	Water	X	X	X	X	X	X	X	X	X	X	10	
5																
6																
7																
8																
9																
10																
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)									
[Signature]		2020/01/15	13:58	[Signature] Tina Maiter		2020/1/16	08:40									

15-Jan-20 14:02

Safiann Maiter
C002917

BLK INS-0180



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/02/05
 Report #: R2841577
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C006266

Received: 2020/01/29, 13:45

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	4	N/A	2020/02/03	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	4	N/A	2020/02/03	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	4	N/A	2020/02/03	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	4	N/A	2020/02/03	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	4	N/A	2020/02/04	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	4	N/A	2020/01/31	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	4	N/A	2020/02/04		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	4	N/A	2020/02/04	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	4	N/A	2020/02/03	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	4	N/A	2020/02/03	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	4	N/A	2020/02/01	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	4	N/A	2020/02/04	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	4	N/A	2020/02/03	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	4	N/A	2020/02/04	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	4	N/A	2020/02/01	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	4	N/A	2020/02/01	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	4	N/A	2020/02/01	BBY WI-00033	Auto Calc
Orthophosphate by Konelab (low level) (1)	4	N/A	2020/02/01	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	4	N/A	2020/02/04	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/02/05
Report #: R2841577
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C006266

Received: 2020/01/29, 13:45

BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XH5742		XH5743		XH5744		XH5745		
Sampling Date		2020/01/29 12:15		2020/01/29 12:30		2020/01/29 13:30		2020/01/29 12:45		
COC Number		1 of 1		1 of 1		1 of 1		1 of 1		
	UNITS	TRIAL #1	RDL	TRIAL #2	RDL	TRIAL #5	RDL	TRIAL #6	RDL	QC Batch
Calculated Parameters										
Nitrate (N)	mg/L	1.21	0.0020	<0.0020	0.0020	0.163	0.020	0.0030	0.0020	9748956
Sulphide (as H ₂ S)	mg/L	<0.0020	0.0020	4.0	0.19	<0.0020	0.0020	2.3	0.096	9748917
Misc. Inorganics										
Fluoride (F)	mg/L	0.650	0.010	0.650	0.010	0.700	0.010	0.710	0.010	9754216
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.050	0.29	0.050	<0.050	0.050	0.58	0.050	9750987
Dissolved Organic Carbon (C)	mg/L	41 (1)	2.0	8.3	0.50	37 (1)	2.0	19	0.50	9750772
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9752547
Alkalinity (Total as CaCO ₃)	mg/L	86.7	0.50	127	0.50	107	0.50	111	0.50	9752684
Acidity (pH 8.3)	mg/L	1.7	1.0	10.2	1.0	7.8	1.0	12.5	1.0	9752547
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9752684
Bicarbonate (HCO ₃)	mg/L	106	0.50	155	0.50	130	0.50	136	0.50	9752684
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9752684
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9752684
Anions										
Orthophosphate (P)	mg/L	0.64 (1)	0.010	1.1 (1)	0.010	0.32	0.0010	0.96 (1)	0.010	9751660
Total Sulphide	mg/L	<0.0018	0.0018	3.8 (1)	0.18	<0.0018	0.0018	2.2 (1)	0.090	9753180
Dissolved Chloride (Cl)	mg/L	59	0.50	64	0.50	57	0.50	60	0.50	9753067
Dissolved Sulphate (SO ₄)	mg/L	230 (1)	5.0	210 (1)	5.0	230 (1)	5.0	230 (1)	5.0	9753067
Nutrients										
Total Ammonia (N)	mg/L	0.088	0.0050	0.13	0.0050	0.11	0.0050	0.093	0.0050	9753472
Nitrate plus Nitrite (N)	mg/L	1.21	0.0020	0.0070	0.0020	3.51 (1)	0.010	0.0051	0.0020	9751726
Nitrite (N)	mg/L	0.0029	0.0020	0.0093	0.0020	3.35 (1)	0.020	0.0021	0.0020	9751729
RDL = Reportable Detection Limit										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										



BUREAU
VERITAS

BV Labs Job #: C006266
Report Date: 2020/02/05

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XH5742	XH5743	XH5744	XH5745		
Sampling Date		2020/01/29 12:15	2020/01/29 12:30	2020/01/29 13:30	2020/01/29 12:45		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	347	358	369	349	0.50	9748625
---	------	-----	-----	-----	-----	------	---------

Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00115	0.00224	0.00120	0.00194	0.00050	9751736
Dissolved Antimony (Sb)	mg/L	0.0231	0.00102	0.0168	0.00811	0.000020	9751736
Dissolved Arsenic (As)	mg/L	0.0422	0.0323	0.0305	0.177	0.000020	9751736
Dissolved Barium (Ba)	mg/L	0.0784	0.0758	0.0548	0.0894	0.000020	9751736
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9751736
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9751736
Dissolved Boron (B)	mg/L	0.033	0.032	0.032	0.032	0.010	9751736
Dissolved Cadmium (Cd)	mg/L	0.00145	0.0000360	0.00205	0.000376	0.0000050	9751736
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9751736
Dissolved Cobalt (Co)	mg/L	0.000324	0.00149	0.000153	0.00931	0.0000050	9751736
Dissolved Copper (Cu)	mg/L	0.00566	0.000236	0.00627	0.00114	0.000050	9751736
Dissolved Iron (Fe)	mg/L	0.0359	0.242	0.0070	0.474	0.0010	9751736
Dissolved Lead (Pb)	mg/L	0.000391	0.0000313	0.000175	0.000443	0.0000050	9751736
Dissolved Lithium (Li)	mg/L	0.0102	0.00951	0.0101	0.00975	0.00050	9751736
Dissolved Manganese (Mn)	mg/L	0.0487	0.312	0.0190	0.256	0.000050	9751736
Dissolved Molybdenum (Mo)	mg/L	0.00237	0.000295	0.00137	0.000720	0.000050	9751736
Dissolved Nickel (Ni)	mg/L	0.0121	0.00524	0.0133	0.0326	0.000020	9751736
Dissolved Selenium (Se)	mg/L	0.00835	0.0221	0.00721	0.0892	0.000040	9751736
Dissolved Silicon (Si)	mg/L	0.999	1.01	0.916	1.07	0.050	9751736
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000409 (1)	<0.0000050	0.0000050	9751736
Dissolved Strontium (Sr)	mg/L	0.502	0.538	0.580	0.592	0.000050	9751736
Dissolved Thallium (Tl)	mg/L	0.000447	0.0000177	0.000379	0.0000588	0.0000020	9751736
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9751736
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9751736
Dissolved Uranium (U)	mg/L	0.0339	0.00769	0.0261	0.119	0.0000020	9751736
Dissolved Vanadium (V)	mg/L	0.00042	<0.00020	0.00022	0.00023	0.00020	9751736
Dissolved Zinc (Zn)	mg/L	0.0883	0.00732	0.266	0.0644	0.00010	9751736
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9751736
Dissolved Calcium (Ca)	mg/L	110	116	120	112	0.050	9749179

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XH5742	XH5743	XH5744	XH5745		
Sampling Date		2020/01/29 12:15	2020/01/29 12:30	2020/01/29 13:30	2020/01/29 12:45		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.4	16.7	17.1	16.6	0.050	9749179
Dissolved Potassium (K)	mg/L	7.93	7.13	6.91	8.21	0.050	9749179
Dissolved Sodium (Na)	mg/L	25.0	25.0	24.9	25.3	0.050	9749179
Dissolved Sulphur (S)	mg/L	80.4	117	79.9	89.3	3.0	9749179
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: C006266
Report Date: 2020/02/05ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XH5742	XH5743	XH5744	XH5745		
Sampling Date		2020/01/29 12:15	2020/01/29 12:30	2020/01/29 13:30	2020/01/29 12:45		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	362	374	375	363	0.50	9748624
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00367	0.00319	0.00858	0.00281	0.00050	9752351
Total Antimony (Sb)	mg/L	0.0229	0.00127	0.0169	0.0124	0.000020	9752351
Total Arsenic (As)	mg/L	0.0432	0.0318	0.0371	0.181	0.000020	9752351
Total Barium (Ba)	mg/L	0.0755	0.0877	0.0560	0.0867	0.000020	9752351
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9752351
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000061	<0.0000050	0.0000050	9752351
Total Boron (B)	mg/L	0.036	0.038	0.038	0.037	0.010	9752351
Total Cadmium (Cd)	mg/L	0.00148	0.0000798	0.00219	0.00188	0.0000050	9752351
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00015	<0.00010	0.00010	9752351
Total Cobalt (Co)	mg/L	0.000350	0.00152	0.000186	0.00986	0.0000050	9752351
Total Copper (Cu)	mg/L	0.00571	0.000230	0.00598	0.00194	0.000050	9752351
Total Iron (Fe)	mg/L	0.0948	0.246	0.388	0.486	0.0010	9752351
Total Lead (Pb)	mg/L	0.000977	0.000127	0.00507	0.00113	0.0000050	9752351
Total Lithium (Li)	mg/L	0.0119	0.0120	0.0122	0.0120	0.00050	9752351
Total Manganese (Mn)	mg/L	0.0474	0.306	0.0211	0.243	0.000050	9752351
Total Molybdenum (Mo)	mg/L	0.00229	0.000309	0.00140	0.000759	0.000050	9752351
Total Nickel (Ni)	mg/L	0.0116	0.00523	0.0127	0.0335	0.000020	9752351
Total Selenium (Se)	mg/L	0.00935	0.0390	0.0136	0.152	0.000040	9752351
Total Silicon (Si)	mg/L	1.11	1.07	0.933	1.21	0.050	9752351
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9752351
Total Strontium (Sr)	mg/L	0.493	0.529	0.564	0.582	0.000050	9752351
Total Thallium (Tl)	mg/L	0.000463	0.0000443	0.000384	0.000228	0.0000020	9752351
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9752351
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9752351
Total Uranium (U)	mg/L	0.0335	0.00778	0.0267	0.123	0.0000020	9752351
Total Vanadium (V)	mg/L	0.00037	<0.00020	0.00027	<0.00020	0.00020	9752351
Total Zinc (Zn)	mg/L	0.0884	0.0518	0.267	0.367	0.00010	9752351
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00013	<0.00010	0.00010	9752351
Total Calcium (Ca)	mg/L	115	119	120	116	0.050	9749617
Total Magnesium (Mg)	mg/L	18.6	18.6	18.4	18.1	0.050	9749617

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XH5742	XH5743	XH5744	XH5745		
Sampling Date		2020/01/29 12:15	2020/01/29 12:30	2020/01/29 13:30	2020/01/29 12:45		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch
Total Potassium (K)	mg/L	8.26	7.48	7.16	8.54	0.050	9749617
Total Sodium (Na)	mg/L	25.9	26.7	26.7	27.1	0.050	9749617
Total Sulphur (S)	mg/L	85.6	142	84.6	104	3.0	9749617
RDL = Reportable Detection Limit							



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BV Labs Job #: C006266
Report Date: 2020/02/05

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XH5742
Sample ID: TRIAL #1
Matrix: Water

Collected: 2020/01/29
Shipped: 2020/01/29
Received: 2020/01/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9752547	N/A	2020/02/03	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9752684	N/A	2020/02/03	Coco Guo
Low level chloride/sulphate by AC	KONE	9753067	N/A	2020/02/03	Balwinder Bassi
Carbon (DOC)	TECH	9750772	N/A	2020/02/03	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9754216	N/A	2020/02/04	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9750987	N/A	2020/01/31	Lesley Quan
Sulphide (as H ₂ S)	CALC	9748917	N/A	2020/02/04	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9748624	N/A	2020/02/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9748625	N/A	2020/02/03	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9749179	N/A	2020/02/03	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9751736	N/A	2020/02/01	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9749617	N/A	2020/02/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9752351	N/A	2020/02/03	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9753472	N/A	2020/02/04	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9751726	N/A	2020/02/01	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9751729	N/A	2020/02/01	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9748956	N/A	2020/02/01	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9751660	N/A	2020/02/01	Mauro Oselin
Total Sulphide	SPEC	9753180	N/A	2020/02/04	Marjolen Busslinger

BV Labs ID: XH5742 Dup
Sample ID: TRIAL #1
Matrix: Water

Collected: 2020/01/29
Shipped: 2020/01/29
Received: 2020/01/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9752547	N/A	2020/02/03	Wilson Au Yueng
Fluoride - Low Level	ISE/ISE	9754216	N/A	2020/02/04	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9750987	N/A	2020/01/31	Lesley Quan
Elements by ICPMS Low Level (total)	ICP/CRCM	9752351	N/A	2020/02/03	Andrew An
Nitrate+Nitrite (N) (low level)	TRAA/COL	9751726	N/A	2020/02/01	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9751729	N/A	2020/02/01	Mauro Oselin
Total Sulphide	SPEC	9753180	N/A	2020/02/04	Marjolen Busslinger

BV Labs ID: XH5743
Sample ID: TRIAL #2
Matrix: Water

Collected: 2020/01/29
Shipped: 2020/01/29
Received: 2020/01/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9752547	N/A	2020/02/03	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9752684	N/A	2020/02/03	Coco Guo
Low level chloride/sulphate by AC	KONE	9753067	N/A	2020/02/03	Balwinder Bassi
Carbon (DOC)	TECH	9750772	N/A	2020/02/03	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9754216	N/A	2020/02/04	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9750987	N/A	2020/01/31	Lesley Quan
Sulphide (as H ₂ S)	CALC	9748917	N/A	2020/02/04	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9748624	N/A	2020/02/04	Automated Statchk



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BV Labs Job #: C006266
Report Date: 2020/02/05

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XH5743
Sample ID: TRIAL #2
Matrix: Water

Collected: 2020/01/29
Shipped: 2020/01/29
Received: 2020/01/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hardness (calculated as CaCO ₃)	CALC	9748625	N/A	2020/02/03	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9749179	N/A	2020/02/03	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9751736	N/A	2020/02/01	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9749617	N/A	2020/02/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9752351	N/A	2020/02/03	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9753472	N/A	2020/02/04	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9751726	N/A	2020/02/01	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9751729	N/A	2020/02/01	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9748956	N/A	2020/02/01	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9751660	N/A	2020/02/01	Mauro Oselin
Total Sulphide	SPEC	9753180	N/A	2020/02/04	Marjolen Busslinger

BV Labs ID: XH5744
Sample ID: TRIAL #5
Matrix: Water

Collected: 2020/01/29
Shipped: 2020/01/29
Received: 2020/01/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9752547	N/A	2020/02/03	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9752684	N/A	2020/02/03	Coco Guo
Low level chloride/sulphate by AC	KONE	9753067	N/A	2020/02/03	Balwinder Bassi
Carbon (DOC)	TECH	9750772	N/A	2020/02/03	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9754216	N/A	2020/02/04	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9750987	N/A	2020/01/31	Lesley Quan
Sulphide (as H ₂ S)	CALC	9748917	N/A	2020/02/04	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9748624	N/A	2020/02/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9748625	N/A	2020/02/03	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9749179	N/A	2020/02/03	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9751736	N/A	2020/02/01	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9749617	N/A	2020/02/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9752351	N/A	2020/02/03	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9753472	N/A	2020/02/04	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9751726	N/A	2020/02/01	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9751729	N/A	2020/02/01	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9748956	N/A	2020/02/01	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9751660	N/A	2020/02/01	Mauro Oselin
Total Sulphide	SPEC	9753180	N/A	2020/02/04	Marjolen Busslinger

BV Labs ID: XH5745
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/01/29
Shipped: 2020/01/29
Received: 2020/01/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9752547	N/A	2020/02/03	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9752684	N/A	2020/02/03	Coco Guo
Low level chloride/sulphate by AC	KONE	9753067	N/A	2020/02/03	Balwinder Bassi
Carbon (DOC)	TECH	9750772	N/A	2020/02/03	Taylor Mullings



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BV Labs Job #: C006266
Report Date: 2020/02/05

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XH5745
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/01/29
Shipped: 2020/01/29
Received: 2020/01/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Fluoride - Low Level	ISE/ISE	9754216	N/A	2020/02/04	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9750987	N/A	2020/01/31	Lesley Quan
Sulphide (as H ₂ S)	CALC	9748917	N/A	2020/02/04	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9748624	N/A	2020/02/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9748625	N/A	2020/02/03	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9749179	N/A	2020/02/03	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9751736	N/A	2020/02/01	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9749617	N/A	2020/02/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9752351	N/A	2020/02/03	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9753472	N/A	2020/02/04	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9751726	N/A	2020/02/01	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9751729	N/A	2020/02/01	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9748956	N/A	2020/02/01	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9751660	N/A	2020/02/01	Mauro Oselin
Total Sulphide	SPEC	9753180	N/A	2020/02/04	Marjolen Busslinger



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.3°C
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Results relate only to the items tested.

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BV Labs Job #: C006266

Report Date: 2020/02/05

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9750772	Dissolved Organic Carbon (C)	2020/02/03	100	80 - 120	103	80 - 120	<0.50	mg/L	0.52	20
9750987	HCl Preserved Iron (Fe+2 Ferrous)	2020/01/31	100	80 - 120	101	90 - 110	<0.050	mg/L	NC	20
9751660	Orthophosphate (P)	2020/02/01	101	80 - 120	95	80 - 120	<0.0010	mg/L	NC	20
9751726	Nitrate plus Nitrite (N)	2020/02/01	NC	80 - 120	108	80 - 120	<0.0020	mg/L	0.22	25
9751729	Nitrite (N)	2020/02/01	100	80 - 120	103	80 - 120	<0.0020	mg/L	NC	25
9751736	Dissolved Aluminum (Al)	2020/02/01	94	80 - 120	97	80 - 120	<0.00050	mg/L	3.3	20
9751736	Dissolved Antimony (Sb)	2020/02/01	98	80 - 120	98	80 - 120	<0.000020	mg/L	1.5	20
9751736	Dissolved Arsenic (As)	2020/02/01	97	80 - 120	97	80 - 120	<0.000020	mg/L	0.24	20
9751736	Dissolved Barium (Ba)	2020/02/01	NC	80 - 120	100	80 - 120	<0.000020	mg/L	1.1	20
9751736	Dissolved Beryllium (Be)	2020/02/01	89	80 - 120	92	80 - 120	<0.000010	mg/L	NC	20
9751736	Dissolved Bismuth (Bi)	2020/02/01	98	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9751736	Dissolved Boron (B)	2020/02/01	94	80 - 120	95	80 - 120	<0.010	mg/L	NC	20
9751736	Dissolved Cadmium (Cd)	2020/02/01	96	80 - 120	98	80 - 120	<0.0000050	mg/L	7.4	20
9751736	Dissolved Chromium (Cr)	2020/02/01	98	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9751736	Dissolved Cobalt (Co)	2020/02/01	93	80 - 120	97	80 - 120	<0.0000050	mg/L	0.089	20
9751736	Dissolved Copper (Cu)	2020/02/01	92	80 - 120	98	80 - 120	<0.000050	mg/L	1.0	20
9751736	Dissolved Iron (Fe)	2020/02/01	99	80 - 120	103	80 - 120	<0.0010	mg/L	0.94	20
9751736	Dissolved Lead (Pb)	2020/02/01	98	80 - 120	102	80 - 120	<0.0000050	mg/L	0.40	20
9751736	Dissolved Lithium (Li)	2020/02/01	87	80 - 120	92	80 - 120	<0.00050	mg/L	0.41	20
9751736	Dissolved Manganese (Mn)	2020/02/01	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.15	20
9751736	Dissolved Molybdenum (Mo)	2020/02/01	106	80 - 120	100	80 - 120	<0.000050	mg/L	1.9	20
9751736	Dissolved Nickel (Ni)	2020/02/01	96	80 - 120	101	80 - 120	<0.000020	mg/L	2.0	20
9751736	Dissolved Selenium (Se)	2020/02/01	97	80 - 120	97	80 - 120	<0.000040	mg/L	2.1	20
9751736	Dissolved Silicon (Si)	2020/02/01	96	80 - 120	92	80 - 120	<0.050	mg/L	0.31	20
9751736	Dissolved Silver (Ag)	2020/02/01	95	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9751736	Dissolved Strontium (Sr)	2020/02/01	NC	80 - 120	97	80 - 120	<0.000050	mg/L	2.1	20
9751736	Dissolved Thallium (Tl)	2020/02/01	100	80 - 120	102	80 - 120	<0.0000020	mg/L	5.4	20
9751736	Dissolved Tin (Sn)	2020/02/01	99	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9751736	Dissolved Titanium (Ti)	2020/02/01	97	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9751736	Dissolved Uranium (U)	2020/02/01	102	80 - 120	103	80 - 120	<0.0000020	mg/L	0.29	20
9751736	Dissolved Vanadium (V)	2020/02/01	100	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9751736	Dissolved Zinc (Zn)	2020/02/01	94	80 - 120	101	80 - 120	<0.00010	mg/L	0.13	20



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BV Labs Job #: C006266

Report Date: 2020/02/05

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9751736	Dissolved Zirconium (Zr)	2020/02/01	101	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9752351	Total Aluminum (Al)	2020/02/03	94	80 - 120	99	80 - 120	<0.00050	mg/L	1.5	20
9752351	Total Antimony (Sb)	2020/02/03	NC	80 - 120	100	80 - 120	<0.000020	mg/L	1.9	20
9752351	Total Arsenic (As)	2020/02/03	98	80 - 120	97	80 - 120	<0.000020	mg/L	1.1	20
9752351	Total Barium (Ba)	2020/02/03	NC	80 - 120	97	80 - 120	<0.000020	mg/L	1.9	20
9752351	Total Beryllium (Be)	2020/02/03	100	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9752351	Total Bismuth (Bi)	2020/02/03	91	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9752351	Total Boron (B)	2020/02/03	101	80 - 120	98	80 - 120	<0.010	mg/L	3.3	20
9752351	Total Cadmium (Cd)	2020/02/03	93	80 - 120	99	80 - 120	<0.0000050	mg/L	2.4	20
9752351	Total Chromium (Cr)	2020/02/03	91	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9752351	Total Cobalt (Co)	2020/02/03	88	80 - 120	98	80 - 120	<0.0000050	mg/L	0.57	20
9752351	Total Copper (Cu)	2020/02/03	91	80 - 120	98	80 - 120	<0.000050	mg/L	1.7	20
9752351	Total Iron (Fe)	2020/02/03	94	80 - 120	102	80 - 120	<0.0010	mg/L	2.6	20
9752351	Total Lead (Pb)	2020/02/03	96	80 - 120	103	80 - 120	<0.0000050	mg/L	0.60	20
9752351	Total Lithium (Li)	2020/02/03	97	80 - 120	94	80 - 120	<0.00050	mg/L	2.8	20
9752351	Total Manganese (Mn)	2020/02/03	89	80 - 120	99	80 - 120	<0.000050	mg/L	0.33	20
9752351	Total Molybdenum (Mo)	2020/02/03	103	80 - 120	101	80 - 120	<0.000050	mg/L	0.31	20
9752351	Total Nickel (Ni)	2020/02/03	87	80 - 120	100	80 - 120	<0.000020	mg/L	0.36	20
9752351	Total Selenium (Se)	2020/02/03	102	80 - 120	100	80 - 120	<0.000040	mg/L	7.3	20
9752351	Total Silicon (Si)	2020/02/03	92	80 - 120	96	80 - 120	<0.050	mg/L	1.7	20
9752351	Total Silver (Ag)	2020/02/03	95	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9752351	Total Strontium (Sr)	2020/02/03	NC	80 - 120	95	80 - 120	<0.000050	mg/L	2.3	20
9752351	Total Thallium (Tl)	2020/02/03	96	80 - 120	101	80 - 120	<0.0000020	mg/L	3.8	20
9752351	Total Tin (Sn)	2020/02/03	96	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9752351	Total Titanium (Ti)	2020/02/03	92	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9752351	Total Uranium (U)	2020/02/03	90	80 - 120	97	80 - 120	<0.0000020	mg/L	1.3	20
9752351	Total Vanadium (V)	2020/02/03	95	80 - 120	100	80 - 120	<0.00020	mg/L	5.8	20
9752351	Total Zinc (Zn)	2020/02/03	NC	80 - 120	102	80 - 120	<0.00010	mg/L	0.15	20
9752351	Total Zirconium (Zr)	2020/02/03	103	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9752547	Acidity (pH 4.5)	2020/02/03					<1.0	mg/L	NC	20
9752547	Acidity (pH 8.3)	2020/02/03			98	80 - 120	<1.0	mg/L	NC	20
9752684	Alkalinity (PP as CaCO ₃)	2020/02/03					<0.50	mg/L	NC	20



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BV Labs Job #: C006266

Report Date: 2020/02/05

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9752684	Alkalinity (Total as CaCO ₃)	2020/02/03	NC	80 - 120	95	80 - 120	<0.50	mg/L	0.13	20
9752684	Bicarbonate (HCO ₃)	2020/02/03					<0.50	mg/L	0.13	20
9752684	Carbonate (CO ₃)	2020/02/03					<0.50	mg/L	NC	20
9752684	Hydroxide (OH)	2020/02/03					<0.50	mg/L	NC	20
9753067	Dissolved Chloride (Cl)	2020/02/03	93	80 - 120	102	80 - 120	0.54, RDL=0.50	mg/L	5.7	20
9753067	Dissolved Sulphate (SO ₄)	2020/02/03	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.16	20
9753180	Total Sulphide	2020/02/04	NC	80 - 120	100	80 - 120	<0.0018	mg/L	NC	20
9753472	Total Ammonia (N)	2020/02/04	87	80 - 120	103	80 - 120	<0.0050	mg/L	0.25	20
9754216	Fluoride (F)	2020/02/04	NC	80 - 120	98	80 - 120	<0.010	mg/L	0	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

BV Labs Job #: C006266
Report Date: 2020/02/05

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Harry (Peng) Liang, Senior Analyst

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required											
Company Name: BMC MINERALS LTD.		Company Name: ALEXCO ENVIRONMENTAL GROUP		Quotation #: B60751		☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 1 Day ☐ 2 Days ☐ 3 Days											
Contact Name:		Contact Name: Andrew Gault; Kristen Piecowye		P.O. #/ AFE#:													
Address: 530-1130 WEST PENDER ST		Address: UNIT 3 151 INDUSTRIAL RD		Project #: BMC-18-02													
Vancouver, BC PC: V6E 4A4		Whitehorse, YK PC: V1A 2V3		Site Location: Kudz Ze Kayah													
Phone:		Phone: (867) 668-6463 vfriesen@contangostrategies.com		Site #:													
Email:		Email: agault@alexcoresource.com kpiewcowa@contangostrategies.com		Sampled By:													
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:											
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		ANALYSIS REQUESTED LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL - Y Present: ☒ Intact: ☒ COOLER TEMPERATURES 10-15 15, 14, 14 3, 1, 1 COOLING MEDIA PRESENT: ☒ Y / N											
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																	
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1	Trial #1	29-Jan-20	12:15	Water	X	X	X	X	X	X	X	X	X	X	9		
2	Trial #2	29-Jan-20	12:30	Water	X	X	X	X	X	X	X	X	X	X	9		
3	Trial #5	29-Jan-20	13:30	Water	X	X	X	X	X	X	X	X	X	X	9		
4	Trial #6	29-Jan-20	12:45	Water	X	X	X	X	X	X	X	X	X	X	9		
5																	
6																	
7																	
8																	
9																	
10																	

REINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
<i>[Signature]</i>	2020/01/29	13:45	<i>[Signature]</i> Kyle VanThournout	2020/01/29	1345
<i>[Signature]</i> Kyle VanThournout	2020/01/29	1500	<i>[Signature]</i> Tina Ull-Hye	2020/01/30	08:40

29-Jan-20 13:45

Safiann Maiter
C006266

AV2 INS-0097



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/02/12
 Report #: R2844045
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C008107

Received: 2020/02/05, 14:32

Sample Matrix: Water
 # Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	2	N/A	2020/02/07	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	2	N/A	2020/02/08	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	1	N/A	2020/02/07	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Low level chloride/sulphate by AC (1)	1	N/A	2020/02/10	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	2	N/A	2020/02/10	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	2	N/A	2020/02/08	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	2	N/A	2020/02/06	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	2	N/A	2020/02/10		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	2	N/A	2020/02/11	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	2	N/A	2020/02/10	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	2	N/A	2020/02/11	BBY WI-00033	Auto Calc
Ion Balance (1)	2	N/A	2020/02/11	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	2	N/A	2020/02/11	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	2	N/A	2020/02/10	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	2	N/A	2020/02/09	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	2	N/A	2020/02/11	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	2	N/A	2020/02/10	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	2	N/A	2020/02/07	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	2	N/A	2020/02/07	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	2	N/A	2020/02/07	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	2	N/A	2020/02/07	BBY WI-00033	Auto Calc
Orthophosphate by Konelab (low level) (1)	2	N/A	2020/02/07	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	2	N/A	2020/02/10	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/02/12
Report #: R2844045
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C008107

Received: 2020/02/05, 14:32

data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BUREAU
VERITASBV Labs Job #: C008107
Report Date: 2020/02/12ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XI5320		XI5321		
Sampling Date		2020/02/05 13:00		2020/02/05 13:15		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	TRIAL #2	RDL	TRIAL #6	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	8.9	N/A	8.5	N/A	9757113
Cation Sum	meq/L	8.7	N/A	8.5	N/A	9757113
Ion Balance	N/A	0.97	0.010	1.0	0.010	9757108
Ion Balance (% Difference)	%	0.97	N/A	0.54	N/A	9757110
Nitrate (N)	mg/L	<0.0020	0.0020	<0.0020	0.0020	9757122
Sulphide (as H ₂ S)	mg/L	4.1	0.096	3.8	0.048	9756929
Misc. Inorganics						
Fluoride (F)	mg/L	0.670	0.010	0.720	0.010	9759741
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.53	0.050	2.3	0.050	9757928
Dissolved Organic Carbon (C)	mg/L	4.2	0.50	12	0.50	9759361
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	9758977
Alkalinity (Total as CaCO ₃)	mg/L	120	0.50	108	0.50	9758878
Acidity (pH 8.3)	mg/L	15.8	1.0	17.5	1.0	9758977
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	9758878
Bicarbonate (HCO ₃)	mg/L	146	0.50	132	0.50	9758878
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	9758878
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	9758878
Anions						
Orthophosphate (P)	mg/L	0.94 (1)	0.010	0.29	0.0010	9759443
Total Sulphide	mg/L	3.9 (1)	0.090	3.6 (1)	0.045	9758874
Dissolved Chloride (Cl)	mg/L	54	0.50	56	0.50	9759476
Dissolved Sulphate (SO ₄)	mg/L	240 (1)	5.0	220 (1)	5.0	9759476
Nutrients						
Total Ammonia (N)	mg/L	0.44	0.0050	0.067	0.0050	9758617
Nitrate plus Nitrite (N)	mg/L	0.0037	0.0020	0.0054	0.0020	9759553
Nitrite (N)	mg/L	0.0044	0.0020	0.0048	0.0020	9759555
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.						

BUREAU
VERITASBV Labs Job #: C008107
Report Date: 2020/02/12ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XI5320	XI5321		
Sampling Date		2020/02/05 13:00	2020/02/05 13:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #2	TRIAL #6	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	362	350	0.50	9757020
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00251	0.00190	0.00050	9759757
Dissolved Antimony (Sb)	mg/L	0.000577	0.00222	0.000020	9759757
Dissolved Arsenic (As)	mg/L	0.0215 (1)	0.123	0.000020	9759757
Dissolved Barium (Ba)	mg/L	0.0838	0.0826	0.000020	9759757
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9759757
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9759757
Dissolved Boron (B)	mg/L	0.036	0.037	0.010	9759757
Dissolved Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	0.0000050	9759757
Dissolved Chromium (Cr)	mg/L	0.00011	0.00025	0.00010	9759757
Dissolved Cobalt (Co)	mg/L	0.000343	0.00142	0.0000050	9759757
Dissolved Copper (Cu)	mg/L	<0.000050	<0.000050	0.000050	9759757
Dissolved Iron (Fe)	mg/L	0.418	2.12	0.0010	9759757
Dissolved Lead (Pb)	mg/L	0.0000051	<0.0000050	0.0000050	9759757
Dissolved Lithium (Li)	mg/L	0.0118	0.0125	0.00050	9759757
Dissolved Manganese (Mn)	mg/L	0.302	0.259	0.000050	9759757
Dissolved Molybdenum (Mo)	mg/L	0.000059	0.000078	0.000050	9759757
Dissolved Nickel (Ni)	mg/L	0.00337	0.00919	0.000020	9759757
Dissolved Selenium (Se)	mg/L	0.00435	0.0253	0.000040	9759757
Dissolved Silicon (Si)	mg/L	1.12	1.19	0.050	9759757
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9759757
Dissolved Strontium (Sr)	mg/L	0.544	0.588	0.000050	9759757
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9759757
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9759757
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9759757
Dissolved Uranium (U)	mg/L	0.00666	0.0589	0.0000020	9759757
Dissolved Vanadium (V)	mg/L	<0.00020	0.00046	0.00020	9759757
Dissolved Zinc (Zn)	mg/L	0.00103	0.00050	0.00010	9759757
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9759757
Dissolved Calcium (Ca)	mg/L	114	111	0.050	9757118
RDL = Reportable Detection Limit					
(1) Matrix Spike outside acceptance criteria due to sample matrix interference.					



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XI5320	XI5321		
Sampling Date		2020/02/05 13:00	2020/02/05 13:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #2	TRIAL #6	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	18.4	18.0	0.050	9757118
Dissolved Potassium (K)	mg/L	7.51	8.44	0.050	9757118
Dissolved Sodium (Na)	mg/L	27.2	27.4	0.050	9757118
Dissolved Sulphur (S)	mg/L	86.6	84.9	3.0	9757118
RDL = Reportable Detection Limit					

BUREAU
VERITASBV Labs Job #: C008107
Report Date: 2020/02/12ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XI5320	XI5321		
Sampling Date		2020/02/05 13:00	2020/02/05 13:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #2	TRIAL #6	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	373	351	0.50	9757105
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00275	0.00295	0.00050	9760321
Total Antimony (Sb)	mg/L	0.00127	0.00362	0.000020	9760321
Total Arsenic (As)	mg/L	0.0305	0.112	0.000020	9760321
Total Barium (Ba)	mg/L	0.0823	0.0832	0.000020	9760321
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9760321
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9760321
Total Boron (B)	mg/L	0.031	0.032	0.010	9760321
Total Cadmium (Cd)	mg/L	0.0000822	0.000402	0.0000050	9760321
Total Chromium (Cr)	mg/L	0.00013	0.00050	0.00010	9760321
Total Cobalt (Co)	mg/L	0.000772	0.00356	0.0000050	9760321
Total Copper (Cu)	mg/L	0.000236	0.000636	0.000050	9760321
Total Iron (Fe)	mg/L	0.495	2.94	0.0010	9760321
Total Lead (Pb)	mg/L	0.0000930	0.000543	0.0000050	9760321
Total Lithium (Li)	mg/L	0.00954	0.00972	0.00050	9760321
Total Manganese (Mn)	mg/L	0.317	0.266	0.000050	9760321
Total Molybdenum (Mo)	mg/L	0.000258	0.000343	0.000050	9760321
Total Nickel (Ni)	mg/L	0.00427	0.0204	0.000020	9760321
Total Selenium (Se)	mg/L	0.0406	0.0728	0.000040	9760321
Total Silicon (Si)	mg/L	1.03	1.07	0.050	9760321
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9760321
Total Strontium (Sr)	mg/L	0.539	0.579	0.000050	9760321
Total Thallium (Tl)	mg/L	0.0000391	0.0000647	0.0000020	9760321
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9760321
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9760321
Total Uranium (U)	mg/L	0.00784	0.0751	0.0000020	9760321
Total Vanadium (V)	mg/L	0.00021	0.00051	0.00020	9760321
Total Zinc (Zn)	mg/L	0.0169	0.0850	0.00010	9760321
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9760321
Total Calcium (Ca)	mg/L	119	111	0.050	9757119
Total Magnesium (Mg)	mg/L	18.5	18.1	0.050	9757119
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: C008107
Report Date: 2020/02/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XI5320	XI5321		
Sampling Date		2020/02/05 13:00	2020/02/05 13:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #2	TRIAL #6	RDL	QC Batch
Total Potassium (K)	mg/L	7.66	8.60	0.050	9757119
Total Sodium (Na)	mg/L	27.1	27.8	0.050	9757119
Total Sulphur (S)	mg/L	144	93.9	3.0	9757119
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: C008107
Report Date: 2020/02/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XI5320
Sample ID: TRIAL #2
Matrix: Water

Collected: 2020/02/05
Shipped: 2020/02/05
Received: 2020/02/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9758977	N/A	2020/02/07	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9758878	N/A	2020/02/08	Coco Guo
Low level chloride/sulphate by AC	KONE	9759476	N/A	2020/02/07	Balwinder Bassi
Carbon (DOC)	TECH	9759361	N/A	2020/02/10	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9759741	N/A	2020/02/08	Edwin Lamigo
Ferrous Iron (Dissolved)	SPEC	9757928	N/A	2020/02/06	Kathleen Dalton
Sulphide (as H ₂ S)	CALC	9756929	N/A	2020/02/10	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9757105	N/A	2020/02/11	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9757020	N/A	2020/02/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9757108	N/A	2020/02/11	Automated Statchk
Ion Balance	CALC	9757110	N/A	2020/02/11	Automated Statchk
Sum of cations, anions	CALC	9757113	N/A	2020/02/11	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9757118	N/A	2020/02/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9759757	N/A	2020/02/09	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9757119	N/A	2020/02/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9760321	N/A	2020/02/10	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9758617	N/A	2020/02/07	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9759553	N/A	2020/02/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9759555	N/A	2020/02/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9757122	N/A	2020/02/07	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9759443	N/A	2020/02/07	Beatriz Ortega
Total Sulphide	SPEC	9758874	N/A	2020/02/10	Amy Phan

BV Labs ID: XI5320 Dup
Sample ID: TRIAL #2
Matrix: Water

Collected: 2020/02/05
Shipped: 2020/02/05
Received: 2020/02/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9758977	N/A	2020/02/07	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9758878	N/A	2020/02/08	Coco Guo
Low level chloride/sulphate by AC	KONE	9759476	N/A	2020/02/07	Balwinder Bassi
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9759757	N/A	2020/02/09	Valentina Balada
Orthophosphate by Konelab (low level)	KONE/COL	9759443	N/A	2020/02/07	Beatriz Ortega

BV Labs ID: XI5321
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/02/05
Shipped: 2020/02/05
Received: 2020/02/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9758977	N/A	2020/02/07	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9758878	N/A	2020/02/08	Coco Guo
Low level chloride/sulphate by AC	KONE	9759476	N/A	2020/02/10	Balwinder Bassi
Carbon (DOC)	TECH	9759361	N/A	2020/02/10	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9759741	N/A	2020/02/08	Edwin Lamigo
Ferrous Iron (Dissolved)	SPEC	9757928	N/A	2020/02/06	Kathleen Dalton
Sulphide (as H ₂ S)	CALC	9756929	N/A	2020/02/10	Automated Statchk



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BV Labs Job #: C008107
Report Date: 2020/02/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XI5321
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/02/05
Shipped: 2020/02/05
Received: 2020/02/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hardness Total (calculated as CaCO ₃)	CALC	9757105	N/A	2020/02/11	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9757020	N/A	2020/02/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9757108	N/A	2020/02/11	Automated Statchk
Ion Balance	CALC	9757110	N/A	2020/02/11	Automated Statchk
Sum of cations, anions	CALC	9757113	N/A	2020/02/11	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9757118	N/A	2020/02/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9759757	N/A	2020/02/09	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9757119	N/A	2020/02/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9760321	N/A	2020/02/10	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9758617	N/A	2020/02/07	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9759553	N/A	2020/02/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9759555	N/A	2020/02/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9757122	N/A	2020/02/07	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9759443	N/A	2020/02/07	Beatriz Ortega
Total Sulphide	SPEC	9758874	N/A	2020/02/10	Amy Phan

BV Labs ID: XI5321 Dup
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/02/05
Shipped: 2020/02/05
Received: 2020/02/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbon (DOC)	TECH	9759361	N/A	2020/02/10	Taylor Mullings
Ammonia-N Low Level (Preserved)	KONE/COL	9758617	N/A	2020/02/07	Fadia Mostafa



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BV Labs Job #: C008107
Report Date: 2020/02/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.0°C
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Results relate only to the items tested.

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BV Labs Job #: C008107

Report Date: 2020/02/12

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9757928	HCl Preserved Iron (Fe+2 Ferrous)	2020/02/06	NC	80 - 120	104	90 - 110	<0.050	mg/L	0.31	20
9758617	Total Ammonia (N)	2020/02/07	91	80 - 120	102	80 - 120	<0.0050	mg/L	3.6	20
9758874	Total Sulphide	2020/02/10	NC	80 - 120	97	80 - 120	<0.0018	mg/L	17	20
9758878	Alkalinity (PP as CaCO ₃)	2020/02/08					<0.50	mg/L	NC	20
9758878	Alkalinity (Total as CaCO ₃)	2020/02/08	NC	80 - 120	94	80 - 120	<0.50	mg/L	3.1	20
9758878	Bicarbonate (HCO ₃)	2020/02/08					<0.50	mg/L	3.1	20
9758878	Carbonate (CO ₃)	2020/02/08					<0.50	mg/L	NC	20
9758878	Hydroxide (OH)	2020/02/08					<0.50	mg/L	NC	20
9758977	Acidity (pH 4.5)	2020/02/07					<1.0	mg/L	NC	20
9758977	Acidity (pH 8.3)	2020/02/07			97	80 - 120	<1.0	mg/L	4.0	20
9759361	Dissolved Organic Carbon (C)	2020/02/10	NC	80 - 120	103	80 - 120	<0.50	mg/L	1.2	20
9759443	Orthophosphate (P)	2020/02/07	NC	80 - 120	90	80 - 120	<0.0010	mg/L	0.026	20
9759476	Dissolved Chloride (Cl)	2020/02/07	NC	80 - 120	108	80 - 120	<0.50	mg/L	1.1	20
9759476	Dissolved Sulphate (SO ₄)	2020/02/07	NC	80 - 120	96	80 - 120	0.63, RDL=0.50	mg/L	7.5	20
9759553	Nitrate plus Nitrite (N)	2020/02/07			101	80 - 120	<0.0020	mg/L		
9759555	Nitrite (N)	2020/02/07			99	80 - 120	<0.0020	mg/L		
9759741	Fluoride (F)	2020/02/08			102	80 - 120	<0.010	mg/L		
9759757	Dissolved Aluminum (Al)	2020/02/09	99	80 - 120	100	80 - 120	<0.00050	mg/L	1.0	20
9759757	Dissolved Antimony (Sb)	2020/02/09	109	80 - 120	100	80 - 120	<0.000020	mg/L	0.035	20
9759757	Dissolved Arsenic (As)	2020/02/09	122 (1)	80 - 120	95	80 - 120	<0.000020	mg/L	0.73	20
9759757	Dissolved Barium (Ba)	2020/02/09	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.018	20
9759757	Dissolved Beryllium (Be)	2020/02/09	89	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
9759757	Dissolved Bismuth (Bi)	2020/02/09	96	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9759757	Dissolved Boron (B)	2020/02/09	99	80 - 120	94	80 - 120	<0.010	mg/L	1.4	20
9759757	Dissolved Cadmium (Cd)	2020/02/09	101	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9759757	Dissolved Chromium (Cr)	2020/02/09	100	80 - 120	99	80 - 120	<0.00010	mg/L	1.4	20
9759757	Dissolved Cobalt (Co)	2020/02/09	100	80 - 120	98	80 - 120	<0.0000050	mg/L	2.7	20
9759757	Dissolved Copper (Cu)	2020/02/09	92	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9759757	Dissolved Iron (Fe)	2020/02/09	105	80 - 120	101	80 - 120	<0.0010	mg/L	0.88	20
9759757	Dissolved Lead (Pb)	2020/02/09	100	80 - 120	101	80 - 120	<0.0000050	mg/L	2.0	20
9759757	Dissolved Lithium (Li)	2020/02/09	82	80 - 120	97	80 - 120	<0.00050	mg/L	0.64	20
9759757	Dissolved Manganese (Mn)	2020/02/09	NC	80 - 120	98	80 - 120	<0.00050	mg/L	0.0089	20



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BV Labs Job #: C008107

Report Date: 2020/02/12

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9759757	Dissolved Molybdenum (Mo)	2020/02/09	115	80 - 120	101	80 - 120	<0.000050	mg/L	3.5	20
9759757	Dissolved Nickel (Ni)	2020/02/09	96	80 - 120	98	80 - 120	<0.000020	mg/L	3.0	20
9759757	Dissolved Selenium (Se)	2020/02/09	95	80 - 120	98	80 - 120	<0.000040	mg/L	0.43	20
9759757	Dissolved Silicon (Si)	2020/02/09	94	80 - 120	98	80 - 120	<0.050	mg/L	0.44	20
9759757	Dissolved Silver (Ag)	2020/02/09	103	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9759757	Dissolved Strontium (Sr)	2020/02/09	NC	80 - 120	93	80 - 120	<0.000050	mg/L	0.23	20
9759757	Dissolved Thallium (Tl)	2020/02/09	101	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9759757	Dissolved Tin (Sn)	2020/02/09	104	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9759757	Dissolved Titanium (Ti)	2020/02/09	101	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9759757	Dissolved Uranium (U)	2020/02/09	103	80 - 120	102	80 - 120	<0.0000020	mg/L	0.15	20
9759757	Dissolved Vanadium (V)	2020/02/09	101	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9759757	Dissolved Zinc (Zn)	2020/02/09	92	80 - 120	101	80 - 120	<0.00010	mg/L	4.6	20
9759757	Dissolved Zirconium (Zr)	2020/02/09	112	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9760321	Total Aluminum (Al)	2020/02/10	100	80 - 120	101	80 - 120	<0.00050	mg/L		
9760321	Total Antimony (Sb)	2020/02/10	103	80 - 120	101	80 - 120	<0.000020	mg/L		
9760321	Total Arsenic (As)	2020/02/10	101	80 - 120	102	80 - 120	<0.000020	mg/L		
9760321	Total Barium (Ba)	2020/02/10	100	80 - 120	98	80 - 120	<0.000020	mg/L		
9760321	Total Beryllium (Be)	2020/02/10	94	80 - 120	95	80 - 120	<0.000010	mg/L		
9760321	Total Bismuth (Bi)	2020/02/10	99	80 - 120	100	80 - 120	<0.0000050	mg/L		
9760321	Total Boron (B)	2020/02/10	102	80 - 120	103	80 - 120	<0.010	mg/L		
9760321	Total Cadmium (Cd)	2020/02/10	102	80 - 120	103	80 - 120	<0.0000050	mg/L		
9760321	Total Chromium (Cr)	2020/02/10	101	80 - 120	102	80 - 120	<0.00010	mg/L		
9760321	Total Cobalt (Co)	2020/02/10	103	80 - 120	105	80 - 120	<0.0000050	mg/L		
9760321	Total Copper (Cu)	2020/02/10	100	80 - 120	101	80 - 120	<0.000050	mg/L		
9760321	Total Iron (Fe)	2020/02/10	100	80 - 120	101	80 - 120	<0.0010	mg/L		
9760321	Total Lead (Pb)	2020/02/10	100	80 - 120	100	80 - 120	<0.0000050	mg/L		
9760321	Total Lithium (Li)	2020/02/10	90	80 - 120	91	80 - 120	<0.00050	mg/L		
9760321	Total Manganese (Mn)	2020/02/10	100	80 - 120	102	80 - 120	<0.000050	mg/L		
9760321	Total Molybdenum (Mo)	2020/02/10	104	80 - 120	105	80 - 120	<0.000050	mg/L		
9760321	Total Nickel (Ni)	2020/02/10	102	80 - 120	103	80 - 120	<0.000020	mg/L		
9760321	Total Selenium (Se)	2020/02/10	101	80 - 120	101	80 - 120	<0.000040	mg/L		
9760321	Total Silicon (Si)	2020/02/10	91	80 - 120	94	80 - 120	<0.050	mg/L		



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BV Labs Job #: C008107

Report Date: 2020/02/12

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9760321	Total Silver (Ag)	2020/02/10	102	80 - 120	104	80 - 120	<0.0000050	mg/L		
9760321	Total Strontium (Sr)	2020/02/10	95	80 - 120	95	80 - 120	<0.000050	mg/L		
9760321	Total Thallium (Tl)	2020/02/10	101	80 - 120	100	80 - 120	<0.0000020	mg/L		
9760321	Total Tin (Sn)	2020/02/10	101	80 - 120	101	80 - 120	<0.00020	mg/L		
9760321	Total Titanium (Ti)	2020/02/10	98	80 - 120	101	80 - 120	<0.00050	mg/L		
9760321	Total Uranium (U)	2020/02/10	99	80 - 120	99	80 - 120	<0.0000020	mg/L		
9760321	Total Vanadium (V)	2020/02/10	99	80 - 120	99	80 - 120	<0.00020	mg/L		
9760321	Total Zinc (Zn)	2020/02/10	103	80 - 120	105	80 - 120	<0.00010	mg/L		
9760321	Total Zirconium (Zr)	2020/02/10	101	80 - 120	105	80 - 120	<0.00010	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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BV Labs Job #: C008107
Report Date: 2020/02/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required											
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS											
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days											
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02												
Phone:		Phone:	(867) 668-6463 vfriesen@contangostrategies.com	Site Location:	Kudz Ze Kayah												
Email:		Email:	agault@alexcoresource.com kpiewowye@contangostrategies.com	Site #:													
				Sampled By:		Date Required:											
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA												LABORATORY USE ONLY CUSTODY SEAL Present: ☒ Intact: ☒ COOLER TEMPERATURES 2, 3, 2 COOLING MEDIA PRESENT: ☒	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																	
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1 Trial #2		05-Feb-20	13:00	Water	X	X	X	X	X	X	X	X	X	X	9		
2 Trial #6		05-Feb-20	13:15	Water	X	X	X	X	X	X	X	X	X	X	10		
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Received in Saskatoon
 By: [Signature]
 I-N FEB 05 2020 14:32
 CS-N
 Temp: 17 / 17 / 17

REUNQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
<u>[Signature]</u>	2020/02/05	14:32	<u>[Signature]</u>	2020/02/06	08:30

05-Feb-20 14:32
 Safiann Maiter

C008107
 SBZ INS-0127



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/02/21
 Report #: R2847975
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C010953

Received: 2020/02/13, 08:50

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	4	N/A	2020/02/20	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	4	N/A	2020/02/19	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	4	N/A	2020/02/19	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Carbon (DOC) (2)	4	N/A	2020/02/20	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	4	N/A	2020/02/20	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	4	N/A	2020/02/19	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	4	N/A	2020/02/20		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	4	N/A	2020/02/21	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	4	N/A	2020/02/21	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	4	N/A	2020/02/21	BBY WI-00033	Auto Calc
Ion Balance (1)	4	N/A	2020/02/21	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	4	N/A	2020/02/21	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	4	N/A	2020/02/21	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	4	N/A	2020/02/20	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	4	N/A	2020/02/21	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	4	N/A	2020/02/20	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	4	N/A	2020/02/20	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	4	N/A	2020/02/19	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	4	N/A	2020/02/19	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	4	N/A	2020/02/19	BBY WI-00033	Auto Calc
Orthophosphate by Konelab (low level) (1)	4	N/A	2020/02/19	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	4	N/A	2020/02/19	AB SOP-00080	SM 23 4500 S2-A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/02/21
Report #: R2847975
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C010953

Received: 2020/02/13, 08:50

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XK0194		XK0195		XK0196		XK0197		
Sampling Date		2020/02/13 11:00		2020/02/13 11:10		2020/02/13 13:00		2020/02/13 11:40		
COC Number		1 of 1		1 of 1		1 of 1		1 of 1		
	UNITS	TRIAL #1	RDL	TRIAL #2	RDL	TRIAL #5	RDL	TRIAL #6	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.9	N/A	8.7	N/A	9.2	N/A	9.1	N/A	9768843
Cation Sum	meq/L	8.5	N/A	8.7	N/A	8.8	N/A	8.7	N/A	9768843
Ion Balance	N/A	0.96	0.010	1.0	0.010	0.96	0.010	0.95	0.010	9768841
Ion Balance (% Difference)	%	2.3	N/A	0.097	N/A	2.0	N/A	2.4	N/A	9768842
Nitrate (N)	mg/L	<0.0020	0.0020	0.0065	0.0020	0.0039	0.0020	0.0095	0.0020	9768739
Sulphide (as H ₂ S)	mg/L	0.23	0.0020	2.2	0.048	<0.0020	0.0020	1.4	0.019	9768552

Misc. Inorganics

Fluoride (F)	mg/L	0.640	0.010	0.660	0.010	0.710	0.010	0.700	0.010	9771893
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	1.0 (1)	0.050	0.54	0.050	0.19	0.050	2.0	0.050	9769924
Dissolved Organic Carbon (C)	mg/L	25	0.50	3.7	0.50	20	0.50	8.7	0.50	9769811
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9771693
Alkalinity (Total as CaCO ₃)	mg/L	92.9	0.50	123	0.50	119	0.50	115	0.50	9770869
Acidity (pH 8.3)	mg/L	7.9	1.0	10.9	1.0	11.5	1.0	10.6	1.0	9771693
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9770869
Bicarbonate (HCO ₃)	mg/L	113	0.50	149	0.50	145	0.50	140	0.50	9770869
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9770869
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9770869

Anions

Orthophosphate (P)	mg/L	0.55 (2)	0.010	0.98 (2)	0.010	0.049	0.0010	0.46	0.0010	9770872
Total Sulphide	mg/L	0.22	0.0018	2.1 (2)	0.045	<0.0018 (3)	0.0018	1.3 (2)	0.018	9770395
Dissolved Chloride (Cl)	mg/L	59	0.50	58	0.50	56	0.50	57	0.50	9770964
Dissolved Sulphate (SO ₄)	mg/L	250 (2)	5.0	220 (2)	5.0	250 (2)	5.0	250 (2)	5.0	9770964

Nutrients

Total Ammonia (N)	mg/L	0.065	0.0050	0.19	0.0050	0.017	0.0050	0.034	0.0050	9769880
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	0.0065	0.0020	0.0078	0.0020	0.0095	0.0020	9770841
Nitrite (N)	mg/L	<0.0020	0.0020	<0.0020	0.0020	0.0039	0.0020	<0.0020	0.0020	9770846

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

(3) Sample pH <9, preservation incomplete. Due to volatility of analyte, a low bias in the results is likely.

BUREAU
VERITASBV Labs Job #: C010953
Report Date: 2020/02/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XK0194	XK0195	XK0196	XK0197		
Sampling Date		2020/02/13 11:00	2020/02/13 11:10	2020/02/13 13:00	2020/02/13 11:40		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	354	366	374	360	0.50	9768697
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00352	0.00246	0.00426	0.00173	0.00050	9770689
Dissolved Antimony (Sb)	mg/L	0.00210	0.000774	0.0166	0.00218	0.000020	9770689
Dissolved Arsenic (As)	mg/L	0.0566	0.0263	0.0341	0.124	0.000020	9770689
Dissolved Barium (Ba)	mg/L	0.0888	0.0872	0.0622	0.0820	0.000020	9770689
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9770689
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9770689
Dissolved Boron (B)	mg/L	0.035	0.035	0.034	0.036	0.010	9770689
Dissolved Cadmium (Cd)	mg/L	0.000199	<0.0000050	0.00114	<0.0000050	0.0000050	9770689
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	<0.00010	0.00026	0.00010	9770689
Dissolved Cobalt (Co)	mg/L	0.00398	0.000286	0.00308	0.000996	0.0000050	9770689
Dissolved Copper (Cu)	mg/L	0.00107	<0.0000050	0.00145	<0.0000050	0.0000050	9770689
Dissolved Iron (Fe)	mg/L	0.966	0.385	0.182	1.78	0.0010	9770689
Dissolved Lead (Pb)	mg/L	0.00135	0.0000070	0.000503	<0.0000050	0.0000050	9770689
Dissolved Lithium (Li)	mg/L	0.0127	0.0119	0.0120	0.0127	0.00050	9770689
Dissolved Manganese (Mn)	mg/L	0.158	0.305	0.260	0.281	0.000050	9770689
Dissolved Molybdenum (Mo)	mg/L	0.00238	0.000078	0.00151	0.000064	0.000050	9770689
Dissolved Nickel (Ni)	mg/L	0.0116	0.00305	0.0136	0.00613	0.000020	9770689
Dissolved Selenium (Se)	mg/L	0.0230	0.0128	0.00475	0.0564	0.000040	9770689
Dissolved Silicon (Si)	mg/L	1.20	1.16	1.07	1.25	0.050	9770689
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9770689
Dissolved Strontium (Sr)	mg/L	0.544	0.579	0.610	0.613	0.000050	9770689
Dissolved Thallium (Tl)	mg/L	0.000104	0.0000027	0.000321	<0.0000020	0.0000020	9770689
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9770689
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9770689
Dissolved Uranium (U)	mg/L	0.0326	0.00620	0.0297	0.0504	0.0000020	9770689
Dissolved Vanadium (V)	mg/L	0.00038	0.00021	0.00020	0.00048	0.00020	9770689
Dissolved Zinc (Zn)	mg/L	0.0148	0.00072	0.255	0.00039	0.00010	9770689
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00011	<0.00010	0.00010	9770689
Dissolved Calcium (Ca)	mg/L	111	117	120	114	0.050	9768700
Dissolved Magnesium (Mg)	mg/L	18.6	17.9	18.1	18.2	0.050	9768700

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XK0194	XK0195	XK0196	XK0197		
Sampling Date		2020/02/13 11:00	2020/02/13 11:10	2020/02/13 13:00	2020/02/13 11:40		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.35	7.24	7.14	8.59	0.050	9768700
Dissolved Sodium (Na)	mg/L	26.3	25.7	25.9	26.8	0.050	9768700
Dissolved Sulphur (S)	mg/L	85.5	98.0	82.6	89.1	3.0	9768700
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: C010953
Report Date: 2020/02/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XK0194	XK0195	XK0196	XK0197		
Sampling Date		2020/02/13 11:00	2020/02/13 11:10	2020/02/13 13:00	2020/02/13 11:40		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	377	368	396	360	0.50	9768725
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00647	0.00248	0.00429	0.00174	0.00050	9771168
Total Antimony (Sb)	mg/L	0.00574	0.00161	0.0167	0.00208	0.000020	9771168
Total Arsenic (As)	mg/L	0.0552	0.0311	0.0377	0.114	0.000020	9771168
Total Barium (Ba)	mg/L	0.0877	0.0833	0.0611	0.0790	0.000020	9771168
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9771168
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9771168
Total Boron (B)	mg/L	0.035	0.036	0.036	0.036	0.010	9771168
Total Cadmium (Cd)	mg/L	0.000755	0.0000646	0.00143	<0.0000050	0.0000050	9771168
Total Chromium (Cr)	mg/L	<0.00010	0.00013	<0.00010	0.00025	0.00010	9771168
Total Cobalt (Co)	mg/L	0.00400	0.000643	0.00304	0.000979	0.0000050	9771168
Total Copper (Cu)	mg/L	0.00285	0.000228	0.00431	<0.000050	0.000050	9771168
Total Iron (Fe)	mg/L	1.04	0.403	0.234	1.77	0.0010	9771168
Total Lead (Pb)	mg/L	0.00210	0.0000847	0.00169	0.0000081	0.0000050	9771168
Total Lithium (Li)	mg/L	0.0120	0.0110	0.0115	0.0114	0.00050	9771168
Total Manganese (Mn)	mg/L	0.158	0.315	0.262	0.270	0.000050	9771168
Total Molybdenum (Mo)	mg/L	0.00239	0.000252	0.00156	0.000080	0.000050	9771168
Total Nickel (Ni)	mg/L	0.0114	0.00363	0.0137	0.00617	0.000020	9771168
Total Selenium (Se)	mg/L	0.0352 (1)	0.0439	0.0131	0.0973	0.000040	9771168
Total Silicon (Si)	mg/L	1.20	1.07	1.01	1.15	0.050	9771168
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9771168
Total Strontium (Sr)	mg/L	0.526	0.551	0.624	0.605	0.000050	9771168
Total Thallium (Tl)	mg/L	0.000219	0.0000434	0.000326	0.0000068	0.0000020	9771168
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9771168
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9771168
Total Uranium (U)	mg/L	0.0340	0.00707	0.0325	0.0496	0.0000020	9771168
Total Vanadium (V)	mg/L	0.00050	0.00033	0.00027	0.00055	0.00020	9771168
Total Zinc (Zn)	mg/L	0.0534	0.0131	0.250	0.00070	0.00010	9771168
Total Zirconium (Zr)	mg/L	0.00021	0.00022	0.00019	0.00020	0.00010	9771168
Total Calcium (Ca)	mg/L	120	118	128	115	0.050	9768736

RDL = Reportable Detection Limit

(1) Matrix Spike outside acceptance criteria due to sample matrix interference.



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XK0194	XK0195	XK0196	XK0197		
Sampling Date		2020/02/13 11:00	2020/02/13 11:10	2020/02/13 13:00	2020/02/13 11:40		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch
Total Magnesium (Mg)	mg/L	18.5	18.1	18.3	17.5	0.050	9768736
Total Potassium (K)	mg/L	8.32	7.38	7.29	8.37	0.050	9768736
Total Sodium (Na)	mg/L	26.3	26.1	26.9	26.4	0.050	9768736
Total Sulphur (S)	mg/L	84.1	113	80.9	89.2	3.0	9768736
RDL = Reportable Detection Limit							



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BV Labs Job #: C010953
Report Date: 2020/02/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XK0194
Sample ID: TRIAL #1
Matrix: Water

Collected: 2020/02/13
Shipped: 2020/02/13
Received: 2020/02/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9771693	N/A	2020/02/20	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9770869	N/A	2020/02/19	Coco Guo
Low level chloride/sulphate by AC	KONE	9770964	N/A	2020/02/19	Balwinder Bassi
Carbon (DOC)	TECH	9769811	N/A	2020/02/20	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9771893	N/A	2020/02/20	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9769924	N/A	2020/02/19	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9768552	N/A	2020/02/20	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9768725	N/A	2020/02/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9768697	N/A	2020/02/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9768841	N/A	2020/02/21	Automated Statchk
Ion Balance	CALC	9768842	N/A	2020/02/21	Automated Statchk
Sum of cations, anions	CALC	9768843	N/A	2020/02/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9768700	N/A	2020/02/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9770689	N/A	2020/02/20	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9768736	N/A	2020/02/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9771168	N/A	2020/02/20	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9769880	N/A	2020/02/20	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9770841	N/A	2020/02/19	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9770846	N/A	2020/02/19	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9768739	N/A	2020/02/19	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9770872	N/A	2020/02/19	Beatriz Ortega
Total Sulphide	SPEC	9770395	N/A	2020/02/19	Kathleen Dalton

BV Labs ID: XK0194 Dup
Sample ID: TRIAL #1
Matrix: Water

Collected: 2020/02/13
Shipped: 2020/02/13
Received: 2020/02/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbon (DOC)	TECH	9769811	N/A	2020/02/20	Taylor Mullings
Ferrous Iron (Dissolved)	SPEC	9769924	N/A	2020/02/19	Jennifer Mee
Elements by ICPMS Low Level (total)	ICP/CRCM	9771168	N/A	2020/02/20	Andrew An

BV Labs ID: XK0195
Sample ID: TRIAL #2
Matrix: Water

Collected: 2020/02/13
Shipped: 2020/02/13
Received: 2020/02/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9771693	N/A	2020/02/20	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9770869	N/A	2020/02/19	Coco Guo
Low level chloride/sulphate by AC	KONE	9770964	N/A	2020/02/19	Balwinder Bassi
Carbon (DOC)	TECH	9769811	N/A	2020/02/20	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9771893	N/A	2020/02/20	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9769924	N/A	2020/02/19	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9768552	N/A	2020/02/20	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9768725	N/A	2020/02/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9768697	N/A	2020/02/21	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: C010953
Report Date: 2020/02/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XK0195
Sample ID: TRIAL #2
Matrix: Water

Collected: 2020/02/13
Shipped: 2020/02/13
Received: 2020/02/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9768841	N/A	2020/02/21	Automated Statchk
Ion Balance	CALC	9768842	N/A	2020/02/21	Automated Statchk
Sum of cations, anions	CALC	9768843	N/A	2020/02/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9768700	N/A	2020/02/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9770689	N/A	2020/02/20	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9768736	N/A	2020/02/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9771168	N/A	2020/02/20	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9769880	N/A	2020/02/20	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9770841	N/A	2020/02/19	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9770846	N/A	2020/02/19	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9768739	N/A	2020/02/19	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9770872	N/A	2020/02/19	Beatriz Ortega
Total Sulphide	SPEC	9770395	N/A	2020/02/19	Kathleen Dalton

BV Labs ID: XK0196
Sample ID: TRIAL #5
Matrix: Water

Collected: 2020/02/13
Shipped: 2020/02/13
Received: 2020/02/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9771693	N/A	2020/02/20	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9770869	N/A	2020/02/19	Coco Guo
Low level chloride/sulphate by AC	KONE	9770964	N/A	2020/02/19	Balwinder Bassi
Carbon (DOC)	TECH	9769811	N/A	2020/02/20	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9771893	N/A	2020/02/20	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9769924	N/A	2020/02/19	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9768552	N/A	2020/02/20	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9768725	N/A	2020/02/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9768697	N/A	2020/02/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9768841	N/A	2020/02/21	Automated Statchk
Ion Balance	CALC	9768842	N/A	2020/02/21	Automated Statchk
Sum of cations, anions	CALC	9768843	N/A	2020/02/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9768700	N/A	2020/02/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9770689	N/A	2020/02/20	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9768736	N/A	2020/02/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9771168	N/A	2020/02/20	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9769880	N/A	2020/02/20	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9770841	N/A	2020/02/19	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9770846	N/A	2020/02/19	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9768739	N/A	2020/02/19	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9770872	N/A	2020/02/19	Beatriz Ortega
Total Sulphide	SPEC	9770395	N/A	2020/02/19	Kathleen Dalton



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BV Labs Job #: C010953

Report Date: 2020/02/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XK0197
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/02/13
Shipped: 2020/02/13
Received: 2020/02/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9771693	N/A	2020/02/20	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9770869	N/A	2020/02/19	Coco Guo
Low level chloride/sulphate by AC	KONE	9770964	N/A	2020/02/19	Balwinder Bassi
Carbon (DOC)	TECH	9769811	N/A	2020/02/20	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9771893	N/A	2020/02/20	Beatriz Ortega
Ferrous Iron (Dissolved)	SPEC	9769924	N/A	2020/02/19	Jennifer Mee
Sulphide (as H ₂ S)	CALC	9768552	N/A	2020/02/20	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9768725	N/A	2020/02/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9768697	N/A	2020/02/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9768841	N/A	2020/02/21	Automated Statchk
Ion Balance	CALC	9768842	N/A	2020/02/21	Automated Statchk
Sum of cations, anions	CALC	9768843	N/A	2020/02/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9768700	N/A	2020/02/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9770689	N/A	2020/02/20	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9768736	N/A	2020/02/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9771168	N/A	2020/02/20	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9769880	N/A	2020/02/20	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9770841	N/A	2020/02/19	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9770846	N/A	2020/02/19	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9768739	N/A	2020/02/19	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9770872	N/A	2020/02/19	Beatriz Ortega
Total Sulphide	SPEC	9770395	N/A	2020/02/19	Kathleen Dalton

BV Labs ID: XK0197 Dup
Sample ID: TRIAL #6
Matrix: Water

Collected: 2020/02/13
Shipped: 2020/02/13
Received: 2020/02/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Low level chloride/sulphate by AC	KONE	9770964	N/A	2020/02/19	Balwinder Bassi



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C
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Sample XK0194 [TRIAL #1] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample XK0195 [TRIAL #2] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample XK0196 [TRIAL #5] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample XK0197 [TRIAL #6] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Results relate only to the items tested.

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BV Labs Job #: C010953

Report Date: 2020/02/21

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9769811	Dissolved Organic Carbon (C)	2020/02/20	NC	80 - 120	101	80 - 120	<0.50	mg/L	0.69	20
9769880	Total Ammonia (N)	2020/02/20	119	80 - 120	114	80 - 120	<0.0050	mg/L	NC	20
9769924	HCl Preserved Iron (Fe+2 Ferrous)	2020/02/19	64 (1)	80 - 120	102	90 - 110	<0.050	mg/L	0.027	20
9770395	Total Sulphide	2020/02/19	111	80 - 120	106	80 - 120	<0.0018	mg/L	NC	20
9770689	Dissolved Aluminum (Al)	2020/02/20	102	80 - 120	104	80 - 120	<0.00050	mg/L	1.5	20
9770689	Dissolved Antimony (Sb)	2020/02/20	103	80 - 120	105	80 - 120	<0.000020	mg/L	3.5	20
9770689	Dissolved Arsenic (As)	2020/02/20	101	80 - 120	104	80 - 120	<0.000020	mg/L	1.9	20
9770689	Dissolved Barium (Ba)	2020/02/20	103	80 - 120	106	80 - 120	<0.000020	mg/L	0.82	20
9770689	Dissolved Beryllium (Be)	2020/02/20	100	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9770689	Dissolved Bismuth (Bi)	2020/02/20	104	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
9770689	Dissolved Boron (B)	2020/02/20	103	80 - 120	101	80 - 120	<0.010	mg/L	NC	20
9770689	Dissolved Cadmium (Cd)	2020/02/20	101	80 - 120	103	80 - 120	<0.0000050	mg/L	18	20
9770689	Dissolved Chromium (Cr)	2020/02/20	98	80 - 120	101	80 - 120	<0.00010	mg/L	7.1	20
9770689	Dissolved Cobalt (Co)	2020/02/20	96	80 - 120	100	80 - 120	<0.0000050	mg/L	0	20
9770689	Dissolved Copper (Cu)	2020/02/20	95	80 - 120	99	80 - 120	<0.000050	mg/L	2.9	20
9770689	Dissolved Iron (Fe)	2020/02/20	104	80 - 120	106	80 - 120	<0.0010	mg/L	1.3	20
9770689	Dissolved Lead (Pb)	2020/02/20	106	80 - 120	106	80 - 120	<0.0000050	mg/L	13	20
9770689	Dissolved Lithium (Li)	2020/02/20	101	80 - 120	106	80 - 120	<0.00050	mg/L	3.0	20
9770689	Dissolved Manganese (Mn)	2020/02/20	96	80 - 120	101	80 - 120	<0.000050	mg/L	1.2	20
9770689	Dissolved Molybdenum (Mo)	2020/02/20	105	80 - 120	106	80 - 120	<0.000050	mg/L	1.8	20
9770689	Dissolved Nickel (Ni)	2020/02/20	95	80 - 120	100	80 - 120	<0.000020	mg/L	1.7	20
9770689	Dissolved Selenium (Se)	2020/02/20	104	80 - 120	104	80 - 120	<0.000040	mg/L	6.0	20
9770689	Dissolved Silicon (Si)	2020/02/20	99	80 - 120	109	80 - 120	<0.050	mg/L	0.082	20
9770689	Dissolved Silver (Ag)	2020/02/20	99	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9770689	Dissolved Strontium (Sr)	2020/02/20	NC	80 - 120	106	80 - 120	<0.000050	mg/L	1.3	20
9770689	Dissolved Thallium (Tl)	2020/02/20	104	80 - 120	106	80 - 120	<0.0000020	mg/L	NC	20
9770689	Dissolved Tin (Sn)	2020/02/20	103	80 - 120	104	80 - 120	<0.00020	mg/L	NC	20
9770689	Dissolved Titanium (Ti)	2020/02/20	101	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9770689	Dissolved Uranium (U)	2020/02/20	109	80 - 120	109	80 - 120	<0.0000020	mg/L	4.2	20
9770689	Dissolved Vanadium (V)	2020/02/20	100	80 - 120	101	80 - 120	<0.00020	mg/L	6.0	20
9770689	Dissolved Zinc (Zn)	2020/02/20	97	80 - 120	100	80 - 120	<0.00010	mg/L	13	20
9770689	Dissolved Zirconium (Zr)	2020/02/20	102	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20

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BV Labs Job #: C010953

Report Date: 2020/02/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9770841	Nitrate plus Nitrite (N)	2020/02/19	31 (1)	80 - 120	108	80 - 120	<0.0020	mg/L	1.3	25
9770846	Nitrite (N)	2020/02/19	36 (1)	80 - 120	105	80 - 120	<0.0020	mg/L	NC	25
9770869	Alkalinity (PP as CaCO ₃)	2020/02/19					<0.50	mg/L		
9770869	Alkalinity (Total as CaCO ₃)	2020/02/19			94	80 - 120	<0.50	mg/L		
9770869	Bicarbonate (HCO ₃)	2020/02/19					<0.50	mg/L		
9770869	Carbonate (CO ₃)	2020/02/19					<0.50	mg/L		
9770869	Hydroxide (OH)	2020/02/19					<0.50	mg/L		
9770872	Orthophosphate (P)	2020/02/19			93	80 - 120	0.0012, RDL=0.0010	mg/L		
9770964	Dissolved Chloride (Cl)	2020/02/19			103	80 - 120	<0.50	mg/L	0.24	20
9770964	Dissolved Sulphate (SO ₄)	2020/02/19			99	80 - 120	<0.50	mg/L	0.091	20
9771168	Total Aluminum (Al)	2020/02/20	96	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9771168	Total Antimony (Sb)	2020/02/20	NC	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9771168	Total Arsenic (As)	2020/02/20	NC	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9771168	Total Barium (Ba)	2020/02/20	NC	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
9771168	Total Beryllium (Be)	2020/02/20	93	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9771168	Total Bismuth (Bi)	2020/02/20	88	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9771168	Total Boron (B)	2020/02/20	95	80 - 120	103	80 - 120	<0.010	mg/L	NC	20
9771168	Total Cadmium (Cd)	2020/02/20	93	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9771168	Total Chromium (Cr)	2020/02/20	94	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9771168	Total Cobalt (Co)	2020/02/20	90	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9771168	Total Copper (Cu)	2020/02/20	84	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9771168	Total Iron (Fe)	2020/02/20	NC	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20
9771168	Total Lead (Pb)	2020/02/20	94	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9771168	Total Lithium (Li)	2020/02/20	89	80 - 120	96	80 - 120	<0.00050	mg/L	NC	20
9771168	Total Manganese (Mn)	2020/02/20	NC	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9771168	Total Molybdenum (Mo)	2020/02/20	106	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9771168	Total Nickel (Ni)	2020/02/20	88	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9771168	Total Selenium (Se)	2020/02/20	48 (1)	80 - 120	97	80 - 120	<0.000040	mg/L	NC	20
9771168	Total Silicon (Si)	2020/02/20	95	80 - 120	99	80 - 120	<0.050	mg/L	NC	20
9771168	Total Silver (Ag)	2020/02/20	100	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9771168	Total Strontium (Sr)	2020/02/20	NC	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20



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VERITAS

BV Labs Job #: C010953

Report Date: 2020/02/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9771168	Total Thallium (Tl)	2020/02/20	94	80 - 120	99	80 - 120	0.0000022, RDL=0.0000020 (2)	mg/L	4.1	20
9771168	Total Tin (Sn)	2020/02/20	98	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9771168	Total Titanium (Ti)	2020/02/20	97	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9771168	Total Uranium (U)	2020/02/20	91	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9771168	Total Vanadium (V)	2020/02/20	98	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9771168	Total Zinc (Zn)	2020/02/20	NC	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9771168	Total Zirconium (Zr)	2020/02/20	99	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9771693	Acidity (pH 4.5)	2020/02/20					<1.0	mg/L	NC	20
9771693	Acidity (pH 8.3)	2020/02/20			97	80 - 120	<1.0	mg/L	NC	20
9771893	Fluoride (F)	2020/02/20	NC	80 - 120	102	80 - 120	<0.010	mg/L	0	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Method blank exceeds acceptance limits for Tl- 2X RDL acceptable for low level metals determination.



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VERITAS

BV Labs Job #: C010953
Report Date: 2020/02/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required														
Company Name: BMC MINERALS LTD.	Company Name: ALEXCO ENVIRONMENTAL GROUP	Quotation #: B60751	☒ Regular TAT 5 days (Most analyses)																	
Contact Name:	Contact Name: Andrew Gault; Kristen Picowye	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS																	
Address: 530-1130 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-02	Rush TAT (Surcharges will be applied)																	
Vancouver, BC PC: V6E 4A4	Whitehorse, YK PC: V1A 2V3	Site Location: Kudz Ze Kayah	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days																	
Phone:	Phone: (867) 668-6463 vfriesen@contangostrategies.com	Site #:	Date Required:																	
Email:	Email: agault@alexcoresource.com kpiceowye@contangostrategies.com	Sampled By:																		
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:														
☐ BC CSR Soil ☐ CCME (Specify) ☐ Drinking Water	☐ BC CSR Water ☐ Other (Specify) ☐ BC Water Quality	☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485	LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL Present Intact COOLER TEMPERATURES COOLING MEDIA PRESENT															
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																				
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix													# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS	
1 Trial #1		13-Feb-20	11:00	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	10		
2 Trial #2		13-Feb-20	11:10	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	10		
3 Trial #5		13-Feb-20	11:00	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	10		
4 Trial #6		13-Feb-20	11:40	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	10		
5																				
6																				
7																				
8																				
9																				
10																				
REUNQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #												
		2020/02/13	13:29			2020/02/13	08:50	CO10953												



Your Project #: BMC-18-02
Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/03/04
Report #: R2853556
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C013904

Received: 2020/02/26, 12:30

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	2	N/A	2020/02/28	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	2	N/A	2020/02/28	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	2	N/A	2020/02/28	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	2	N/A	2020/03/02	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	2	N/A	2020/02/28	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	2	N/A	2020/02/28	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	2	N/A	2020/03/02		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	2	N/A	2020/03/03	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	2	N/A	2020/03/02	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	2	N/A	2020/03/02	BBY WI-00033	Auto Calc
Ion Balance (1)	2	N/A	2020/03/02	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	2	N/A	2020/03/02	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	2	N/A	2020/03/02	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	2	N/A	2020/02/29	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	2	N/A	2020/03/03	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	2	N/A	2020/03/03	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	2	N/A	2020/03/04	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	2	N/A	2020/02/29	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	2	N/A	2020/02/29	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	2	N/A	2020/02/29	BBY WI-00033	Auto Calc
Orthophosphate by Konelab (low level) (1)	2	N/A	2020/02/28	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	2	N/A	2020/03/02	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/03/04
Report #: R2853556
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C013904

Received: 2020/02/26, 12:30

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BUREAU
VERITASBV Labs Job #: C013904
Report Date: 2020/03/04ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		XL4574		XL4575		
Sampling Date		2020/02/26 11:00		2020/02/26 12:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	TRIAL #1	RDL	TRIAL #5	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	8.7	N/A	8.5	N/A	9778960
Cation Sum	meq/L	8.5	N/A	9.1	N/A	9778960
Ion Balance	N/A	0.98	0.010	1.1	0.010	9778958
Ion Balance (% Difference)	%	1.1	N/A	3.6	N/A	9778959
Nitrate (N)	mg/L	<0.0020	0.0020	<0.0020	0.0020	9778961
Sulphide (as H ₂ S)	mg/L	0.26	0.0020	0.037	0.0020	9778440
Misc. Inorganics						
Fluoride (F)	mg/L	0.670	0.010	0.730	0.010	9781002
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.52	0.050	1.1	0.050	9781029
Dissolved Organic Carbon (C)	mg/L	14	0.50	16	0.50	9781013
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	9780756
Alkalinity (Total as CaCO ₃)	mg/L	94.5	0.50	122	0.50	9780987
Acidity (pH 8.3)	mg/L	13.0	1.0	20.0	1.0	9780756
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	9780987
Bicarbonate (HCO ₃)	mg/L	115	0.50	149	0.50	9780987
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	9780987
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	9780987
Anions						
Orthophosphate (P)	mg/L	0.65 (1)	0.010	0.083	0.0010	9781174
Total Sulphide	mg/L	0.24	0.0018	0.035	0.0018	9781961
Dissolved Chloride (Cl)	mg/L	57	0.50	56	0.50	9781236
Dissolved Sulphate (SO ₄)	mg/L	250 (1)	5.0	210 (1)	5.0	9781236
Nutrients						
Total Ammonia (N)	mg/L	0.087	0.0050	0.017	0.0050	9785567
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	0.0053	0.0020	9781633
Nitrite (N)	mg/L	0.0020	0.0020	0.0036	0.0020	9781635
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.						

BUREAU
VERITASBV Labs Job #: C013904
Report Date: 2020/03/04ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XL4574	XL4575		
Sampling Date		2020/02/26 11:00	2020/02/26 12:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #5	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	354	385	0.50	9778420
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00467	0.00329	0.00050	9781367
Dissolved Antimony (Sb)	mg/L	0.00134	0.00918	0.000020	9781367
Dissolved Arsenic (As)	mg/L	0.0419	0.0401	0.000020	9781367
Dissolved Barium (Ba)	mg/L	0.0840	0.0658	0.000020	9781367
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9781367
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9781367
Dissolved Boron (B)	mg/L	0.040	0.041	0.010	9781367
Dissolved Cadmium (Cd)	mg/L	0.0000702	0.0000476	0.0000050	9781367
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9781367
Dissolved Cobalt (Co)	mg/L	0.00212	0.00485	0.0000050	9781367
Dissolved Copper (Cu)	mg/L	0.000394	0.000372	0.000050	9781367
Dissolved Iron (Fe)	mg/L	0.498	1.12	0.0010	9781367
Dissolved Lead (Pb)	mg/L	0.000635	0.000167	0.0000050	9781367
Dissolved Lithium (Li)	mg/L	0.0121	0.0113	0.00050	9781367
Dissolved Manganese (Mn)	mg/L	0.0976	0.337	0.000050	9781367
Dissolved Molybdenum (Mo)	mg/L	0.00221	0.00162	0.000050	9781367
Dissolved Nickel (Ni)	mg/L	0.00985	0.0140	0.000020	9781367
Dissolved Selenium (Se)	mg/L	0.0137	0.00264	0.000040	9781367
Dissolved Silicon (Si)	mg/L	1.13	1.01	0.050	9781367
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9781367
Dissolved Strontium (Sr)	mg/L	0.519	0.587	0.000050	9781367
Dissolved Thallium (Tl)	mg/L	0.0000436	0.0000600	0.0000020	9781367
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9781367
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9781367
Dissolved Uranium (U)	mg/L	0.0240	0.0293	0.0000020	9781367
Dissolved Vanadium (V)	mg/L	0.00034	<0.00020	0.00020	9781367
Dissolved Zinc (Zn)	mg/L	0.00737	0.0662	0.00010	9781367
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9781367
Dissolved Calcium (Ca)	mg/L	111	124	0.050	9778421
Dissolved Magnesium (Mg)	mg/L	18.8	18.2	0.050	9778421
Dissolved Potassium (K)	mg/L	8.54	7.47	0.050	9778421
RDL = Reportable Detection Limit					



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XL4574	XL4575		
Sampling Date		2020/02/26 11:00	2020/02/26 12:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #5	RDL	QC Batch
Dissolved Sodium (Na)	mg/L	26.8	26.5	0.050	9778421
Dissolved Sulphur (S)	mg/L	87.1	83.4	3.0	9778421
RDL = Reportable Detection Limit					



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BV Labs Job #: C013904
Report Date: 2020/03/04

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XL4574	XL4575		
Sampling Date		2020/02/26 11:00	2020/02/26 12:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #5	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	380	398	0.50	9778419
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00628	0.00477	0.00050	9784689
Total Antimony (Sb)	mg/L	0.00225	0.0107	0.000020	9784689
Total Arsenic (As)	mg/L	0.0432	0.0419	0.000020	9784689
Total Barium (Ba)	mg/L	0.0847	0.0659	0.000020	9784689
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9784689
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9784689
Total Boron (B)	mg/L	0.038	0.037	0.010	9784689
Total Cadmium (Cd)	mg/L	0.000250	0.00110	0.0000050	9784689
Total Chromium (Cr)	mg/L	<0.00010	0.00010	0.00010	9784689
Total Cobalt (Co)	mg/L	0.00211	0.00483	0.0000050	9784689
Total Copper (Cu)	mg/L	0.00102	0.00360	0.000050	9784689
Total Iron (Fe)	mg/L	0.687	1.23	0.0010	9784689
Total Lead (Pb)	mg/L	0.00106	0.00209	0.0000050	9784689
Total Lithium (Li)	mg/L	0.0128	0.0120	0.00050	9784689
Total Manganese (Mn)	mg/L	0.101	0.355	0.000050	9784689
Total Molybdenum (Mo)	mg/L	0.00227	0.00157	0.000050	9784689
Total Nickel (Ni)	mg/L	0.00999	0.0139	0.000020	9784689
Total Selenium (Se)	mg/L	0.0228	0.00323	0.000040	9784689
Total Silicon (Si)	mg/L	1.20	1.03	0.050	9784689
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9784689
Total Strontium (Sr)	mg/L	0.545	0.614	0.000050	9784689
Total Thallium (Tl)	mg/L	0.000103	0.000129	0.0000020	9784689
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9784689
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9784689
Total Uranium (U)	mg/L	0.0256	0.0328	0.0000020	9784689
Total Vanadium (V)	mg/L	0.00031	<0.00020	0.00020	9784689
Total Zinc (Zn)	mg/L	0.0224	0.119	0.00010	9784689
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9784689
Total Calcium (Ca)	mg/L	120	128	0.050	9778422
Total Magnesium (Mg)	mg/L	19.5	19.0	0.050	9778422
Total Potassium (K)	mg/L	8.68	7.48	0.050	9778422
RDL = Reportable Detection Limit					



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BV Labs Job #: C013904
Report Date: 2020/03/04

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XL4574	XL4575		
Sampling Date		2020/02/26 11:00	2020/02/26 12:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	TRIAL #1	TRIAL #5	RDL	QC Batch
Total Sodium (Na)	mg/L	28.1	27.5	0.050	9778422
Total Sulphur (S)	mg/L	88.0	85.4	3.0	9778422
RDL = Reportable Detection Limit					



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.3°C
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Results relate only to the items tested.



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BV Labs Job #: C013904

Report Date: 2020/03/04

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9780756	Acidity (pH 4.5)	2020/02/28					<1.0	mg/L		
9780756	Acidity (pH 8.3)	2020/02/28			99	80 - 120	<1.0	mg/L		
9780987	Alkalinity (PP as CaCO ₃)	2020/02/28					<0.50	mg/L		
9780987	Alkalinity (Total as CaCO ₃)	2020/02/28			95	80 - 120	<0.50	mg/L		
9780987	Bicarbonate (HCO ₃)	2020/02/28					<0.50	mg/L		
9780987	Carbonate (CO ₃)	2020/02/28					<0.50	mg/L		
9780987	Hydroxide (OH)	2020/02/28					<0.50	mg/L		
9781002	Fluoride (F)	2020/02/28	NC	80 - 120	104	80 - 120	<0.010	mg/L	0	20
9781013	Dissolved Organic Carbon (C)	2020/03/02	NC	80 - 120	103	80 - 120	<0.50	mg/L	1.6	20
9781029	HCl Preserved Iron (Fe+2 Ferrous)	2020/02/28	98	80 - 120	95	90 - 110	<0.050	mg/L	19	20
9781174	Orthophosphate (P)	2020/02/28			90	80 - 120	<0.0010	mg/L		
9781236	Dissolved Chloride (Cl)	2020/02/28	NC	80 - 120	103	80 - 120	<0.50	mg/L	1.8	20
9781236	Dissolved Sulphate (SO ₄)	2020/02/28	NC	80 - 120	100	80 - 120	<0.50	mg/L	1.3	20
9781367	Dissolved Aluminum (Al)	2020/03/02	NC	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9781367	Dissolved Antimony (Sb)	2020/03/02	107	80 - 120	106	80 - 120	<0.000020	mg/L	NC	20
9781367	Dissolved Arsenic (As)	2020/03/02	112	80 - 120	107	80 - 120	<0.000020	mg/L	NC	20
9781367	Dissolved Barium (Ba)	2020/03/02	NC	80 - 120	106	80 - 120	<0.000020	mg/L	NC	20
9781367	Dissolved Beryllium (Be)	2020/03/02	96	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9781367	Dissolved Bismuth (Bi)	2020/03/02	97	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9781367	Dissolved Boron (B)	2020/03/02	NC	80 - 120	105	80 - 120	<0.010	mg/L	NC	20
9781367	Dissolved Cadmium (Cd)	2020/03/02	100	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9781367	Dissolved Chromium (Cr)	2020/03/02	99	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9781367	Dissolved Cobalt (Co)	2020/03/02	96	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9781367	Dissolved Copper (Cu)	2020/03/02	90	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9781367	Dissolved Iron (Fe)	2020/03/02	NC	80 - 120	110	80 - 120	<0.0010	mg/L	NC	20
9781367	Dissolved Lead (Pb)	2020/03/02	101	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
9781367	Dissolved Lithium (Li)	2020/03/02	NC	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9781367	Dissolved Manganese (Mn)	2020/03/02	90	80 - 120	107	80 - 120	<0.000050	mg/L	NC	20
9781367	Dissolved Molybdenum (Mo)	2020/03/02	NC	80 - 120	109	80 - 120	<0.000050	mg/L	NC	20
9781367	Dissolved Nickel (Ni)	2020/03/02	93	80 - 120	105	80 - 120	<0.000020	mg/L	NC	20
9781367	Dissolved Selenium (Se)	2020/03/02	108	80 - 120	105	80 - 120	<0.000040	mg/L	NC	20
9781367	Dissolved Silicon (Si)	2020/03/02	93	80 - 120	107	80 - 120	<0.050	mg/L	NC	20
9781367	Dissolved Silver (Ag)	2020/03/02	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20



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BV Labs Job #: C013904

Report Date: 2020/03/04

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9781367	Dissolved Strontium (Sr)	2020/03/02	NC	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9781367	Dissolved Thallium (Tl)	2020/03/02	94	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9781367	Dissolved Tin (Sn)	2020/03/02	106	80 - 120	106	80 - 120	<0.00020	mg/L	NC	20
9781367	Dissolved Titanium (Ti)	2020/03/02	105	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
9781367	Dissolved Uranium (U)	2020/03/02	108	80 - 120	109	80 - 120	<0.0000020	mg/L	NC	20
9781367	Dissolved Vanadium (V)	2020/03/02	104	80 - 120	107	80 - 120	<0.00020	mg/L	NC	20
9781367	Dissolved Zinc (Zn)	2020/03/02	92	80 - 120	108	80 - 120	<0.00010	mg/L	NC	20
9781367	Dissolved Zirconium (Zr)	2020/03/02	104	80 - 120	109	80 - 120	<0.00010	mg/L	NC	20
9781633	Nitrate plus Nitrite (N)	2020/02/29			100	80 - 120	<0.0020	mg/L		
9781635	Nitrite (N)	2020/02/29			98	80 - 120	<0.0020	mg/L		
9781961	Total Sulphide	2020/03/02	88	80 - 120	95	80 - 120	<0.0018	mg/L	NC	20
9784689	Total Aluminum (Al)	2020/03/03	103	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9784689	Total Antimony (Sb)	2020/03/03	103	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
9784689	Total Arsenic (As)	2020/03/03	101	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9784689	Total Barium (Ba)	2020/03/03	97	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
9784689	Total Beryllium (Be)	2020/03/03	100	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
9784689	Total Bismuth (Bi)	2020/03/03	98	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9784689	Total Boron (B)	2020/03/03	100	80 - 120	103	80 - 120	<0.010	mg/L	NC	20
9784689	Total Cadmium (Cd)	2020/03/03	100	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9784689	Total Chromium (Cr)	2020/03/03	99	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9784689	Total Cobalt (Co)	2020/03/03	96	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9784689	Total Copper (Cu)	2020/03/03	99	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9784689	Total Iron (Fe)	2020/03/03	105	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
9784689	Total Lead (Pb)	2020/03/03	101	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9784689	Total Lithium (Li)	2020/03/03	99	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9784689	Total Manganese (Mn)	2020/03/03	99	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9784689	Total Molybdenum (Mo)	2020/03/03	102	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9784689	Total Nickel (Ni)	2020/03/03	99	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9784689	Total Selenium (Se)	2020/03/03	104	80 - 120	104	80 - 120	<0.000040	mg/L	NC	20
9784689	Total Silicon (Si)	2020/03/03	104	80 - 120	103	80 - 120	<0.050	mg/L	NC	20
9784689	Total Silver (Ag)	2020/03/03	99	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9784689	Total Strontium (Sr)	2020/03/03	98	80 - 120	96	80 - 120	<0.000050	mg/L	NC	20



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BV Labs Job #: C013904

Report Date: 2020/03/04

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9784689	Total Thallium (Tl)	2020/03/03	100	80 - 120	97	80 - 120	0.0000022, RDL=0.0000020 (1)	mg/L	NC	20
9784689	Total Tin (Sn)	2020/03/03	102	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9784689	Total Titanium (Ti)	2020/03/03	100	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9784689	Total Uranium (U)	2020/03/03	103	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9784689	Total Vanadium (V)	2020/03/03	100	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9784689	Total Zinc (Zn)	2020/03/03	101	80 - 120	102	80 - 120	<0.00010	mg/L	1.4	20
9784689	Total Zirconium (Zr)	2020/03/03	101	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9785567	Total Ammonia (N)	2020/03/04	99	80 - 120	109	80 - 120	<0.0050	mg/L	0.77	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for Tl- 2X RDL acceptable for low level metals determination.



VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required										
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS										
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days										
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02	Date Required:										
Phone:		Phone:	(867) 668-6463 vfriesen@ensero.com	Site Location:	Kudz Ze Kayah											
Email:		Email:	agault@ensero.com kpiewcowye@ensero.com	Site #:												
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:										
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA		LABORATORY USE ONLY CUSTODY SEAL Y/N Present Intact COOLER TEMPERATURES COOLING MEDIA PRESENT Y/N COMMENTS										
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1	Trial #1	26-Feb-20	11:00	Water	X	X	X	X	X	X	X	X	X	X	10	
2	Trial #5	26-Feb-20	12:00	Water	X	X	X	X	X	X	X	X	X	X	10	
3																
4																
5																
6																
7																
8																
9																
10																

Received in Saskatoon
 By: *Patricia Worsell*
 I - N
 CS - N
 Temp: 7 / 9 / 19.

26-Feb-20 12:30
 Safiann Maiter

C013904
 SBZ INS-0198

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #
<i>Kristen P.</i>	2020/02/26	12:34	<i>SARA BISCHOFF</i>	2020/02/27	08:50	



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/03/17
 Report #: R2859115
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C018375

Received: 2020/03/11, 12:06

Sample Matrix: Water
 # Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	2	N/A	2020/03/13	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	2	N/A	2020/03/14	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	2	N/A	2020/03/13	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	2	N/A	2020/03/17	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	2	N/A	2020/03/16	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	2	N/A	2020/03/13	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	2	N/A	2020/03/17		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	2	N/A	2020/03/16	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	2	N/A	2020/03/17	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	2	N/A	2020/03/17	BBY WI-00033	Auto Calc
Ion Balance (1)	2	N/A	2020/03/17	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	2	N/A	2020/03/16	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	2	N/A	2020/03/17	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	2	N/A	2020/03/16	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	2	N/A	2020/03/16	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	2	N/A	2020/03/14	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	2	N/A	2020/03/17	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	2	N/A	2020/03/13	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	2	N/A	2020/03/13	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	2	N/A	2020/03/13	BBY WI-00033	Auto Calc
Orthophosphate by Konelab (low level) (1)	2	N/A	2020/03/13	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	2	N/A	2020/03/17	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/03/17
Report #: R2859115
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C018375

Received: 2020/03/11, 12:06

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

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BV Labs Job #: C018375
Report Date: 2020/03/17

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XN5869	XN5872		
Sampling Date		2020/03/11 09:45	2020/03/11 10:45		
COC Number		1 of 1	1 of 1		
	UNITS	TRAIL #2	TRAIL #6	RDL	QC Batch
Calculated Parameters					
Anion Sum	meq/L	9.6	9.3	N/A	9795851
Cation Sum	meq/L	9.1	9.0	N/A	9795851
Ion Balance	N/A	0.95	0.97	0.010	9795849
Ion Balance (% Difference)	%	1.7	1.1	N/A	9795850
Nitrate (N)	mg/L	0.361	0.0020	0.0020	9795847
Sulphide (as H ₂ S)	mg/L	0.0020	0.22	0.0020	9795051
Misc. Inorganics					
Fluoride (F)	mg/L	0.650	0.700	0.010	9797653
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	<0.050	0.97	0.050	9797176
Dissolved Organic Carbon (C)	mg/L	3.1	3.2	0.50	9798445
Acidity (pH 4.5)	mg/L	<1.0	<1.0	1.0	9797196
Alkalinity (Total as CaCO ₃)	mg/L	118	118	0.50	9797323
Acidity (pH 8.3)	mg/L	15.3	16.4	1.0	9797196
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	0.50	9797323
Bicarbonate (HCO ₃)	mg/L	144	144	0.50	9797323
Carbonate (CO ₃)	mg/L	<0.50	<0.50	0.50	9797323
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9797323
Anions					
Orthophosphate (P)	mg/L	0.94 (1)	0.50 (1)	0.010	9797686
Total Sulphide	mg/L	0.0019	0.21	0.0018	9799989
Dissolved Chloride (Cl)	mg/L	64	58	0.50	9798902
Dissolved Sulphate (SO ₄)	mg/L	250 (1)	250 (1)	5.0	9798902
Nutrients					
Total Ammonia (N)	mg/L	0.16	0.14	0.0050	9799915
Nitrate plus Nitrite (N)	mg/L	0.365	0.0020	0.0020	9797572
Nitrite (N)	mg/L	0.0035	<0.0020	0.0020	9797576
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.					

BUREAU
VERITASBV Labs Job #: C018375
Report Date: 2020/03/17ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XN5869	XN5872		
Sampling Date		2020/03/11 09:45	2020/03/11 10:45		
COC Number		1 of 1	1 of 1		
	UNITS	TRAIL #2	TRAIL #6	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	389	378	0.50	9794955
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00116	0.00180	0.00050	9797615
Dissolved Antimony (Sb)	mg/L	0.00383	0.00308	0.000020	9797615
Dissolved Arsenic (As)	mg/L	0.0447	0.111	0.000020	9797615
Dissolved Barium (Ba)	mg/L	0.0741	0.0784	0.000020	9797615
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9797615
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9797615
Dissolved Boron (B)	mg/L	0.037	0.038	0.010	9797615
Dissolved Cadmium (Cd)	mg/L	0.0000142	<0.0000050	0.0000050	9797615
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00021	0.00010	9797615
Dissolved Cobalt (Co)	mg/L	0.000508	0.00121	0.0000050	9797615
Dissolved Copper (Cu)	mg/L	0.000251	0.000087	0.000050	9797615
Dissolved Iron (Fe)	mg/L	0.0082	1.03	0.0010	9797615
Dissolved Lead (Pb)	mg/L	0.0000168	0.0000554	0.0000050	9797615
Dissolved Lithium (Li)	mg/L	0.0108	0.0110	0.00050	9797615
Dissolved Manganese (Mn)	mg/L	0.282	0.310	0.000050	9797615
Dissolved Molybdenum (Mo)	mg/L	0.000683	0.000085	0.000050	9797615
Dissolved Nickel (Ni)	mg/L	0.00491	0.00723	0.000020	9797615
Dissolved Selenium (Se)	mg/L	0.00164	0.00227	0.000040	9797615
Dissolved Silicon (Si)	mg/L	1.13	1.20	0.050	9797615
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9797615
Dissolved Strontium (Sr)	mg/L	0.587	0.642	0.000050	9797615
Dissolved Thallium (Tl)	mg/L	0.0000435	0.0000074	0.0000020	9797615
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9797615
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9797615
Dissolved Uranium (U)	mg/L	0.00965	0.0268	0.0000020	9797615
Dissolved Vanadium (V)	mg/L	<0.00020	0.00029	0.00020	9797615
Dissolved Zinc (Zn)	mg/L	0.0202	0.00529	0.00010	9797615
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9797615
Dissolved Calcium (Ca)	mg/L	125	122	0.050	9794956
Dissolved Magnesium (Mg)	mg/L	18.5	18.0	0.050	9794956
RDL = Reportable Detection Limit					



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BV Labs Job #: C018375
Report Date: 2020/03/17

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XN5869	XN5872		
Sampling Date		2020/03/11 09:45	2020/03/11 10:45		
COC Number		1 of 1	1 of 1		
	UNITS	TRAIL #2	TRAIL #6	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.44	8.60	0.050	9794956
Dissolved Sodium (Na)	mg/L	26.8	26.8	0.050	9794956
Dissolved Sulphur (S)	mg/L	81.4	82.8	3.0	9794956
RDL = Reportable Detection Limit					

BUREAU
VERITASBV Labs Job #: C018375
Report Date: 2020/03/17ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XN5869	XN5872		
Sampling Date		2020/03/11 09:45	2020/03/11 10:45		
COC Number		1 of 1	1 of 1		
	UNITS	TRAIL #2	TRAIL #6	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	381	371	0.50	9794954
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00136	0.00166	0.00050	9797619
Total Antimony (Sb)	mg/L	0.00369	0.00291	0.000020	9797619
Total Arsenic (As)	mg/L	0.0442	0.101	0.000020	9797619
Total Barium (Ba)	mg/L	0.0757	0.0794	0.000020	9797619
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9797619
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9797619
Total Boron (B)	mg/L	0.033	0.034	0.010	9797619
Total Cadmium (Cd)	mg/L	0.0000302	0.0000193	0.0000050	9797619
Total Chromium (Cr)	mg/L	<0.00010	0.00022	0.00010	9797619
Total Cobalt (Co)	mg/L	0.000544	0.00126	0.0000050	9797619
Total Copper (Cu)	mg/L	0.000207	0.000126	0.000050	9797619
Total Iron (Fe)	mg/L	0.0817	0.996	0.0010	9797619
Total Lead (Pb)	mg/L	0.000135	0.000128	0.0000050	9797619
Total Lithium (Li)	mg/L	0.0107	0.0109	0.00050	9797619
Total Manganese (Mn)	mg/L	0.260	0.276	0.000050	9797619
Total Molybdenum (Mo)	mg/L	0.000607	0.000101	0.000050	9797619
Total Nickel (Ni)	mg/L	0.00480	0.00707	0.000020	9797619
Total Selenium (Se)	mg/L	0.00172	0.0104	0.000040	9797619
Total Silicon (Si)	mg/L	1.10	1.17	0.050	9797619
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9797619
Total Strontium (Sr)	mg/L	0.574	0.606	0.000050	9797619
Total Thallium (Tl)	mg/L	0.0000439	0.0000107	0.0000020	9797619
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9797619
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9797619
Total Uranium (U)	mg/L	0.00939	0.0268	0.0000020	9797619
Total Vanadium (V)	mg/L	0.00021	0.00043	0.00020	9797619
Total Zinc (Zn)	mg/L	0.0197	0.00698	0.00010	9797619
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9797619
Total Calcium (Ca)	mg/L	122	119	0.050	9794957
Total Magnesium (Mg)	mg/L	18.6	17.8	0.050	9794957
RDL = Reportable Detection Limit					



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BV Labs Job #: C018375
Report Date: 2020/03/17

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XN5869	XN5872		
Sampling Date		2020/03/11 09:45	2020/03/11 10:45		
COC Number		1 of 1	1 of 1		
	UNITS	TRAIL #2	TRAIL #6	RDL	QC Batch
Total Potassium (K)	mg/L	7.79	8.64	0.050	9794957
Total Sodium (Na)	mg/L	26.4	26.5	0.050	9794957
Total Sulphur (S)	mg/L	78.5	80.4	3.0	9794957
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: C018375
Report Date: 2020/03/17

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XN5869
Sample ID: TRAIL #2
Matrix: Water

Collected: 2020/03/11
Shipped: 2020/03/11
Received: 2020/03/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9797196	N/A	2020/03/13	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9797323	N/A	2020/03/14	Coco Guo
Low level chloride/sulphate by AC	KONE	9798902	N/A	2020/03/13	Balwinder Bassi
Carbon (DOC)	TECH	9798445	N/A	2020/03/17	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9797653	N/A	2020/03/16	Bomi Park
Ferrous Iron (Dissolved)	SPEC	9797176	N/A	2020/03/13	Kathleen Dalton
Sulphide (as H ₂ S)	CALC	9795051	N/A	2020/03/17	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9794954	N/A	2020/03/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9794955	N/A	2020/03/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9795849	N/A	2020/03/17	Automated Statchk
Ion Balance	CALC	9795850	N/A	2020/03/17	Automated Statchk
Sum of cations, anions	CALC	9795851	N/A	2020/03/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9794956	N/A	2020/03/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9797615	N/A	2020/03/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9794957	N/A	2020/03/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9797619	N/A	2020/03/14	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9799915	N/A	2020/03/17	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9797572	N/A	2020/03/13	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9797576	N/A	2020/03/13	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9795847	N/A	2020/03/13	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9797686	N/A	2020/03/13	Beatriz Ortega
Total Sulphide	SPEC	9799989	N/A	2020/03/17	Preetleen Kathuria

BV Labs ID: XN5869 Dup
Sample ID: TRAIL #2
Matrix: Water

Collected: 2020/03/11
Shipped: 2020/03/11
Received: 2020/03/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9797323	N/A	2020/03/14	Coco Guo
Low level chloride/sulphate by AC	KONE	9798902	N/A	2020/03/13	Balwinder Bassi
Ferrous Iron (Dissolved)	SPEC	9797176	N/A	2020/03/13	Kathleen Dalton

BV Labs ID: XN5872
Sample ID: TRAIL #6
Matrix: Water

Collected: 2020/03/11
Shipped: 2020/03/11
Received: 2020/03/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9797196	N/A	2020/03/13	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9797323	N/A	2020/03/14	Coco Guo
Low level chloride/sulphate by AC	KONE	9798902	N/A	2020/03/13	Balwinder Bassi
Carbon (DOC)	TECH	9798445	N/A	2020/03/17	Taylor Mullings
Fluoride - Low Level	ISE/ISE	9797653	N/A	2020/03/16	Bomi Park
Ferrous Iron (Dissolved)	SPEC	9797176	N/A	2020/03/13	Kathleen Dalton
Sulphide (as H ₂ S)	CALC	9795051	N/A	2020/03/17	Automated Statchk
Hardness Total (calculated as CaCO ₃)	CALC	9794954	N/A	2020/03/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9794955	N/A	2020/03/17	Automated Statchk



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BV Labs Job #: C018375
Report Date: 2020/03/17

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XN5872
Sample ID: TRAIL #6
Matrix: Water

Collected: 2020/03/11
Shipped: 2020/03/11
Received: 2020/03/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9795849	N/A	2020/03/17	Automated Statchk
Ion Balance	CALC	9795850	N/A	2020/03/17	Automated Statchk
Sum of cations, anions	CALC	9795851	N/A	2020/03/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9794956	N/A	2020/03/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9797615	N/A	2020/03/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9794957	N/A	2020/03/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9797619	N/A	2020/03/14	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9799915	N/A	2020/03/17	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9797572	N/A	2020/03/13	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9797576	N/A	2020/03/13	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9795847	N/A	2020/03/13	Automated Statchk
Orthophosphate by Konelab (low level)	KONE/COL	9797686	N/A	2020/03/13	Beatriz Ortega
Total Sulphide	SPEC	9799989	N/A	2020/03/17	Preetleen Kathuria



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VERITAS

BV Labs Job #: C018375
Report Date: 2020/03/17

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.0°C
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Results relate only to the items tested.

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VERITAS

BV Labs Job #: C018375

Report Date: 2020/03/17

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9797176	HCl Preserved Iron (Fe+2 Ferrous)	2020/03/13	96	80 - 120	98	90 - 110	<0.050	mg/L	NC	20
9797196	Acidity (pH 4.5)	2020/03/13					<1.0	mg/L		
9797196	Acidity (pH 8.3)	2020/03/13			97	80 - 120	<1.0	mg/L		
9797323	Alkalinity (PP as CaCO ₃)	2020/03/14					<0.50	mg/L	NC	20
9797323	Alkalinity (Total as CaCO ₃)	2020/03/14	NC	80 - 120	97	80 - 120	<0.50	mg/L	3.0	20
9797323	Bicarbonate (HCO ₃)	2020/03/14					<0.50	mg/L	3.0	20
9797323	Carbonate (CO ₃)	2020/03/14					<0.50	mg/L	NC	20
9797323	Hydroxide (OH)	2020/03/14					<0.50	mg/L	NC	20
9797572	Nitrate plus Nitrite (N)	2020/03/13			107	80 - 120	<0.0020	mg/L		
9797576	Nitrite (N)	2020/03/13			99	80 - 120	<0.0020	mg/L		
9797615	Dissolved Aluminum (Al)	2020/03/17	101	80 - 120	102	80 - 120	<0.00050	mg/L	13	20
9797615	Dissolved Antimony (Sb)	2020/03/17	110	80 - 120	108	80 - 120	<0.000020	mg/L	0.13	20
9797615	Dissolved Arsenic (As)	2020/03/17	112	80 - 120	103	80 - 120	<0.000020	mg/L	1.9	20
9797615	Dissolved Barium (Ba)	2020/03/17	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.48	20
9797615	Dissolved Beryllium (Be)	2020/03/17	89	80 - 120	93	80 - 120	<0.000010	mg/L	NC	20
9797615	Dissolved Bismuth (Bi)	2020/03/17	94	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9797615	Dissolved Boron (B)	2020/03/17	NC	80 - 120	98	80 - 120	<0.010	mg/L	3.7	20
9797615	Dissolved Cadmium (Cd)	2020/03/17	101	80 - 120	107	80 - 120	<0.0000050	mg/L	NC	20
9797615	Dissolved Chromium (Cr)	2020/03/17	101	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
9797615	Dissolved Cobalt (Co)	2020/03/17	97	80 - 120	104	80 - 120	<0.0000050	mg/L	0.29	20
9797615	Dissolved Copper (Cu)	2020/03/17	98	80 - 120	100	80 - 120	<0.000050	mg/L	6.6	20
9797615	Dissolved Iron (Fe)	2020/03/17	105	80 - 120	112	80 - 120	<0.0010	mg/L	13	20
9797615	Dissolved Lead (Pb)	2020/03/17	98	80 - 120	105	80 - 120	<0.0000050	mg/L	11	20
9797615	Dissolved Lithium (Li)	2020/03/17	NC	80 - 120	92	80 - 120	<0.00050	mg/L	0.84	20
9797615	Dissolved Manganese (Mn)	2020/03/17	100	80 - 120	106	80 - 120	<0.000050	mg/L	11	20
9797615	Dissolved Molybdenum (Mo)	2020/03/17	NC	80 - 120	106	80 - 120	<0.000050	mg/L	0.82	20
9797615	Dissolved Nickel (Ni)	2020/03/17	94	80 - 120	106	80 - 120	<0.000020	mg/L	0.22	20
9797615	Dissolved Selenium (Se)	2020/03/17	103	80 - 120	97	80 - 120	<0.000040	mg/L	2.0	20
9797615	Dissolved Silicon (Si)	2020/03/17	96	80 - 120	100	80 - 120	<0.050	mg/L	0.91	20
9797615	Dissolved Silver (Ag)	2020/03/17	100	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9797615	Dissolved Strontium (Sr)	2020/03/17	NC	80 - 120	103	80 - 120	<0.000050	mg/L	0.17	20
9797615	Dissolved Thallium (Tl)	2020/03/17	102	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20



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BV Labs Job #: C018375

Report Date: 2020/03/17

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9797615	Dissolved Tin (Sn)	2020/03/17	112	80 - 120	109	80 - 120	<0.00020	mg/L	NC	20
9797615	Dissolved Titanium (Ti)	2020/03/17	109	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9797615	Dissolved Uranium (U)	2020/03/17	113	80 - 120	107	80 - 120	<0.0000020	mg/L	1.2	20
9797615	Dissolved Vanadium (V)	2020/03/17	109	80 - 120	106	80 - 120	<0.00020	mg/L	7.4	20
9797615	Dissolved Zinc (Zn)	2020/03/17	95	80 - 120	112	80 - 120	<0.00010	mg/L	8.7	20
9797615	Dissolved Zirconium (Zr)	2020/03/17	124 (1)	80 - 120	106	80 - 120	<0.00010	mg/L	2.6	20
9797619	Total Aluminum (Al)	2020/03/14	101	80 - 120	101	80 - 120	<0.00050	mg/L		
9797619	Total Antimony (Sb)	2020/03/14	103	80 - 120	101	80 - 120	<0.000020	mg/L		
9797619	Total Arsenic (As)	2020/03/14	104	80 - 120	100	80 - 120	<0.000020	mg/L		
9797619	Total Barium (Ba)	2020/03/14	105	80 - 120	101	80 - 120	<0.000020	mg/L		
9797619	Total Beryllium (Be)	2020/03/14	98	80 - 120	97	80 - 120	<0.000010	mg/L		
9797619	Total Bismuth (Bi)	2020/03/14	99	80 - 120	100	80 - 120	<0.0000050	mg/L		
9797619	Total Boron (B)	2020/03/14	99	80 - 120	97	80 - 120	<0.010	mg/L		
9797619	Total Cadmium (Cd)	2020/03/14	102	80 - 120	100	80 - 120	<0.0000050	mg/L		
9797619	Total Chromium (Cr)	2020/03/14	99	80 - 120	98	80 - 120	<0.00010	mg/L		
9797619	Total Cobalt (Co)	2020/03/14	98	80 - 120	97	80 - 120	<0.0000050	mg/L		
9797619	Total Copper (Cu)	2020/03/14	98	80 - 120	98	80 - 120	<0.000050	mg/L		
9797619	Total Iron (Fe)	2020/03/14	103	80 - 120	105	80 - 120	<0.0010	mg/L		
9797619	Total Lead (Pb)	2020/03/14	101	80 - 120	99	80 - 120	<0.0000050	mg/L		
9797619	Total Lithium (Li)	2020/03/14	96	80 - 120	97	80 - 120	<0.00050	mg/L		
9797619	Total Manganese (Mn)	2020/03/14	97	80 - 120	97	80 - 120	<0.000050	mg/L		
9797619	Total Molybdenum (Mo)	2020/03/14	104	80 - 120	103	80 - 120	<0.000050	mg/L		
9797619	Total Nickel (Ni)	2020/03/14	98	80 - 120	98	80 - 120	<0.000020	mg/L		
9797619	Total Selenium (Se)	2020/03/14	104	80 - 120	102	80 - 120	<0.000040	mg/L		
9797619	Total Silicon (Si)	2020/03/14	95	80 - 120	102	80 - 120	<0.050	mg/L		
9797619	Total Silver (Ag)	2020/03/14	99	80 - 120	98	80 - 120	<0.0000050	mg/L		
9797619	Total Strontium (Sr)	2020/03/14	101	80 - 120	99	80 - 120	<0.000050	mg/L		
9797619	Total Thallium (Tl)	2020/03/14	99	80 - 120	99	80 - 120	<0.0000020	mg/L		
9797619	Total Tin (Sn)	2020/03/14	104	80 - 120	103	80 - 120	<0.00020	mg/L		
9797619	Total Titanium (Ti)	2020/03/14	100	80 - 120	97	80 - 120	<0.00050	mg/L		
9797619	Total Uranium (U)	2020/03/14	104	80 - 120	102	80 - 120	0.0000025, RDL=0.0000020 (2)	mg/L		



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BV Labs Job #: C018375

Report Date: 2020/03/17

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9797619	Total Vanadium (V)	2020/03/14	101	80 - 120	99	80 - 120	<0.00020	mg/L		
9797619	Total Zinc (Zn)	2020/03/14	102	80 - 120	99	80 - 120	<0.00010	mg/L		
9797619	Total Zirconium (Zr)	2020/03/14	103	80 - 120	99	80 - 120	<0.00010	mg/L		
9797653	Fluoride (F)	2020/03/16			100	80 - 120	<0.010	mg/L		
9797686	Orthophosphate (P)	2020/03/13	92	80 - 120	94	80 - 120	<0.0010	mg/L	1.2	20
9798445	Dissolved Organic Carbon (C)	2020/03/17	93	80 - 120	100	80 - 120	<0.50	mg/L	5.6	20
9798902	Dissolved Chloride (Cl)	2020/03/13	NC	80 - 120	104	80 - 120	<0.50	mg/L	7.7	20
9798902	Dissolved Sulphate (SO4)	2020/03/13	NC	80 - 120	102	80 - 120	<0.50	mg/L	8.0	20
9799915	Total Ammonia (N)	2020/03/17	NC	80 - 120	105	80 - 120	<0.0050	mg/L	0.77	20
9799989	Total Sulphide	2020/03/17	119	80 - 120	91	80 - 120	<0.0018	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Method Blank exceeds acceptance limits for U - $2 \times \text{RDL}$ acceptable for low level metals determination.



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VERITAS

BV Labs Job #: C018375
Report Date: 2020/03/17

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required													
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses)													
Contact Name:		Contact Name:	Andrew Gault; Kristen Plecowye	P.O. #/ AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS													
Address:	530-1130 WEST PENDER ST	Address:	UNIT 3 151 INDUSTRIAL RD	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)													
	Vancouver, BC PC: V6E 4A4		Whitehorse, YK PC: V1A 2V3	Site Location:	Kudz Ze Kayah	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days													
Phone:		Phone:	(867) 668-6463 vfriesen@ensero.com	Site #:		Date Required:													
Email:		Email:	agault@ensero.com kpiewcowye@ensero.com	Sampled By:															
Regulatory Criteria		Special Instructions		Analysis Requested														Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA														LABORATORY USE ONLY CUSTODY SEAL Y / N Present Intact COOLING MEDIA PRESENT Y / N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE			
1 Trial #2		11-Mar-20	9:45	Water	X	X	X	X	X	X	X	X	X	X	10				
2 Trial #6		11-Mar-20	10:45	Water	X	X	X	X	X	X	X	X	X	X	10				
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #											
<i>[Signature]</i>		2020/03/11	2:06	<i>[Signature]</i> Tina Hewitt		2020/03/12	08:40	C018375											

Received in Saskatoon
By: *[Signature]*
I-N MAR 11 2020 12:00
Temp: 17 / 14 / 14



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN
 ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/04/02
 Report #: R2865318
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C021661
Received: 2020/03/25, 13:50

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	4	N/A	2020/03/30	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	4	N/A	2020/03/27	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	4	N/A	2020/03/27	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
Carbon (DOC) (2)	4	N/A	2020/03/30	AB SOP-00087	MMCW 119 1996 m
Fluoride - Low Level (1)	4	N/A	2020/03/28	BBY6SOP-00048	SM 23 4500-F C m
Ferrous Iron (Dissolved)	4	N/A	2020/03/27	AB SOP-00041	SM 23 3500-Fe A,B m
Sulphide (as H ₂ S)	4	N/A	2020/04/01		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	4	N/A	2020/03/30	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	4	N/A	2020/03/30	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	4	N/A	2020/03/31	BBY WI-00033	Auto Calc
Ion Balance (1)	4	N/A	2020/03/31	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	4	N/A	2020/03/31	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	4	N/A	2020/03/30	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	4	N/A	2020/03/27	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	4	N/A	2020/03/30	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	4	N/A	2020/03/27	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	4	N/A	2020/03/27	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	4	N/A	2020/03/28	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	4	N/A	2020/03/28	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	4	N/A	2020/03/28	BBY WI-00033	Auto Calc
Orthophosphate by Konelab (low level) (1)	4	N/A	2020/03/27	BBY6SOP-00013	SM 23 4500-P E m
Total Sulphide	4	N/A	2020/04/01	AB SOP-00080	SM 23 4500 S ₂ -A D Fm

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 1

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/04/02
Report #: R2865318
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C021661

Received: 2020/03/25, 13:50

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: C021661
Report Date: 2020/04/02

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XP0595		XP0596		XP0597		
Sampling Date		2020/03/25 11:30		2020/03/25 11:45		2020/03/25 13:15		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	TRIAL #1	RDL	TRIAL #2	RDL	TRIAL #5	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	9.2	N/A	9.6	N/A	10	N/A	9808509
Cation Sum	meq/L	8.8	N/A	9.0	N/A	8.9	N/A	9808509
Ion Balance	N/A	0.95	0.010	0.94	0.010	0.90	0.010	9808505
Ion Balance (% Difference)	%	2.4	N/A	3.4	N/A	5.3	N/A	9808506
Nitrate (N)	mg/L	<0.0020	0.0020	0.508	0.0020	<0.0020	0.0020	9808520
Sulphide (as H ₂ S)	mg/L	3.0	0.019	<0.0020	0.0020	0.0045	0.0020	9808079
Misc. Inorganics								
Fluoride (F)	mg/L	0.590	0.010	0.680	0.010	0.710	0.010	9810340
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	0.46	0.050	<0.050	0.050	<0.050	0.050	9809668
Dissolved Organic Carbon (C)	mg/L	3.8	0.50	3.5	0.50	11	0.50	9810451
Acidity (pH 4.5)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	9811131
Alkalinity (Total as CaCO ₃)	mg/L	103	0.50	117	0.50	120	0.50	9809924
Acidity (pH 8.3)	mg/L	5.5	1.0	9.0	1.0	10.3	1.0	9811131
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	9809924
Bicarbonate (HCO ₃)	mg/L	126	0.50	142	0.50	147	0.50	9809924
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	9809924
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	9809924
Anions								
Orthophosphate (P)	mg/L	0.79 (1)	0.010	0.85 (1)	0.010	0.16	0.0010	9809891
Total Sulphide	mg/L	2.8 (1)	0.018	<0.0018	0.0018	0.0043	0.0018	9812928
Dissolved Chloride (Cl)	mg/L	60	0.50	61	0.50	57	0.50	9810038
Dissolved Sulphate (SO ₄)	mg/L	260 (1)	5.0	260 (1)	5.0	280 (1)	5.0	9810038
Nutrients								
Total Ammonia (N)	mg/L	0.23	0.0050	0.016	0.0050	0.015	0.0050	9809664
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	0.510	0.0020	0.0129	0.0020	9810278
Nitrite (N)	mg/L	0.0020	0.0020	0.0021	0.0020	0.0151	0.0020	9810279
RDL = Reportable Detection Limit								
N/A = Not Applicable								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								



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BV Labs Job #: C021661
Report Date: 2020/04/02

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XP0598		
Sampling Date		2020/03/25 12:15		
COC Number		1 of 1		
	UNITS	TRIAL #6	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	9.6	N/A	9808509
Cation Sum	meq/L	8.8	N/A	9808509
Ion Balance	N/A	0.92	0.010	9808505
Ion Balance (% Difference)	%	4.0	N/A	9808506
Nitrate (N)	mg/L	<0.0020	0.0020	9808520
Sulphide (as H ₂ S)	mg/L	0.42	0.010	9808079
Misc. Inorganics				
Fluoride (F)	mg/L	0.730	0.010	9810340
HCl Preserved Iron (Fe+2 Ferrous)	mg/L	1.0	0.050	9809668
Dissolved Organic Carbon (C)	mg/L	3.3	0.50	9810451
Acidity (pH 4.5)	mg/L	<1.0	1.0	9811131
Alkalinity (Total as CaCO ₃)	mg/L	116	0.50	9810041
Acidity (pH 8.3)	mg/L	9.9	1.0	9811131
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9810041
Bicarbonate (HCO ₃)	mg/L	142	0.50	9810041
Carbonate (CO ₃)	mg/L	<0.50	0.50	9810041
Hydroxide (OH)	mg/L	<0.50	0.50	9810041
Anions				
Orthophosphate (P)	mg/L	0.48	0.0010	9809891
Total Sulphide	mg/L	0.40 (1)	0.0090	9812928
Dissolved Chloride (Cl)	mg/L	58	0.50	9810038
Dissolved Sulphate (SO ₄)	mg/L	270 (1)	5.0	9810038
Nutrients				
Total Ammonia (N)	mg/L	0.26	0.0050	9809664
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9810278
Nitrite (N)	mg/L	0.0037	0.0020	9810279
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.				



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BV Labs Job #: C021661
Report Date: 2020/04/02

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XP0595	XP0596		XP0597		
Sampling Date		2020/03/25 11:30	2020/03/25 11:45		2020/03/25 13:15		
COC Number		1 of 1	1 of 1		1 of 1		
	UNITS	TRIAL #1	TRIAL #2	QC Batch	TRIAL #5	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	370	383	9808245	380	0.50	9808245
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00479	0.00073	9809832	0.00082	0.00050	9809832
Dissolved Antimony (Sb)	mg/L	0.00122	0.00420	9809832	0.00111	0.000020	9809832
Dissolved Arsenic (As)	mg/L	0.0292	0.0474	9809832	0.0141	0.000020	9809832
Dissolved Barium (Ba)	mg/L	0.0814	0.0728	9809832	0.0564	0.000020	9809832
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9809832	<0.000010	0.000010	9809832
Dissolved Bismuth (Bi)	mg/L	<0.0000050 (1)	<0.0000050	9809832	<0.0000050	0.0000050	9809832
Dissolved Boron (B)	mg/L	0.036	0.036	9809832	0.035	0.010	9809832
Dissolved Cadmium (Cd)	mg/L	0.0000566	0.0000697	9809832	0.0000053	0.0000050	9809832
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9809832	<0.00010	0.00010	9809832
Dissolved Cobalt (Co)	mg/L	0.000717	0.000470	9809832	0.00460	0.0000050	9809832
Dissolved Copper (Cu)	mg/L	0.000261	0.000342	9809832	0.000133	0.000050	9809832
Dissolved Iron (Fe)	mg/L	0.326	0.0070	9809832	0.0305	0.0010	9809832
Dissolved Lead (Pb)	mg/L	0.000297	0.0000094	9809832	0.0000178	0.0000050	9809832
Dissolved Lithium (Li)	mg/L	0.0120	0.0114	9809832	0.0113	0.00050	9809832
Dissolved Manganese (Mn)	mg/L	0.134	0.269	9809832	0.363	0.000050	9809832
Dissolved Molybdenum (Mo)	mg/L	0.000552	0.000640	9809832	0.00118	0.000050	9809832
Dissolved Nickel (Ni)	mg/L	0.00390	0.00492	9809832	0.0118	0.000020	9809832
Dissolved Selenium (Se)	mg/L	0.0410 (1)	0.00981	9809832	0.00138	0.000040	9813978
Dissolved Silicon (Si)	mg/L	1.27	1.21	9809832	1.05	0.050	9809832
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9809832	<0.0000050	0.0000050	9809832
Dissolved Strontium (Sr)	mg/L	0.551	0.579	9809832	0.617	0.000050	9809832
Dissolved Thallium (Tl)	mg/L	0.0000240	0.0000423	9809832	0.0000060	0.0000020	9809832
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9809832	<0.00020	0.00020	9809832
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9809832	<0.00050	0.00050	9809832
Dissolved Uranium (U)	mg/L	0.0120	0.0108	9809832	0.0285	0.0000020	9809832
Dissolved Vanadium (V)	mg/L	0.00031	<0.00020	9809832	<0.00020	0.00020	9809832
Dissolved Zinc (Zn)	mg/L	0.00565	0.0261	9809832	0.00500	0.00010	9809832
Dissolved Zirconium (Zr)	mg/L	0.00011	<0.00010	9809832	<0.00010	0.00010	9809832
Dissolved Calcium (Ca)	mg/L	117	123	9808513	122	0.050	9808513

RDL = Reportable Detection Limit

(1) Matrix Spike outside acceptance criteria due to sample matrix interference.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XP0595	XP0596		XP0597		
Sampling Date		2020/03/25 11:30	2020/03/25 11:45		2020/03/25 13:15		
COC Number		1 of 1	1 of 1		1 of 1		
	UNITS	TRIAL #1	TRIAL #2	QC Batch	TRIAL #5	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	18.7	18.2	9808513	18.2	0.050	9808513
Dissolved Potassium (K)	mg/L	8.38	7.41	9808513	7.28	0.050	9808513
Dissolved Sodium (Na)	mg/L	26.4	26.2	9808513	26.2	0.050	9808513
Dissolved Sulphur (S)	mg/L	101	84.0	9808513	86.3	3.0	9808513
RDL = Reportable Detection Limit							



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BV Labs Job #: C021661
Report Date: 2020/04/02

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XP0598		
Sampling Date		2020/03/25 12:15		
COC Number		1 of 1		
	UNITS	TRIAL #6	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	372	0.50	9808245
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.00167	0.00050	9809832
Dissolved Antimony (Sb)	mg/L	0.00315	0.000020	9809832
Dissolved Arsenic (As)	mg/L	0.112	0.000020	9809832
Dissolved Barium (Ba)	mg/L	0.0786	0.000020	9809832
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	9809832
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9809832
Dissolved Boron (B)	mg/L	0.036	0.010	9809832
Dissolved Cadmium (Cd)	mg/L	<0.0000050	0.0000050	9809832
Dissolved Chromium (Cr)	mg/L	0.00023	0.00010	9809832
Dissolved Cobalt (Co)	mg/L	0.00115	0.0000050	9809832
Dissolved Copper (Cu)	mg/L	0.000068	0.000050	9809832
Dissolved Iron (Fe)	mg/L	0.990	0.0010	9809832
Dissolved Lead (Pb)	mg/L	0.0000723	0.0000050	9809832
Dissolved Lithium (Li)	mg/L	0.0117	0.00050	9809832
Dissolved Manganese (Mn)	mg/L	0.307	0.000050	9809832
Dissolved Molybdenum (Mo)	mg/L	0.000115	0.000050	9809832
Dissolved Nickel (Ni)	mg/L	0.00704	0.000020	9809832
Dissolved Selenium (Se)	mg/L	0.00953	0.000040	9809832
Dissolved Silicon (Si)	mg/L	1.28	0.050	9809832
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9809832
Dissolved Strontium (Sr)	mg/L	0.627	0.000050	9809832
Dissolved Thallium (Tl)	mg/L	0.0000033	0.0000020	9809832
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9809832
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9809832
Dissolved Uranium (U)	mg/L	0.0289	0.0000020	9809832
Dissolved Vanadium (V)	mg/L	0.00040	0.00020	9809832
Dissolved Zinc (Zn)	mg/L	0.00408	0.00010	9809832
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	9809832
Dissolved Calcium (Ca)	mg/L	120	0.050	9808513
Dissolved Magnesium (Mg)	mg/L	17.3	0.050	9808513
RDL = Reportable Detection Limit				



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BV Labs Job #: C021661
Report Date: 2020/04/02

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XP0598		
Sampling Date		2020/03/25 12:15		
COC Number		1 of 1		
	UNITS	TRIAL #6	RDL	QC Batch
Dissolved Potassium (K)	mg/L	8.40	0.050	9808513
Dissolved Sodium (Na)	mg/L	25.9	0.050	9808513
Dissolved Sulphur (S)	mg/L	88.1	3.0	9808513
RDL = Reportable Detection Limit				

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VERITASBV Labs Job #: C021661
Report Date: 2020/04/02ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XP0595	XP0596	XP0597	XP0598		
Sampling Date		2020/03/25 11:30	2020/03/25 11:45	2020/03/25 13:15	2020/03/25 12:15		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	366	379	382	372	0.50	9808243
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00595	0.00121	0.00267	0.00207	0.00050	9809791
Total Antimony (Sb)	mg/L	0.00149	0.00412	0.00130	0.00323	0.000020	9809791
Total Arsenic (As)	mg/L	0.0291	0.0476	0.0292	0.110	0.000020	9809791
Total Barium (Ba)	mg/L	0.0853	0.0729	0.0663	0.0794	0.000020	9809791
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9809791
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9809791
Total Boron (B)	mg/L	0.036	0.037	0.035	0.037	0.010	9809791
Total Cadmium (Cd)	mg/L	0.000140	0.0000680	0.0000671	0.0000148	0.0000050	9809791
Total Chromium (Cr)	mg/L	<0.00010	0.00010	<0.00010	0.00024	0.00010	9809791
Total Cobalt (Co)	mg/L	0.00102	0.000484	0.00456	0.00123	0.0000050	9809791
Total Copper (Cu)	mg/L	0.000500	0.000463	0.000431	0.000081	0.000050	9809791
Total Iron (Fe)	mg/L	0.565	0.0699	1.46	1.02	0.0010	9809791
Total Lead (Pb)	mg/L	0.000674	0.000126	0.000682	0.000194	0.0000050	9809791
Total Lithium (Li)	mg/L	0.0118	0.0113	0.0113	0.0119	0.00050	9809791
Total Manganese (Mn)	mg/L	0.141	0.275	0.360	0.309	0.000050	9809791
Total Molybdenum (Mo)	mg/L	0.000775	0.000681	0.00119	0.000110	0.000050	9809791
Total Nickel (Ni)	mg/L	0.00522	0.00499	0.0115	0.00734	0.000020	9809791
Total Selenium (Se)	mg/L	0.0774	0.0104	0.0128	0.0122	0.000040	9809791
Total Silicon (Si)	mg/L	1.24	1.17	1.04	1.25	0.050	9809791
Total Silver (Ag)	mg/L	<0.0000050	0.0000060	<0.0000050	<0.0000050	0.0000050	9809791
Total Strontium (Sr)	mg/L	0.546	0.573	0.613	0.629	0.000050	9809791
Total Thallium (Tl)	mg/L	0.0000633	0.0000475	0.0000063	0.0000102	0.0000020	9809791
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9809791
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9809791
Total Uranium (U)	mg/L	0.0135	0.0108	0.0293	0.0295	0.0000020	9809791
Total Vanadium (V)	mg/L	0.00033	0.00021	<0.00020	0.00041	0.00020	9809791
Total Zinc (Zn)	mg/L	0.0136	0.0259	0.00590	0.00736	0.00010	9809791
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9809791
Total Calcium (Ca)	mg/L	116	121	124	119	0.050	9808515
Total Magnesium (Mg)	mg/L	18.6	18.3	17.8	17.9	0.050	9808515
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XP0595	XP0596	XP0597	XP0598		
Sampling Date		2020/03/25 11:30	2020/03/25 11:45	2020/03/25 13:15	2020/03/25 12:15		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	TRIAL #1	TRIAL #2	TRIAL #5	TRIAL #6	RDL	QC Batch
Total Potassium (K)	mg/L	8.31	7.48	7.21	8.53	0.050	9808515
Total Sodium (Na)	mg/L	26.1	26.3	25.8	26.4	0.050	9808515
Total Sulphur (S)	mg/L	134	81.8	82.6	90.6	3.0	9808515
RDL = Reportable Detection Limit							



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	15.3°C
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Sample XP0597, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.



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BV Labs Job #: C021661

Report Date: 2020/04/02

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9809664	Total Ammonia (N)	2020/03/27	92	80 - 120	99	80 - 120	<0.0050	mg/L		
9809668	HCl Preserved Iron (Fe+2 Ferrous)	2020/03/27	97	80 - 120	101	90 - 110	<0.050	mg/L	8.4	20
9809791	Total Aluminum (Al)	2020/03/27	103	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9809791	Total Antimony (Sb)	2020/03/27	94	80 - 120	95	80 - 120	<0.000020	mg/L	NC	20
9809791	Total Arsenic (As)	2020/03/27	103	80 - 120	103	80 - 120	<0.000020	mg/L	NC	20
9809791	Total Barium (Ba)	2020/03/27	101	80 - 120	102	80 - 120	<0.000020	mg/L	4.6	20
9809791	Total Beryllium (Be)	2020/03/27	101	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9809791	Total Bismuth (Bi)	2020/03/27	93	80 - 120	93	80 - 120	<0.0000050	mg/L	NC	20
9809791	Total Boron (B)	2020/03/27	98	80 - 120	95	80 - 120	<0.010	mg/L	NC	20
9809791	Total Cadmium (Cd)	2020/03/27	100	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9809791	Total Chromium (Cr)	2020/03/27	102	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9809791	Total Cobalt (Co)	2020/03/27	100	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9809791	Total Copper (Cu)	2020/03/27	101	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9809791	Total Iron (Fe)	2020/03/27	106	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
9809791	Total Lead (Pb)	2020/03/27	100	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9809791	Total Lithium (Li)	2020/03/27	100	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9809791	Total Manganese (Mn)	2020/03/27	103	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9809791	Total Molybdenum (Mo)	2020/03/27	96	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9809791	Total Nickel (Ni)	2020/03/27	101	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9809791	Total Selenium (Se)	2020/03/27	101	80 - 120	103	80 - 120	<0.000040	mg/L	NC	20
9809791	Total Silicon (Si)	2020/03/27	104	80 - 120	105	80 - 120	<0.050	mg/L	NC	20
9809791	Total Silver (Ag)	2020/03/27	101	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9809791	Total Strontium (Sr)	2020/03/27	101	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9809791	Total Thallium (Tl)	2020/03/27	96	80 - 120	95	80 - 120	<0.0000020	mg/L	NC	20
9809791	Total Tin (Sn)	2020/03/27	97	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9809791	Total Titanium (Ti)	2020/03/27	106	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9809791	Total Uranium (U)	2020/03/27	104	80 - 120	105	80 - 120	<0.0000020	mg/L	NC	20
9809791	Total Vanadium (V)	2020/03/27	102	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9809791	Total Zinc (Zn)	2020/03/27	99	80 - 120	103	80 - 120	<0.00010	mg/L	0.57	20
9809791	Total Zirconium (Zr)	2020/03/27	98	80 - 120	94	80 - 120	<0.00010	mg/L	NC	20
9809832	Dissolved Aluminum (Al)	2020/03/27	101	80 - 120	102	80 - 120	<0.00050	mg/L	4.2	20
9809832	Dissolved Antimony (Sb)	2020/03/27	95	80 - 120	92	80 - 120	<0.000020	mg/L	2.0	20



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BV Labs Job #: C021661

Report Date: 2020/04/02

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9809832	Dissolved Arsenic (As)	2020/03/27	110	80 - 120	104	80 - 120	<0.000020	mg/L	0.46	20
9809832	Dissolved Barium (Ba)	2020/03/27	NC	80 - 120	99	80 - 120	<0.000020	mg/L	1.1	20
9809832	Dissolved Beryllium (Be)	2020/03/27	99	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9809832	Dissolved Bismuth (Bi)	2020/03/27	78 (1)	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
9809832	Dissolved Boron (B)	2020/03/27	97	80 - 120	96	80 - 120	<0.010	mg/L	0.30	20
9809832	Dissolved Cadmium (Cd)	2020/03/27	100	80 - 120	101	80 - 120	<0.0000050	mg/L	12	20
9809832	Dissolved Chromium (Cr)	2020/03/27	101	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9809832	Dissolved Cobalt (Co)	2020/03/27	96	80 - 120	98	80 - 120	<0.0000050	mg/L	3.5	20
9809832	Dissolved Copper (Cu)	2020/03/27	93	80 - 120	99	80 - 120	<0.000050	mg/L	0.077	20
9809832	Dissolved Iron (Fe)	2020/03/27	101	80 - 120	104	80 - 120	<0.0010	mg/L	0.028	20
9809832	Dissolved Lead (Pb)	2020/03/27	98	80 - 120	100	80 - 120	<0.0000050	mg/L	9.1	20
9809832	Dissolved Lithium (Li)	2020/03/27	98	80 - 120	100	80 - 120	<0.00050	mg/L	0.16	20
9809832	Dissolved Manganese (Mn)	2020/03/27	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.10	20
9809832	Dissolved Molybdenum (Mo)	2020/03/27	109	80 - 120	97	80 - 120	<0.000050	mg/L	0.98	20
9809832	Dissolved Nickel (Ni)	2020/03/27	94	80 - 120	100	80 - 120	<0.000020	mg/L	3.4	20
9809832	Dissolved Selenium (Se)	2020/03/27	64 (1)	80 - 120	102	80 - 120	<0.000040	mg/L	5.2	20
9809832	Dissolved Silicon (Si)	2020/03/27	103	80 - 120	105	80 - 120	<0.050	mg/L	2.3	20
9809832	Dissolved Silver (Ag)	2020/03/27	89	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9809832	Dissolved Strontium (Sr)	2020/03/27	NC	80 - 120	102	80 - 120	<0.000050	mg/L	0.14	20
9809832	Dissolved Thallium (Tl)	2020/03/27	97	80 - 120	94	80 - 120	<0.0000020	mg/L	4.3	20
9809832	Dissolved Tin (Sn)	2020/03/27	98	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9809832	Dissolved Titanium (Ti)	2020/03/27	105	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9809832	Dissolved Uranium (U)	2020/03/27	110	80 - 120	102	80 - 120	<0.0000020	mg/L	0.15	20
9809832	Dissolved Vanadium (V)	2020/03/27	105	80 - 120	101	80 - 120	<0.00020	mg/L	9.6	20
9809832	Dissolved Zinc (Zn)	2020/03/27	91	80 - 120	104	80 - 120	<0.00010	mg/L	2.9	20
9809832	Dissolved Zirconium (Zr)	2020/03/27	109	80 - 120	97	80 - 120	<0.00010	mg/L	4.9	20
9809891	Orthophosphate (P)	2020/03/27	NC	80 - 120	97	80 - 120	<0.0010	mg/L	5.7	20
9809924	Alkalinity (PP as CaCO3)	2020/03/27					<0.50	mg/L		
9809924	Alkalinity (Total as CaCO3)	2020/03/27			96	80 - 120	<0.50	mg/L		
9809924	Bicarbonate (HCO3)	2020/03/27					<0.50	mg/L		
9809924	Carbonate (CO3)	2020/03/27					<0.50	mg/L		
9809924	Hydroxide (OH)	2020/03/27					<0.50	mg/L		

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VERITAS

BV Labs Job #: C021661

Report Date: 2020/04/02

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9810038	Dissolved Chloride (Cl)	2020/03/27	NC	80 - 120	103	80 - 120	<0.50	mg/L	1.7	20
9810038	Dissolved Sulphate (SO ₄)	2020/03/27	NC	80 - 120	100	80 - 120	<0.50	mg/L	3.1	20
9810041	Alkalinity (PP as CaCO ₃)	2020/03/27					<0.50	mg/L	NC	20
9810041	Alkalinity (Total as CaCO ₃)	2020/03/27	NC	80 - 120	95	80 - 120	<0.50	mg/L	1.9	20
9810041	Bicarbonate (HCO ₃)	2020/03/27					<0.50	mg/L	1.9	20
9810041	Carbonate (CO ₃)	2020/03/27					<0.50	mg/L	NC	20
9810041	Hydroxide (OH)	2020/03/27					<0.50	mg/L	NC	20
9810278	Nitrate plus Nitrite (N)	2020/03/28			108	80 - 120	<0.0020	mg/L		
9810279	Nitrite (N)	2020/03/28			104	80 - 120	<0.0020	mg/L		
9810340	Fluoride (F)	2020/03/28	NC	80 - 120	106	80 - 120	<0.010	mg/L	0	20
9810451	Dissolved Organic Carbon (C)	2020/03/30	88	80 - 120	108	80 - 120	<0.50	mg/L	6.6	20
9811131	Acidity (pH 4.5)	2020/03/30					<1.0	mg/L	NC	20
9811131	Acidity (pH 8.3)	2020/03/30			102	80 - 120	<1.0	mg/L	14	20
9812928	Total Sulphide	2020/04/01	104	80 - 120	109	80 - 120	<0.0018	mg/L	10	20
9813978	Dissolved Selenium (Se)	2020/04/02			98	80 - 120	<0.000040	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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BV Labs Job #: C021661
Report Date: 2020/04/02

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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CHAIN OF CUSTODY RECORD

BBY FCD-00077/05

Page 1 of 1

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required											
Company Name: BMC MINERALS LTD.	Company Name: ALEXCO ENVIRONMENTAL GROUP	Quotation #: B60751	☒ Regular TAT 5 days (Most analyses)		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS												
Contact Name:	Contact Name: Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:	☐ Same Day ☐ 2 Days		☐ 1 Day ☐ 3 Days												
Address: 530-1130 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-02	Rush TAT (Surcharges will be applied)														
Vancouver, BC PC: V6E 4A4	Whitehorse, YK PC: V1A 2V3	Site Location: Kudz Ze Kayah															
Phone:	Phone: (867) 668-6463 vfriesen@ensero.com	Site #:	Date Required:														
Email:	Email: agault@ensero.com kpiecowye@ensero.com	Sampled By:	Rush Confirmation #:														
Regulatory Criteria		Special Instructions		Analysis Requested												Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS ANIONS (Cl, F, NO2, NO3, SO4) ACIDITY ALKALINITY PHOSPHATE SULPHIDE FERROUS IRON DOC AMMONIA												LABORATORY USE ONLY CUSTODY SEAL Y / N Present Intact Y Y COOLER TEMPERATURES 1, 2, 2 ICE - YES COOLING MEDIA PRESENT Y / N Y / N	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																	
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	ANIONS (Cl, F, NO2, NO3, SO4)	ACIDITY	ALKALINITY	PHOSPHATE	SULPHIDE	FERROUS IRON	DOC	AMMONIA	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1 Trial #1		2020/03/25	11:50	Water	X	X	X	X	X	X	X	X	X	X	10		Received in Saskatoon By: Patricia W. 11:50 15-MAR-20 13:50 Temp: 15 / 17 / 14
2 Trial #2		2020/03/25	11:45	Water	X	X	X	X	X	X	X	X	X	X	10		
3 Trial #5		2020/03/25	13:15	Water	X	X	X	X	X	X	X	X	X	X	10		
4 Trial #6		2020/03/25	12:15	Water	X	X	X	X	X	X	X	X	X	X	10		
5																	
6																	
7																	
8																	
9																	
10																	
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)									
Kristen Piecowye		2020/03/25	14:00	ANN BMM SARA BISCHOFF		2020/03/26		08:45									

25-Mar-20 13:50

Safiann Maiter



C021661

FK3

INS-0141



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08481080

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/04/27
Report #: R2872668
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C027165

Received: 2020/04/21, 12:31

Sample Matrix: Water
Samples Received: 1

Analyses	Date		Laboratory Method	Analytical Method
	Quantity	Extracted		
Hardness Total (calculated as CaCO ₃) (1, 2)	1	N/A	2020/04/23 BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	1	N/A	2020/04/23 BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	1	N/A	2020/04/23 BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	1	N/A	2020/04/23 BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	N/A	2020/04/23 BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	1	N/A	2020/04/23 BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO ₃ Preserve for Metals (1)	1	N/A	2020/04/22 BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08481080

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/04/27
Report #: R2872668
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C027165

Received: 2020/04/21, 12:31

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: Diana.CRUIZ@bvlabs.com

Phone# (403) 291-3077

=====

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BV Labs Job #: C027165
Report Date: 2020/04/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XR3611	
Sampling Date		2020/04/21 10:15	
COC Number		08481080	
	UNITS	AS TRIAL	QC Batch
Calculated Parameters			
Filter and HNO3 Preservation	N/A	FIELD	ONSITE



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BV Labs Job #: C027165
Report Date: 2020/04/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XR3611		
Sampling Date		2020/04/21 10:15		
COC Number		08481080		
	UNITS	AS TRIAL	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	140	0.50	9829292
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.00230	0.00050	9830121
Dissolved Antimony (Sb)	mg/L	0.0166	0.000020	9830121
Dissolved Arsenic (As)	mg/L	0.0617	0.000020	9830121
Dissolved Barium (Ba)	mg/L	0.00182	0.000020	9830121
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	9830121
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9830121
Dissolved Boron (B)	mg/L	0.020	0.010	9830121
Dissolved Cadmium (Cd)	mg/L	0.00332	0.0000050	9830121
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	9830121
Dissolved Cobalt (Co)	mg/L	0.00232	0.0000050	9830121
Dissolved Copper (Cu)	mg/L	0.0116	0.000050	9830121
Dissolved Iron (Fe)	mg/L	0.0012	0.0010	9830121
Dissolved Lead (Pb)	mg/L	0.0113	0.0000050	9830121
Dissolved Lithium (Li)	mg/L	<0.00050	0.00050	9830121
Dissolved Manganese (Mn)	mg/L	0.00251	0.000050	9830121
Dissolved Molybdenum (Mo)	mg/L	0.000196	0.000050	9830121
Dissolved Nickel (Ni)	mg/L	0.0105	0.000020	9830121
Dissolved Selenium (Se)	mg/L	0.00824	0.000040	9830121
Dissolved Silicon (Si)	mg/L	<0.050	0.050	9830121
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9830121
Dissolved Strontium (Sr)	mg/L	0.314	0.000050	9830121
Dissolved Thallium (Tl)	mg/L	0.0000693	0.0000020	9830121
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9830121
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9830121
Dissolved Uranium (U)	mg/L	0.0328	0.0000020	9830121
Dissolved Vanadium (V)	mg/L	0.00026	0.00020	9830121
Dissolved Zinc (Zn)	mg/L	0.272	0.00010	9830121
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	9830121
Dissolved Calcium (Ca)	mg/L	56.1	0.050	9829294
Dissolved Magnesium (Mg)	mg/L	0.052	0.050	9829294
RDL = Reportable Detection Limit				



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BV Labs Job #: C027165
Report Date: 2020/04/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XR3611		
Sampling Date		2020/04/21 10:15		
COC Number		08481080		
	UNITS	AS TRIAL	RDL	QC Batch
Dissolved Potassium (K)	mg/L	0.320	0.050	9829294
Dissolved Sodium (Na)	mg/L	27.9	0.050	9829294
Dissolved Sulphur (S)	mg/L	47.6	3.0	9829294
RDL = Reportable Detection Limit				



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BV Labs Job #: C027165
Report Date: 2020/04/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XR3611		
Sampling Date		2020/04/21 10:15		
COC Number		08481080		
	UNITS	AS TRIAL	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	143	0.50	9829291
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.00867	0.00050	9830064
Total Antimony (Sb)	mg/L	0.0168	0.000020	9830064
Total Arsenic (As)	mg/L	0.0617	0.000020	9830064
Total Barium (Ba)	mg/L	0.00184	0.000020	9830064
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9830064
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9830064
Total Boron (B)	mg/L	0.020	0.010	9830064
Total Cadmium (Cd)	mg/L	0.00334	0.0000050	9830064
Total Chromium (Cr)	mg/L	<0.00010	0.00010	9830064
Total Cobalt (Co)	mg/L	0.00235	0.0000050	9830064
Total Copper (Cu)	mg/L	0.0136	0.000050	9830064
Total Iron (Fe)	mg/L	0.0050	0.0010	9830064
Total Lead (Pb)	mg/L	0.0124	0.0000050	9830064
Total Lithium (Li)	mg/L	<0.00050	0.00050	9830064
Total Manganese (Mn)	mg/L	0.00312	0.000050	9830064
Total Molybdenum (Mo)	mg/L	0.000209	0.000050	9830064
Total Nickel (Ni)	mg/L	0.0107	0.000020	9830064
Total Selenium (Se)	mg/L	0.00832	0.000040	9830064
Total Silicon (Si)	mg/L	<0.050	0.050	9830064
Total Silver (Ag)	mg/L	0.0000211	0.0000050	9830064
Total Strontium (Sr)	mg/L	0.315	0.000050	9830064
Total Thallium (Tl)	mg/L	0.0000691	0.0000020	9830064
Total Tin (Sn)	mg/L	<0.00020	0.00020	9830064
Total Titanium (Ti)	mg/L	<0.00050	0.00050	9830064
Total Uranium (U)	mg/L	0.0328	0.0000020	9830064
Total Vanadium (V)	mg/L	0.00030	0.00020	9830064
Total Zinc (Zn)	mg/L	0.272	0.00010	9830064
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	9830064
Total Calcium (Ca)	mg/L	57.2	0.050	9829297
Total Magnesium (Mg)	mg/L	0.111	0.050	9829297
RDL = Reportable Detection Limit				



BUREAU
VERITAS

BV Labs Job #: C027165
Report Date: 2020/04/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XR3611		
Sampling Date		2020/04/21 10:15		
COC Number		08481080		
	UNITS	AS TRIAL	RDL	QC Batch
Total Potassium (K)	mg/L	0.320	0.050	9829297
Total Sodium (Na)	mg/L	28.0	0.050	9829297
Total Sulphur (S)	mg/L	47.7	3.0	9829297
RDL = Reportable Detection Limit				



BUREAU
VERITAS

BV Labs Job #: C027165
Report Date: 2020/04/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	15.0°C
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Results relate only to the items tested.

BUREAU
VERITAS

BV Labs Job #: C027165

Report Date: 2020/04/27

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9830064	Total Aluminum (Al)	2020/04/23	96	80 - 120	100	80 - 120	<0.00050	mg/L	6.4	20
9830064	Total Antimony (Sb)	2020/04/23	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.12	20
9830064	Total Arsenic (As)	2020/04/23	NC	80 - 120	103	80 - 120	<0.000020	mg/L	1.9	20
9830064	Total Barium (Ba)	2020/04/23	103	80 - 120	103	80 - 120	<0.000020	mg/L	0	20
9830064	Total Beryllium (Be)	2020/04/23	100	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9830064	Total Bismuth (Bi)	2020/04/23	90	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
9830064	Total Boron (B)	2020/04/23	91	80 - 120	94	80 - 120	<0.010	mg/L	0.88	20
9830064	Total Cadmium (Cd)	2020/04/23	100	80 - 120	102	80 - 120	<0.0000050	mg/L	0.72	20
9830064	Total Chromium (Cr)	2020/04/23	98	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9830064	Total Cobalt (Co)	2020/04/23	99	80 - 120	100	80 - 120	<0.0000050	mg/L	0.19	20
9830064	Total Copper (Cu)	2020/04/23	93	80 - 120	96	80 - 120	<0.000050	mg/L	0.23	20
9830064	Total Iron (Fe)	2020/04/23	95	80 - 120	103	80 - 120	<0.0010	mg/L	2.8	20
9830064	Total Lead (Pb)	2020/04/23	100	80 - 120	101	80 - 120	<0.0000050	mg/L	0.22	20
9830064	Total Lithium (Li)	2020/04/23	99	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9830064	Total Manganese (Mn)	2020/04/23	98	80 - 120	98	80 - 120	<0.000050	mg/L	2.2	20
9830064	Total Molybdenum (Mo)	2020/04/23	102	80 - 120	98	80 - 120	<0.000050	mg/L	2.7	20
9830064	Total Nickel (Ni)	2020/04/23	96	80 - 120	98	80 - 120	<0.000020	mg/L	0.91	20
9830064	Total Selenium (Se)	2020/04/23	98	80 - 120	103	80 - 120	<0.000040	mg/L	0.081	20
9830064	Total Silicon (Si)	2020/04/23	99	80 - 120	106	80 - 120	<0.050	mg/L	NC	20
9830064	Total Silver (Ag)	2020/04/23	98	80 - 120	101	80 - 120	<0.0000050	mg/L	8.4	20
9830064	Total Strontium (Sr)	2020/04/23	NC	80 - 120	101	80 - 120	<0.000050	mg/L	2.1	20
9830064	Total Thallium (Tl)	2020/04/23	93	80 - 120	95	80 - 120	<0.0000020	mg/L	1.5	20
9830064	Total Tin (Sn)	2020/04/23	95	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9830064	Total Titanium (Ti)	2020/04/23	101	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9830064	Total Uranium (U)	2020/04/23	105	80 - 120	103	80 - 120	<0.0000020	mg/L	0.16	20
9830064	Total Vanadium (V)	2020/04/23	100	80 - 120	97	80 - 120	<0.00020	mg/L	5.9	20
9830064	Total Zinc (Zn)	2020/04/23	NC	80 - 120	102	80 - 120	<0.00010	mg/L	0.57	20
9830064	Total Zirconium (Zr)	2020/04/23	103	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9830121	Dissolved Aluminum (Al)	2020/04/23	96	80 - 120	98	80 - 120	<0.00050	mg/L	0.14	20
9830121	Dissolved Antimony (Sb)	2020/04/23	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.77	20
9830121	Dissolved Arsenic (As)	2020/04/23	NC	80 - 120	102	80 - 120	<0.000020	mg/L	1.0	20
9830121	Dissolved Barium (Ba)	2020/04/23	102	80 - 120	104	80 - 120	<0.000020	mg/L	0.038	20

BUREAU
VERITAS

BV Labs Job #: C027165

Report Date: 2020/04/27

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9830121	Dissolved Beryllium (Be)	2020/04/23	99	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9830121	Dissolved Bismuth (Bi)	2020/04/23	90	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9830121	Dissolved Boron (B)	2020/04/23	89	80 - 120	92	80 - 120	<0.010	mg/L	0.48	20
9830121	Dissolved Cadmium (Cd)	2020/04/23	100	80 - 120	101	80 - 120	<0.0000050	mg/L	0.40	20
9830121	Dissolved Chromium (Cr)	2020/04/23	99	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9830121	Dissolved Cobalt (Co)	2020/04/23	98	80 - 120	99	80 - 120	<0.0000050	mg/L	1.2	20
9830121	Dissolved Copper (Cu)	2020/04/23	93	80 - 120	97	80 - 120	<0.000050	mg/L	1.1	20
9830121	Dissolved Iron (Fe)	2020/04/23	100	80 - 120	103	80 - 120	<0.0010	mg/L	0.30	20
9830121	Dissolved Lead (Pb)	2020/04/23	99	80 - 120	101	80 - 120	<0.0000050	mg/L	0.65	20
9830121	Dissolved Lithium (Li)	2020/04/23	97	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9830121	Dissolved Manganese (Mn)	2020/04/23	99	80 - 120	99	80 - 120	<0.000050	mg/L	0.45	20
9830121	Dissolved Molybdenum (Mo)	2020/04/23	101	80 - 120	99	80 - 120	<0.000050	mg/L	5.8	20
9830121	Dissolved Nickel (Ni)	2020/04/23	97	80 - 120	99	80 - 120	<0.000020	mg/L	0.41	20
9830121	Dissolved Selenium (Se)	2020/04/23	100	80 - 120	99	80 - 120	<0.000040	mg/L	0.0012	20
9830121	Dissolved Silicon (Si)	2020/04/23	102	80 - 120	103	80 - 120	<0.050	mg/L	NC	20
9830121	Dissolved Silver (Ag)	2020/04/23	98	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9830121	Dissolved Strontium (Sr)	2020/04/23	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.82	20
9830121	Dissolved Thallium (Tl)	2020/04/23	93	80 - 120	96	80 - 120	<0.0000020	mg/L	1.7	20
9830121	Dissolved Tin (Sn)	2020/04/23	95	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9830121	Dissolved Titanium (Ti)	2020/04/23	103	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9830121	Dissolved Uranium (U)	2020/04/23	97	80 - 120	106	80 - 120	<0.0000020	mg/L	0.38	20
9830121	Dissolved Vanadium (V)	2020/04/23	100	80 - 120	98	80 - 120	<0.00020	mg/L	3.0	20
9830121	Dissolved Zinc (Zn)	2020/04/23	NC	80 - 120	102	80 - 120	<0.00010	mg/L	0.91	20
9830121	Dissolved Zirconium (Zr)	2020/04/23	102	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).



BUREAU
VERITAS

BV Labs Job #: C027165
Report Date: 2020/04/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

08481080

FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: BMC MINERALS LTD.	Company Name: Ensero Solutions	Quotation #: B60751	☒ Regular TAT 5 days (Most analyses)				
Contact Name:	Contact Name: Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS				
Address: 750-789 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-02	Rush TAT (Surcharges will be applied)				
Vancouver, BC PC: V6C 1H2	Whitehorse, YK PC: V1A 2V3	Site Location: Kudz Ze Kayah	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days				
Phone:	Phone: (867) 668-6463 vfriesen@ensero.com	Site #:	Date Required:				
Email:	Email: agault@ensero.com kpiecowye@ensero.com	Sampled By:					
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485				LABORATORY USE ONLY CUSTODY SEAL - Y / N Present Intact COOLING MEDIA PRESENT COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	
1 As Trial		21-Apr-20	10:15	Water	X	X	
2							
3							
4							
5							
6							
7							
8							
9							
10							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
				MARILYN		2020/04/22	08:00
				TRUANI			



C027165_COC



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08483323

Attention: Kai Woloshyn

Ensero Solutions
15-410 Downey Road
Saskatoon, SK
Canada S7N 4N1

Report Date: 2020/05/19
Report #: R2880174
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C030971

Received: 2020/05/06, 13:08

Sample Matrix: Water
Samples Received: 5

Analyses	Date		Date Analyzed	Laboratory Method	Analytical Method
	Quantity	Extracted			
Hardness Total (calculated as CaCO ₃) (1, 2)	5	N/A	2020/05/11	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	5	N/A	2020/05/11	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	5	N/A	2020/05/11	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	5	N/A	2020/05/09	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	5	N/A	2020/05/11	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	5	N/A	2020/05/08	BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO ₃ Preserve for Metals (1)	5	N/A	2020/05/07	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08483323

Attention: Kai Woloshyn

Ensero Solutions
15-410 Downey Road
Saskatoon, SK
Canada S7N 4N1

Report Date: 2020/05/19
Report #: R2880174
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C030971

Received: 2020/05/06, 13:08

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: Diana.CRUIZ@bvlabs.com

Phone# (403) 291-3077

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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VERITAS

BV Labs Job #: C030971
Report Date: 2020/05/19

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XT0256	XT0257	XT0258	XT0259	XT0260	
Sampling Date		2020/05/05 11:45	2020/05/05 13:05	2020/05/05 13:10	2020/05/06 12:00	2020/05/06 12:00	
COC Number		08483323	08483323	08483323	08483323	08483323	
	UNITS	FE:AS TRIAL	FE:TRAIL (20:1)	FE:TRAIL (10:1)	FE:TRAIL (20:1)	FE:TRAIL (10:1)	QC Batch
Calculated Parameters							
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	ONSITE



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VERITAS

BV Labs Job #: C030971
Report Date: 2020/05/19

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XT0256	XT0257	XT0258	XT0259	XT0260		
Sampling Date		2020/05/05 11:45	2020/05/05 13:05	2020/05/05 13:10	2020/05/06 12:00	2020/05/06 12:00		
COC Number		08483323	08483323	08483323	08483323	08483323		
	UNITS	FE:AS TRIAL	FE:TRAIL (20:1)	FE:TRAIL (10:1)	FE:TRAIL (20:1)	FE:TRAIL (10:1)	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	142	142	141	143	142	0.50	9844382
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00240	0.00108	0.00160	0.00065	0.00169	0.00050	9845115
Dissolved Antimony (Sb)	mg/L	0.0160	0.0151	0.0155	0.0148	0.0158	0.000020	9845115
Dissolved Arsenic (As)	mg/L	0.0616	0.00525	0.0284	0.00390	0.0366	0.000020	9845115
Dissolved Barium (Ba)	mg/L	0.00174	0.00267	0.00281	0.00373	0.00337	0.000020	9845115
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9845115
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9845115
Dissolved Boron (B)	mg/L	0.023	0.022	0.022	0.023	0.023	0.010	9845115
Dissolved Cadmium (Cd)	mg/L	0.00324	0.00225	0.00237	0.00209	0.00244	0.0000050	9845115
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00010	9845115
Dissolved Cobalt (Co)	mg/L	0.00239	0.00221	0.00230	0.00222	0.00232	0.0000050	9845115
Dissolved Copper (Cu)	mg/L	0.0115	0.00157	0.00442	0.00136	0.00676	0.000050	9845115
Dissolved Iron (Fe)	mg/L	<0.0010	0.0524	0.143	0.0362	0.204	0.0010	9845115
Dissolved Lead (Pb)	mg/L	0.0108	0.000455	0.00235	0.000335	0.00342	0.0000050	9845115
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9845115
Dissolved Manganese (Mn)	mg/L	0.00220	0.00489	0.00351	0.00504	0.00391	0.000050	9845115
Dissolved Molybdenum (Mo)	mg/L	0.000186	0.000208	0.000186	0.000269	0.000220	0.000050	9845115
Dissolved Nickel (Ni)	mg/L	0.0107	0.00979	0.0101	0.00944	0.0104	0.000020	9845115
Dissolved Selenium (Se)	mg/L	0.00839	0.00836	0.00834	0.00827	0.00836	0.000040	9845115
Dissolved Silicon (Si)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9845115
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9845115
Dissolved Strontium (Sr)	mg/L	0.308	0.310	0.313	0.320	0.318	0.000050	9845115
Dissolved Thallium (Tl)	mg/L	0.0000604	0.0000601	0.0000617	0.0000633	0.0000596	0.0000020	9845115
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9845115
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9845115
Dissolved Uranium (U)	mg/L	0.0327	0.0268	0.0320	0.0274	0.0319	0.0000020	9845115
Dissolved Vanadium (V)	mg/L	0.00030	<0.00020	<0.00020	<0.00020	0.00029	0.00020	9845115
Dissolved Zinc (Zn)	mg/L	0.265	0.148	0.176	0.141	0.182	0.00010	9845115
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9845115
Dissolved Calcium (Ca)	mg/L	56.7	56.8	56.3	57.2	56.8	0.050	9843747
Dissolved Magnesium (Mg)	mg/L	0.052	0.066	0.067	0.067	0.080	0.050	9843747

RDL = Reportable Detection Limit



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BV Labs Job #: C030971
Report Date: 2020/05/19

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XT0256	XT0257	XT0258	XT0259	XT0260		
Sampling Date		2020/05/05 11:45	2020/05/05 13:05	2020/05/05 13:10	2020/05/06 12:00	2020/05/06 12:00		
COC Number		08483323	08483323	08483323	08483323	08483323		
	UNITS	FE:AS TRIAL	FE:TRAIL (20:1)	FE:TRAIL (10:1)	FE:TRAIL (20:1)	FE:TRAIL (10:1)	RDL	QC Batch
Dissolved Potassium (K)	mg/L	0.312	0.331	0.316	0.339	0.329	0.050	9843747
Dissolved Sodium (Na)	mg/L	27.9	27.4	27.5	27.9	28.1	0.050	9843747
Dissolved Sulphur (S)	mg/L	47.2	47.2	47.6	47.6	48.8	3.0	9843747
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: C030971
Report Date: 2020/05/19Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XT0256	XT0257	XT0258	XT0259	XT0260		
Sampling Date		2020/05/05 11:45	2020/05/05 13:05	2020/05/05 13:10	2020/05/06 12:00	2020/05/06 12:00		
COC Number		08483323	08483323	08483323	08483323	08483323		
	UNITS	FE:AS TRIAL	FE:TRAIL (20:1)	FE:TRAIL (10:1)	FE:TRAIL (20:1)	FE:TRAIL (10:1)	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	146	147	151	146	147	0.50	9844380
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0129	0.00642	0.00521	0.00146	0.00247	0.00050	9845290
Total Antimony (Sb)	mg/L	0.0164	0.0165	0.0167	0.0157	0.0163	0.000020	9845290
Total Arsenic (As)	mg/L	0.0624	0.0616	0.0640	0.0325	0.0558	0.000020	9845290
Total Barium (Ba)	mg/L	0.00197	0.00295	0.00311	0.00391	0.00358	0.000020	9845290
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	0.000010	9845290
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9845290
Total Boron (B)	mg/L	0.020	0.021	0.021	0.022	0.023	0.010	9845290
Total Cadmium (Cd)	mg/L	0.00321	0.00309	0.00310	0.00261	0.00295	0.0000050	9845290
Total Chromium (Cr)	mg/L	<0.00010	0.00041	0.00025	0.00022	0.00016	0.00010	9845290
Total Cobalt (Co)	mg/L	0.00223	0.00220	0.00225	0.00221	0.00218	0.0000050	9845290
Total Copper (Cu)	mg/L	0.0128	0.0134	0.0138	0.00835	0.0134	0.0000050	9845290
Total Iron (Fe)	mg/L	0.0075	1.24	0.646	0.638	0.509	0.0010	9845290
Total Lead (Pb)	mg/L	0.0121	0.0107	0.0111	0.00554	0.00897	0.0000050	9845290
Total Lithium (Li)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9845290
Total Manganese (Mn)	mg/L	0.00322	0.00530	0.00392	0.00492	0.00367	0.0000050	9845290
Total Molybdenum (Mo)	mg/L	0.000183	0.000224	0.000199	0.000253	0.000198	0.0000050	9845290
Total Nickel (Ni)	mg/L	0.00980	0.00984	0.0100	0.00951	0.00962	0.000020	9845290
Total Selenium (Se)	mg/L	0.00836	0.00825	0.00866	0.00836	0.00853	0.000040	9845290
Total Silicon (Si)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9845290
Total Silver (Ag)	mg/L	0.0000353	0.0000283	0.0000209	0.0000138	0.0000103	0.0000050	9845290
Total Strontium (Sr)	mg/L	0.329	0.348	0.363	0.353	0.354	0.0000050	9845290
Total Thallium (Tl)	mg/L	0.0000639	0.0000604	0.0000634	0.0000602	0.0000575	0.0000020	9845290
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9845290
Total Titanium (Ti)	mg/L	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9845290
Total Uranium (U)	mg/L	0.0327	0.0327	0.0329	0.0307	0.0327	0.0000020	9845290
Total Vanadium (V)	mg/L	0.00024	0.00039	0.00031	0.00026	0.00028	0.00020	9845290
Total Zinc (Zn)	mg/L	0.254	0.243	0.247	0.195	0.226	0.00010	9845290
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9845290
Total Calcium (Ca)	mg/L	58.4	58.6	60.1	58.5	58.6	0.050	9843749
Total Magnesium (Mg)	mg/L	0.148	0.101	0.098	0.074	0.086	0.050	9843749

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XT0256	XT0257	XT0258	XT0259	XT0260		
Sampling Date		2020/05/05 11:45	2020/05/05 13:05	2020/05/05 13:10	2020/05/06 12:00	2020/05/06 12:00		
COC Number		08483323	08483323	08483323	08483323	08483323		
	UNITS	FE:AS TRIAL	FE:TRAIL (20:1)	FE:TRAIL (10:1)	FE:TRAIL (20:1)	FE:TRAIL (10:1)	RDL	QC Batch
Total Potassium (K)	mg/L	0.322	0.346	0.345	0.362	0.340	0.050	9843749
Total Sodium (Na)	mg/L	27.5	27.6	28.1	28.5	27.7	0.050	9843749
Total Sulphur (S)	mg/L	47.8	48.2	49.6	50.1	50.4	3.0	9843749
RDL = Reportable Detection Limit								



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.3°C
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Results relate only to the items tested.

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BV Labs Job #: C030971

Report Date: 2020/05/19

QUALITY ASSURANCE REPORT

Ensero Solutions

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9845115	Dissolved Aluminum (Al)	2020/05/09	101	80 - 120	103	80 - 120	<0.00050	mg/L	2.9	20
9845115	Dissolved Antimony (Sb)	2020/05/09	NC	80 - 120	94	80 - 120	<0.000020	mg/L	0.32	20
9845115	Dissolved Arsenic (As)	2020/05/09	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.49	20
9845115	Dissolved Barium (Ba)	2020/05/09	101	80 - 120	104	80 - 120	<0.000020	mg/L	0.75	20
9845115	Dissolved Beryllium (Be)	2020/05/09	97	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9845115	Dissolved Bismuth (Bi)	2020/05/09	93	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9845115	Dissolved Boron (B)	2020/05/09	94	80 - 120	94	80 - 120	<0.010	mg/L	2.5	20
9845115	Dissolved Cadmium (Cd)	2020/05/09	100	80 - 120	100	80 - 120	<0.0000050	mg/L	0.82	20
9845115	Dissolved Chromium (Cr)	2020/05/09	99	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9845115	Dissolved Cobalt (Co)	2020/05/09	97	80 - 120	101	80 - 120	<0.0000050	mg/L	3.0	20
9845115	Dissolved Copper (Cu)	2020/05/09	94	80 - 120	100	80 - 120	<0.000050	mg/L	0.11	20
9845115	Dissolved Iron (Fe)	2020/05/09	98	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
9845115	Dissolved Lead (Pb)	2020/05/09	99	80 - 120	99	80 - 120	<0.0000050	mg/L	0.51	20
9845115	Dissolved Lithium (Li)	2020/05/09	95	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9845115	Dissolved Manganese (Mn)	2020/05/09	98	80 - 120	102	80 - 120	<0.000050	mg/L	0.41	20
9845115	Dissolved Molybdenum (Mo)	2020/05/09	99	80 - 120	98	80 - 120	<0.000050	mg/L	0.91	20
9845115	Dissolved Nickel (Ni)	2020/05/09	97	80 - 120	100	80 - 120	<0.000020	mg/L	1.2	20
9845115	Dissolved Selenium (Se)	2020/05/09	101	80 - 120	103	80 - 120	<0.000040	mg/L	2.4	20
9845115	Dissolved Silicon (Si)	2020/05/09	103	80 - 120	105	80 - 120	<0.050	mg/L	NC	20
9845115	Dissolved Silver (Ag)	2020/05/09	99	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9845115	Dissolved Strontium (Sr)	2020/05/09	NC	80 - 120	103	80 - 120	<0.000050	mg/L	0.23	20
9845115	Dissolved Thallium (Tl)	2020/05/09	94	80 - 120	96	80 - 120	<0.0000020	mg/L	2.8	20
9845115	Dissolved Tin (Sn)	2020/05/09	95	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9845115	Dissolved Titanium (Ti)	2020/05/09	102	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9845115	Dissolved Uranium (U)	2020/05/09	102	80 - 120	103	80 - 120	<0.0000020	mg/L	0.99	20
9845115	Dissolved Vanadium (V)	2020/05/09	100	80 - 120	101	80 - 120	<0.00020	mg/L	3.6	20
9845115	Dissolved Zinc (Zn)	2020/05/09	NC	80 - 120	101	80 - 120	0.00012, RDL=0.00010 (1)	mg/L	0.30	20
9845115	Dissolved Zirconium (Zr)	2020/05/09	100	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9845290	Total Aluminum (Al)	2020/05/08	102	80 - 120	104	80 - 120	<0.00050	mg/L	0.76	20
9845290	Total Antimony (Sb)	2020/05/08	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.071	20
9845290	Total Arsenic (As)	2020/05/08	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.68	20



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BV Labs Job #: C030971

Report Date: 2020/05/19

QUALITY ASSURANCE REPORT(CONT'D)

Ensero Solutions

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9845290	Total Barium (Ba)	2020/05/08	103	80 - 120	104	80 - 120	<0.000020	mg/L	0.55	20
9845290	Total Beryllium (Be)	2020/05/08	96	80 - 120	104	80 - 120	<0.000010	mg/L	NC	20
9845290	Total Bismuth (Bi)	2020/05/08	92	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
9845290	Total Boron (B)	2020/05/08	94	80 - 120	95	80 - 120	<0.010	mg/L	0.74	20
9845290	Total Cadmium (Cd)	2020/05/08	100	80 - 120	100	80 - 120	<0.0000050	mg/L	0.66	20
9845290	Total Chromium (Cr)	2020/05/08	98	80 - 120	96	80 - 120	<0.00010	mg/L	9.7	20
9845290	Total Cobalt (Co)	2020/05/08	102	80 - 120	94	80 - 120	<0.0000050	mg/L	2.3	20
9845290	Total Copper (Cu)	2020/05/08	96	80 - 120	91	80 - 120	<0.000050	mg/L	1.8	20
9845290	Total Iron (Fe)	2020/05/08	NC	80 - 120	101	80 - 120	<0.0010	mg/L	1.6	20
9845290	Total Lead (Pb)	2020/05/08	103	80 - 120	99	80 - 120	<0.0000050	mg/L	0.051	20
9845290	Total Lithium (Li)	2020/05/08	95	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
9845290	Total Manganese (Mn)	2020/05/08	98	80 - 120	98	80 - 120	<0.000050	mg/L	3.1	20
9845290	Total Molybdenum (Mo)	2020/05/08	102	80 - 120	98	80 - 120	<0.000050	mg/L	6.0	20
9845290	Total Nickel (Ni)	2020/05/08	98	80 - 120	92	80 - 120	<0.000020	mg/L	0.49	20
9845290	Total Selenium (Se)	2020/05/08	102	80 - 120	102	80 - 120	<0.000040	mg/L	1.6	20
9845290	Total Silicon (Si)	2020/05/08	96	80 - 120	110	80 - 120	<0.050	mg/L	NC	20
9845290	Total Silver (Ag)	2020/05/08	96	80 - 120	101	80 - 120	<0.0000050	mg/L	14	20
9845290	Total Strontium (Sr)	2020/05/08	NC	80 - 120	109	80 - 120	<0.000050	mg/L	0.0018	20
9845290	Total Thallium (Tl)	2020/05/08	95	80 - 120	95	80 - 120	<0.0000020	mg/L	1.6	20
9845290	Total Tin (Sn)	2020/05/08	96	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9845290	Total Titanium (Ti)	2020/05/08	100	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9845290	Total Uranium (U)	2020/05/08	109	80 - 120	101	80 - 120	<0.0000020	mg/L	1.4	20
9845290	Total Vanadium (V)	2020/05/08	100	80 - 120	98	80 - 120	<0.00020	mg/L	2.1	20
9845290	Total Zinc (Zn)	2020/05/08	NC	80 - 120	96	80 - 120	<0.00010	mg/L	1.6	20



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BV Labs Job #: C030971

Report Date: 2020/05/19

QUALITY ASSURANCE REPORT(CONT'D)

Ensero Solutions

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9845290	Total Zirconium (Zr)	2020/05/08	103	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement. Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference. Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy. Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination. NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration) NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$). (1) Method Blank exceeds acceptance limits for Zn - $2 \times \text{RDL}$ acceptable for low level metals determination.										



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BV Labs Job #: C030971
Report Date: 2020/05/19

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY

COC #:

1(PA7) 08483323

BBY FCD-00077/05

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: BMC MINERALS LTD.	Company Name: ENSERO SOLUTIONS	Quotation #: B60751	☒ Regular TAT 5 days (Most analyses)				
Contact Name:	Contact Name: Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS				
Address: 750-789 WEST PENDER ST	Address: UNIT 3 151 INDUSTRIAL RD	Project #: BMC-18-02	Rush TAT (Surcharges will be applied)				
Vancouver, BC PC: V6C1H2	Whitehorse, YK PC: V1A 2V3	Site Location: Kudz Ze Kayah	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days				
Phone:	Phone: (867) 668-6463 vfriesen@ensero.com	Site #:	Date Required:				
Email:	Email: agault@ensero.com kpiecowye@ensero.com	Sampled By:					
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS		LABORATORY USE ONLY CUSTODY SEAL Y / N Present Intact COOLING MEDIA PRESENT ☒ N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	# OF CONTAINERS SUBMITTED
1 Fe:As Trial		05-May-20	11:45	Water	X	X	4
2 Fe:As Trial (20:1)		05-May-20	13:05	Water	X	X	4
3 Fe:As Trial (10:1)		05-May-20	13:10	Water	X	X	4
4 Fe:As Trial (20:1)		06-May-20	12:00	Water	X	X	4
5 Fe:As Trial (10:1)		06-May-20	12:00	Water	X	X	4
6							
7							
8							
9							
10							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Kristen Piecowye		2020/05/06	13:00	[Signature]		2020/05/07	08:00



C030971_COC



Your Project #: BMC-18-02
 Site Location: KUDZ DE KAYAH
 Your C.O.C. #: 08483383

Attention: Kai Woloshyn

Ensero Solutions
 15-410 Downey Road
 Saskatoon, SK
 Canada S7N 4N1

Report Date: 2020/05/20
 Report #: R2881075
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C032165

Received: 2020/05/12, 12:57

Sample Matrix: Water
 # Samples Received: 2

Analyses	Date		Date Analyzed	Laboratory Method	Analytical Method
	Quantity	Extracted			
Hardness Total (calculated as CaCO ₃) (1, 2)	2	N/A	2020/05/19	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	2	N/A	2020/05/15	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	2	N/A	2020/05/15	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	2	N/A	2020/05/15	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	2	N/A	2020/05/19	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	2	N/A	2020/05/19	BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO ₃ Preserve for Metals (1)	2	N/A	2020/05/13	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).



Your Project #: BMC-18-02
Site Location: KUDZ DE KAYAH
Your C.O.C. #: 08483383

Attention: Kai Woloshyn

Ensero Solutions
15-410 Downey Road
Saskatoon, SK
Canada S7N 4N1

Report Date: 2020/05/20
Report #: R2881075
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C032165

Received: 2020/05/12, 12:57

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: Diana.CRUIZ@bvlabs.com

Phone# (403) 291-3077

=====

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BV Labs Job #: C032165
Report Date: 2020/05/20

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ DE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XT5466	XT5467	
Sampling Date		2020/05/11 15:00	2020/05/11 15:00	
COC Number		08483383	08483383	
	UNITS	FE:AS TRIAL (20:1)	FE:AS TRIAL (10:1)	QC Batch
Calculated Parameters				
Filter and HNO3 Preservation	N/A	FIELD	FIELD	ONSITE

BUREAU
VERITASBV Labs Job #: C032165
Report Date: 2020/05/20Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ DE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XT5466	XT5467		
Sampling Date		2020/05/11 15:00	2020/05/11 15:00		
COC Number		08483383	08483383		
	UNITS	FE:AS TRIAL (20:1)	FE:AS TRIAL (10:1)	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	144	145	0.50	9849579
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00240	0.00246	0.00050	9851033
Dissolved Antimony (Sb)	mg/L	0.0149	0.0158	0.000020	9851033
Dissolved Arsenic (As)	mg/L	0.00352	0.0268	0.000020	9851033
Dissolved Barium (Ba)	mg/L	0.00574	0.00359	0.000020	9851033
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9851033
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9851033
Dissolved Boron (B)	mg/L	0.028	0.028	0.010	9851033
Dissolved Cadmium (Cd)	mg/L	0.00154	0.00183	0.0000050	9851033
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9851033
Dissolved Cobalt (Co)	mg/L	0.00201	0.00214	0.0000050	9851033
Dissolved Copper (Cu)	mg/L	0.00111	0.00172	0.000050	9851033
Dissolved Iron (Fe)	mg/L	0.0163	0.0036	0.0010	9851033
Dissolved Lead (Pb)	mg/L	0.000152	0.0000902	0.0000050	9851033
Dissolved Lithium (Li)	mg/L	<0.00050	<0.00050	0.00050	9851033
Dissolved Manganese (Mn)	mg/L	0.00504	0.00388	0.000050	9851033
Dissolved Molybdenum (Mo)	mg/L	0.000281	0.000233	0.000050	9851033
Dissolved Nickel (Ni)	mg/L	0.00833	0.00954	0.000020	9851033
Dissolved Selenium (Se)	mg/L	0.00830	0.00840	0.000040	9851033
Dissolved Silicon (Si)	mg/L	0.073	0.078	0.050	9851033
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9851033
Dissolved Strontium (Sr)	mg/L	0.342	0.337	0.000050	9851033
Dissolved Thallium (Tl)	mg/L	0.0000631	0.0000639	0.0000020	9851033
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9851033
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9851033
Dissolved Uranium (U)	mg/L	0.0309	0.0331	0.0000020	9851033
Dissolved Vanadium (V)	mg/L	<0.00020	0.00020	0.00020	9851033
Dissolved Zinc (Zn)	mg/L	0.0918	0.113	0.00010	9851033
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9851033
Dissolved Calcium (Ca)	mg/L	57.7	57.8	0.050	9849732
RDL = Reportable Detection Limit					



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BV Labs Job #: C032165
Report Date: 2020/05/20

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ DE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XT5466	XT5467		
Sampling Date		2020/05/11 15:00	2020/05/11 15:00		
COC Number		08483383	08483383		
	UNITS	FE:AS TRIAL (20:1)	FE:AS TRIAL (10:1)	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	0.076	0.084	0.050	9849732
Dissolved Potassium (K)	mg/L	0.361	0.332	0.050	9849732
Dissolved Sodium (Na)	mg/L	29.3	28.9	0.050	9849732
Dissolved Sulphur (S)	mg/L	48.0	48.0	3.0	9849732
RDL = Reportable Detection Limit					



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BV Labs Job #: C032165
Report Date: 2020/05/20

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ DE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XT5466	XT5467		
Sampling Date		2020/05/11 15:00	2020/05/11 15:00		
COC Number		08483383	08483383		
	UNITS	FE:AS TRIAL (20:1)	FE:AS TRIAL (10:1)	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	148	152	0.50	9849556
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00225	0.00357	0.00050	9851832
Total Antimony (Sb)	mg/L	0.0162	0.0172	0.000020	9851832
Total Arsenic (As)	mg/L	0.00621	0.0292	0.000020	9851832
Total Barium (Ba)	mg/L	0.00579	0.00362	0.000020	9851832
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9851832
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9851832
Total Boron (B)	mg/L	0.032	0.032	0.010	9851832
Total Cadmium (Cd)	mg/L	0.00164	0.00192	0.0000050	9851832
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9851832
Total Cobalt (Co)	mg/L	0.00207	0.00223	0.0000050	9851832
Total Copper (Cu)	mg/L	0.00209	0.00304	0.000050	9851832
Total Iron (Fe)	mg/L	0.0813	0.0461	0.0010	9851832
Total Lead (Pb)	mg/L	0.000671	0.000824	0.0000050	9851832
Total Lithium (Li)	mg/L	<0.00050	<0.00050	0.00050	9851832
Total Manganese (Mn)	mg/L	0.00498	0.00392	0.000050	9851832
Total Molybdenum (Mo)	mg/L	0.000288	0.000245	0.000050	9851832
Total Nickel (Ni)	mg/L	0.00857	0.00997	0.000020	9851832
Total Selenium (Se)	mg/L	0.00854	0.00867	0.000040	9851832
Total Silicon (Si)	mg/L	0.075	0.077	0.050	9851832
Total Silver (Ag)	mg/L	<0.0000050	0.0000051	0.0000050	9851832
Total Strontium (Sr)	mg/L	0.338	0.331	0.000050	9851832
Total Thallium (Tl)	mg/L	0.0000692	0.0000713	0.0000020	9851832
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9851832
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9851832
Total Uranium (U)	mg/L	0.0304	0.0340	0.0000020	9851832
Total Vanadium (V)	mg/L	<0.00020	0.00021	0.00020	9851832
Total Zinc (Zn)	mg/L	0.103	0.127	0.00010	9851832
Total Zirconium (Zr)	mg/L	0.00012	<0.00010	0.00010	9851832
Total Calcium (Ca)	mg/L	59.3	60.8	0.050	9849734
RDL = Reportable Detection Limit					



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BV Labs Job #: C032165
Report Date: 2020/05/20

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ DE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XT5466	XT5467		
Sampling Date		2020/05/11 15:00	2020/05/11 15:00		
COC Number		08483383	08483383		
	UNITS	FE:AS TRIAL (20:1)	FE:AS TRIAL (10:1)	RDL	QC Batch
Total Magnesium (Mg)	mg/L	0.075	0.089	0.050	9849734
Total Potassium (K)	mg/L	0.362	0.346	0.050	9849734
Total Sodium (Na)	mg/L	28.9	29.7	0.050	9849734
Total Sulphur (S)	mg/L	48.1	47.8	3.0	9849734
RDL = Reportable Detection Limit					



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.3°C
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Results relate only to the items tested.

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BV Labs Job #: C032165

Report Date: 2020/05/20

QUALITY ASSURANCE REPORT

Ensero Solutions

Client Project #: BMC-18-02

Site Location: KUDZ DE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9851033	Dissolved Aluminum (Al)	2020/05/15	98	80 - 120	103	80 - 120	<0.00050	mg/L	12	20
9851033	Dissolved Antimony (Sb)	2020/05/15	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.68	20
9851033	Dissolved Arsenic (As)	2020/05/15	103	80 - 120	107	80 - 120	<0.000020	mg/L	0.89	20
9851033	Dissolved Barium (Ba)	2020/05/15	100	80 - 120	103	80 - 120	<0.000020	mg/L	0.63	20
9851033	Dissolved Beryllium (Be)	2020/05/15	100	80 - 120	106	80 - 120	<0.000010	mg/L	NC	20
9851033	Dissolved Bismuth (Bi)	2020/05/15	91	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
9851033	Dissolved Boron (B)	2020/05/15	99	80 - 120	100	80 - 120	<0.010	mg/L	1.2	20
9851033	Dissolved Cadmium (Cd)	2020/05/15	97	80 - 120	104	80 - 120	<0.0000050	mg/L	2.7	20
9851033	Dissolved Chromium (Cr)	2020/05/15	99	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9851033	Dissolved Cobalt (Co)	2020/05/15	92	80 - 120	99	80 - 120	<0.0000050	mg/L	2.3	20
9851033	Dissolved Copper (Cu)	2020/05/15	93	80 - 120	102	80 - 120	<0.000050	mg/L	1.4	20
9851033	Dissolved Iron (Fe)	2020/05/15	98	80 - 120	104	80 - 120	<0.0010	mg/L	1.1	20
9851033	Dissolved Lead (Pb)	2020/05/15	99	80 - 120	102	80 - 120	<0.0000050	mg/L	4.2	20
9851033	Dissolved Lithium (Li)	2020/05/15	100	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9851033	Dissolved Manganese (Mn)	2020/05/15	97	80 - 120	102	80 - 120	<0.000050	mg/L	1.4	20
9851033	Dissolved Molybdenum (Mo)	2020/05/15	104	80 - 120	100	80 - 120	<0.000050	mg/L	7.4	20
9851033	Dissolved Nickel (Ni)	2020/05/15	94	80 - 120	102	80 - 120	<0.000020	mg/L	1.2	20
9851033	Dissolved Selenium (Se)	2020/05/15	100	80 - 120	107	80 - 120	<0.000040	mg/L	1.5	20
9851033	Dissolved Silicon (Si)	2020/05/15	101	80 - 120	104	80 - 120	<0.050	mg/L	0.15	20
9851033	Dissolved Silver (Ag)	2020/05/15	97	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9851033	Dissolved Strontium (Sr)	2020/05/15	NC	80 - 120	102	80 - 120	<0.000050	mg/L	0.084	20
9851033	Dissolved Thallium (Tl)	2020/05/15	94	80 - 120	96	80 - 120	<0.0000020	mg/L	1.4	20
9851033	Dissolved Tin (Sn)	2020/05/15	93	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9851033	Dissolved Titanium (Ti)	2020/05/15	104	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
9851033	Dissolved Uranium (U)	2020/05/15	104	80 - 120	102	80 - 120	<0.0000020	mg/L	1.6	20
9851033	Dissolved Vanadium (V)	2020/05/15	100	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9851033	Dissolved Zinc (Zn)	2020/05/15	NC	80 - 120	109	80 - 120	<0.00010	mg/L	1.6	20
9851033	Dissolved Zirconium (Zr)	2020/05/15	97	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9851832	Total Aluminum (Al)	2020/05/19	102	80 - 120	99	80 - 120	<0.00050	mg/L	9.5	20
9851832	Total Antimony (Sb)	2020/05/19	NC	80 - 120	105	80 - 120	<0.000020	mg/L	16	20
9851832	Total Arsenic (As)	2020/05/19	108	80 - 120	101	80 - 120	<0.000020	mg/L	6.9	20
9851832	Total Barium (Ba)	2020/05/19	102	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20



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BV Labs Job #: C032165

Report Date: 2020/05/20

QUALITY ASSURANCE REPORT(CONT'D)

Ensero Solutions

Client Project #: BMC-18-02

Site Location: KUDZ DE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9851832	Total Beryllium (Be)	2020/05/19	103	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9851832	Total Bismuth (Bi)	2020/05/19	101	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9851832	Total Boron (B)	2020/05/19	106	80 - 120	102	80 - 120	<0.010	mg/L	0.028	20
9851832	Total Cadmium (Cd)	2020/05/19	102	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9851832	Total Chromium (Cr)	2020/05/19	104	80 - 120	99	80 - 120	<0.00010	mg/L	8.2	20
9851832	Total Cobalt (Co)	2020/05/19	100	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9851832	Total Copper (Cu)	2020/05/19	98	80 - 120	97	80 - 120	<0.000050	mg/L	0.36	20
9851832	Total Iron (Fe)	2020/05/19	108	80 - 120	105	80 - 120	<0.0010	mg/L	3.2	20
9851832	Total Lead (Pb)	2020/05/19	103	80 - 120	101	80 - 120	<0.0000050	mg/L	3.1	20
9851832	Total Lithium (Li)	2020/05/19	101	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9851832	Total Manganese (Mn)	2020/05/19	103	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9851832	Total Molybdenum (Mo)	2020/05/19	111	80 - 120	107	80 - 120	<0.000050	mg/L	NC	20
9851832	Total Nickel (Ni)	2020/05/19	99	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9851832	Total Selenium (Se)	2020/05/19	109	80 - 120	103	80 - 120	<0.000040	mg/L	NC	20
9851832	Total Silicon (Si)	2020/05/19	106	80 - 120	103	80 - 120	<0.050	mg/L	1.1	20
9851832	Total Silver (Ag)	2020/05/19	102	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9851832	Total Strontium (Sr)	2020/05/19	NC	80 - 120	101	80 - 120	<0.000050	mg/L	14	20
9851832	Total Thallium (Tl)	2020/05/19	104	80 - 120	104	80 - 120	0.0000023, RDL=0.0000020 (1)	mg/L	NC	20
9851832	Total Tin (Sn)	2020/05/19	103	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9851832	Total Titanium (Ti)	2020/05/19	108	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9851832	Total Uranium (U)	2020/05/19	107	80 - 120	104	80 - 120	<0.0000020	mg/L	NC	20
9851832	Total Vanadium (V)	2020/05/19	106	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9851832	Total Zinc (Zn)	2020/05/19	NC	80 - 120	98	80 - 120	<0.00010	mg/L	1.8	20



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BV Labs Job #: C032165

Report Date: 2020/05/20

QUALITY ASSURANCE REPORT(CONT'D)

Ensero Solutions

Client Project #: BMC-18-02

Site Location: KUDZ DE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9851832	Total Zirconium (Zr)	2020/05/19	108	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement. Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference. Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy. Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination. NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration) NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL). (1) Method blank exceeds acceptance limits for TI- 2X RDL acceptable for low level metals determination.										



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BV Labs Job #: C032165
Report Date: 2020/05/20

Ensero Solutions
Client Project #: BMC-18-02
Site Location: KUDZ DE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ENSERO SOLUTIONS	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Contact Name:		Contact Name:	Andrew Gault; Kristen Piecowye	P.O. #/ AFE#:		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days	
Address:	750-789 WEST PENDER ST Vancouver, BC PC: V6C1H2	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02		
Phone:		Phone:	(867) 668-6463 vfriesen@ensero.com	Site Location:	Kudz Ze Kayah		
Email:		Email:	agault@ensero.com kpiecowye@ensero.com	Site #:			
				Sampled By:		Date Required:	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) <u>USE SCENARIO # 12485</u>		Analysis Requested LOW LEVEL TOTAL METALS LOW LEVEL DISSOLVED METALS		LABORATORY USE ONLY CUSTODY SEAL Present: Intact COOLING MEDIA PRESENT: Y/N COMMENTS	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	LOW LEVEL TOTAL METALS	LOW LEVEL DISSOLVED METALS	# OF CONTAINERS SUBMITTED
1 Fe:As Trial (20:1)		11-May-20	15:00	Water	X	X	4
2 Fe:As Trial (10:1)		11-May-20	15:00	Water	X	X	4
3							
4							
5							
6							
7							
8							
9							
10							
REUNQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Kristen Piecowye		2020-05-12		R. B. L. P. W. I.		2020-05-12	08:10



C032165_COC

APPENDIX B.

In Situ Data

APPENDIX B. **In Situ Data**

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A1. RAW YSI DATA

Table B1-1: YSI Data Collected Through *in situ* Testing

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (μS/cm)	Specific Conductivity - Field (μS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 1 - Top of Water Column	25-Mar-19	98.2	8.66	788	845	162.1	7.13	21.5
	8-Apr-19	1.8	0.16	775	821	-117.6	6.70	22.1
	23-Apr-19	2.0	0.18	804	839	-85.6	6.53	22.6
	7-May-19	13.3	1.17	783	841	44.2	6.39	21.4
	21-May-19	20.1	1.78	767	824	50.5	6.49	21.3
	5-Jun-19	31.2	2.73	746	794	267.2	6.52	21.9
	18-Jun-19	1.0	0.08	784	839	141.4	6.57	21.6
	3-Jul-19	13.3	1.13	766	794	164.8	6.62	23.2
	16-Jul-19	22.3	1.89	839	859	215.0	6.62	23.7
	12-Aug-19	60.6	5.28	798	844	216.9	6.75	22.1
	9-Sep-19	71.0	6.21	777	826	178.8	6.95	21.9
	7-Oct-19	76.5	6.85	762	831	205.0	7.06	20.6
	4-Nov-19	78.5	6.95	801	864	210.4	7.16	21.2
	2-Dec-19	68.5	6.10	800	868	235.6	7.20	20.9
	8-Jan-20	79.9	7.39	754	852	201.1	7.33	19.0
	15-Jan-20	84.9	7.94	734	837	294.6	7.40	18.5
	29-Jan-20	77.7	7.19	768	868	222.9	7.41	18.9
	13-Feb-20	0.9	0.08	768	873	-4.9	6.54	18.4
	26-Feb-20	3.5	0.32	760	866	-53.1	6.58	18.6
	25-Mar-20	2.3	0.21	783	866	-112.6	6.47	19.9

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 1 - Middle of Water Column	25-Mar-19	98.7	8.70	789	846	158.6	7.13	21.5
	8-Apr-19	0.7	0.06	772	822	-110.3	6.75	21.8
	23-Apr-19	0.8	0.07	802	841	-109.8	6.53	22.5
	7-May-19	6.8	0.60	781	842	41.2	6.40	21.2
	21-May-19	13.4	1.18	765	824	40.4	6.45	21.3
	5-Jun-19	26.6	2.33	746	795	257.3	6.47	21.8
	18-Jun-19	0.4	0.04	782	838	135.3	6.54	21.5
	3-Jul-19	9.6	0.83	764	795	158.6	6.60	23.0
	16-Jul-19	21.1	1.79	835	859	217.1	6.60	23.6
	12-Aug-19	60.1	5.24	796	844	218.9	6.73	22.0
	9-Sep-19	71.3	6.25	773	825	178.3	6.95	21.8
	7-Oct-19	75.3	6.75	761	831	205.4	7.06	20.6
	4-Nov-19	78.3	6.94	801	864	211.4	7.15	21.2
	2-Dec-19	65.4	5.84	798	868	235.3	7.19	20.8
	8-Jan-20	77.1	7.14	754	852	200.8	7.33	19.0
	15-Jan-20	82.7	7.77	729	837	295.4	7.40	18.3
	29-Jan-20	78.8	7.31	766	867	222.9	7.40	18.8
	13-Feb-20	1.0	0.11	763	874	-12.8	6.55	18.2
	26-Feb-20	3.7	0.38	756	866	-55.1	6.59	18.4
	25-Mar-20	2.4	0.22	779	865	-112.0	6.47	19.8
Trial 1 - Bottom of Water Column	25-Mar-19	98.3	8.67	789	846	154.1	7.12	21.4
	8-Apr-19	1.2	0.11	770	820	-92.3	6.81	21.8
	23-Apr-19	0.6	0.05	801	843	-125.1	6.55	22.6

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 1 - Bottom of Water Column	7-May-19	12.0	1.06	782	844	-75.3	6.51	21.2
	21-May-19	2.0	0.62	767	828	17.8	6.38	21.2
	5-Jun-19	28.2	2.48	748	799	253.8	6.39	21.7
	18-Jun-19	0.6	0.05	780	836	140.7	6.51	21.5
	3-Jul-19	8.4	0.72	763	798	166.9	6.58	22.7
	16-Jul-19	18.4	1.56	835	861	220.5	6.58	23.1
	12-Aug-19	56.4	4.93	796	845	220.3	6.73	22.0
	9-Sep-19	68.2	5.98	772	824	177.4	6.96	21.7
	7-Oct-19	77.5	6.95	762	833	206.1	7.04	20.5
	4-Nov-19	82.3	7.31	799	864	212.8	7.12	21.1
	2-Dec-19	58.8	5.26	798	870	234.8	7.16	20.7
	8-Jan-20	80.7	7.49	752	853	199.4	7.33	18.8
	15-Jan-20	84.3	7.92	729	837	296.5	7.21	18.2
	29-Jan-20	74.1	6.49	764	868	222.7	7.38	18.8
	13-Feb-20	1.2	0.11	763	876	-19.0	6.55	18.2
	26-Feb-20	5.0	0.47	752	864	-53.5	6.62	18.2
	25-Mar-20	2.6	0.24	777	865	-110.2	6.48	19.7
Trial 2 - Top of Water Column	25-Mar-19	96.2	8.47	784	842	168.8	7.13	21.5
	8-Apr-19	0.6	0.05	766	813	-101.4	6.40	22.0
	23-Apr-19	1.2	0.11	800	834	-73.6	6.36	22.6
	7-May-19	16.4	1.45	792	851	47.4	6.32	21.4
	21-May-19	20.0	1.77	774	832	30.4	6.39	21.4
	5-Jun-19	12.2	1.06	752	800	262.4	6.36	21.9

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 2 - Top of Water Column	18-Jun-19	0.4	0.04	786	836	22.7	6.37	21.6
	3-Jul-19	0.4	0.03	767	793	-189.1	6.25	23.2
	16-Jul-19	2.4	0.20	841	862	62.0	6.21	23.7
	12-Aug-19	16.6	1.45	801	848	69.5	6.26	22.1
	9-Sep-19	32.0	2.80	777	828	147.9	6.37	21.8
	7-Oct-19	53.2	4.76	788	859	212.3	6.43	20.7
	4-Nov-19	57.0	5.04	806	869	215.6	6.52	21.3
	2-Dec-19	78.9	7.02	805	873	205.8	6.56	20.9
	8-Jan-20	1.0	0.09	760	856	50.6	6.65	19.1
	15-Jan-20	1.8	0.17	736	839	-87.0	6.41	18.6
	29-Jan-20	1.4	0.13	778	877	-128.6	6.49	19.0
	5-Feb-20	0.6	0.05	782	882	-227.2	6.59	18.9
	13-Feb-20	1.3	0.12	782	887	-99.6	6.47	18.7
	11-Mar-20	27.7	2.61	764	881	196.4	6.45	18.0
	25-Mar-20	25.3	2.29	797	881	51.4	6.47	19.9
Trial 2 - Middle of Water Column	25-Mar-19	91.6	8.47	788	842	167.7	7.13	21.5
	8-Apr-19	0.4	0.04	766	816	-91.6	6.40	21.9
	23-Apr-19	0.8	0.07	796	839	-81.2	6.34	22.6
	7-May-19	15.9	1.40	790	851	30.8	6.32	21.3
	21-May-19	16.7	1.48	773	832	21.1	6.35	21.3
	5-Jun-19	5.4	0.47	751	800	264.0	6.30	21.8
	18-Jun-19	0.3	0.02	780	835	25.4	6.32	21.6
	3-Jul-19	0.4	0.03	762	792	-186.3	6.22	23.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 2 - Middle of Water Column	16-Jul-19	0.6	0.05	838	863	-56.6	6.19	23.5
	12-Aug-19	16.2	1.40	800	849	47.3	6.23	22.0
	9-Sep-19	32.1	2.82	776	829	143.1	6.39	21.7
	7-Oct-19	55.6	4.99	787	859	212.8	6.44	20.6
	4-Nov-19	55.1	4.88	806	868	216.1	6.53	21.2
	2-Dec-19	79.9	7.13	804	874	202.7	6.57	20.8
	8-Jan-20	1.0	0.09	758	856	31.5	6.64	19.0
	15-Jan-20	1.9	0.18	733	839	-84.5	6.41	18.4
	29-Jan-20	1.2	0.11	775	877	-128.1	6.50	19.0
	5-Feb-20	0.7	0.06	778	881	-218.1	6.60	18.8
	13-Feb-20	1.4	0.13	777	887	-101.7	6.48	18.3
	11-Mar-20	24.1	2.28	759	879	196.9	6.46	17.8
	25-Mar-20	17.8	1.64	794	881	45.4	6.47	19.8
Trial 2 - Bottom of Water Column	25-Mar-19	96.7	8.52	787	843	165.5	7.13	21.5
	8-Apr-19	0.7	0.06	765	815	-93.0	6.47	21.8
	23-Apr-19	0.5	0.05	796	838	-105.4	6.33	22.4
	7-May-19	11.7	1.04	790	852	-66.6	6.33	21.2
	21-May-19	10.8	0.96	772	833	-14.3	6.32	21.2
	5-Jun-19	4.2	0.37	750	801	274.0	6.22	21.7
	18-Jun-19	1.0	0.09	779	835	13.2	6.27	21.5
	3-Jul-19	0.6	0.05	759	792	-166.7	6.16	22.8
	16-Jul-19	2.0	0.17	836	864	-48.7	6.19	23.3
	12-Aug-19	16.5	1.44	804	854	15.1	6.21	21.9

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 2 - Bottom of Water Column	9-Sep-19	31.7	2.78	775	829	121.1	6.40	21.6
	7-Oct-19	51.9	4.65	786	859	212.8	6.46	20.6
	4-Nov-19	51.6	4.58	805	869	215.3	6.57	21.1
	2-Dec-19	69.6	6.22	813	886	196.5	6.60	20.7
	8-Jan-20	1.7	0.16	762	862	36.3	6.73	18.9
	15-Jan-20	1.6	0.15	734	842	-70.1	6.63	18.3
	29-Jan-20	1.1	0.10	773	877	-127.3	6.51	18.8
	5-Feb-20	0.8	0.08	777	882	-202.5	6.62	18.8
	13-Feb-20	2.1	0.18	774	887	-103.0	6.49	18.4
	11-Mar-20	26.5	2.51	761	882	197.9	6.38	17.8
	25-Mar-20	16.4	1.49	793	881	41.3	6.47	19.7
Trial 3 - Top of Water Column	25-Mar-19	58.9	5.18	777	832	116.1	6.94	21.6
	8-Apr-19	0.6	0.05	762	809	-130.4	6.48	22.0
	23-Apr-19	1.3	0.13	784	821	-10.1	6.48	22.6
	7-May-19	12.9	1.14	771	827	73.3	6.45	21.4
	21-May-19	31.1	2.74	753	809	72.6	6.54	21.4
	5-Jun-19	27.8	2.43	730	776	280.3	6.55	21.9
	18-Jun-19	0.5	0.05	763	816	-97.6	6.58	21.6
	3-Jul-19	1.5	0.13	746	772	-83.1	6.57	23.2
	16-Jul-19	11.1	0.94	808	829	113.4	6.58	23.6
	12-Aug-19	41.8	3.63	765	811	136.7	6.61	22.0
	9-Sep-19	44.2	3.88	738	787	162.6	6.74	21.7
	7-Oct-19	53.3	4.77	745	812	203.8	6.75	20.7

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 3 - Top of Water Column	4-Nov-19	53.0	4.69	759	817	173.0	6.81	21.3
	2-Dec-19	57.0	5.07	756	819	141.9	6.82	20.9
Trial 3 - Middle of Water Column	25-Mar-19	58.2	5.13	776	831	121.9	6.93	21.5
	8-Apr-19	0.4	0.04	759	808	-136.6	6.48	21.8
	23-Apr-19	1.1	0.09	783	822	12.5	6.47	22.5
	7-May-19	12.5	1.10	769	827	69.3	6.45	21.3
	21-May-19	24.6	2.17	751	809	50.5	6.48	21.3
	5-Jun-19	25.0	2.19	727	775	280.6	6.49	21.8
	18-Jun-19	0.3	0.03	762	815	-64.6	6.55	21.5
	3-Jul-19	0.8	0.07	742	772	-121.4	6.52	23.0
	16-Jul-19	11.2	0.95	805	829	112.0	6.55	23.5
	12-Aug-19	40.7	3.54	764	812	129.9	6.59	21.9
	9-Sep-19	42.4	3.72	736	787	159.1	6.74	21.6
	7-Oct-19	51.2	4.59	744	812	204.1	6.75	20.6
	4-Nov-19	50.6	4.48	758	817	167.9	6.80	21.2
	2-Dec-19	55.0	4.90	755	820	134.6	6.80	20.9
Trial 3 - Bottom of Water Column	25-Mar-19	57.8	5.09	775	831	135.8	6.92	21.5
	8-Apr-19	0.5	0.04	759	809	-135.8	6.49	21.7
	23-Apr-19	0.9	0.08	780	823	-50.1	6.50	22.4
	7-May-19	14.4	1.27	767	827	41.6	6.45	21.2
	21-May-19	19.6	1.74	750	808	43.7	6.44	21.2
	5-Jun-19	27.9	2.45	726	775	283.8	6.42	21.7
	18-Jun-19	1.0	0.09	763	818	-104.9	6.47	21.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 3 - Bottom of Water Column	3-Jul-19	1.4	0.12	740	773	-119.5	6.44	22.8
	16-Jul-19	11.1	0.94	803	830	52.5	6.52	23.3
	12-Aug-19	37.1	3.22	763	811	105.8	6.50	21.9
	9-Sep-19	45.2	3.92	735	786	155.7	6.74	21.5
	7-Oct-19	50.9	4.95	742	811	204.9	6.73	20.6
	4-Nov-19	46.3	4.11	757	818	155.6	6.80	21.1
	2-Dec-19	53.1	4.70	754	820	120.7	6.77	20.8
Trial 4 - Top of Water Column	25-Mar-19	68.5	6.02	784	839	128.7	6.94	21.6
	8-Apr-19	0.8	0.07	765	813	-165.0	6.27	22.0
	23-Apr-19	0.6	0.05	796	835	-100.1	6.35	22.6
	7-May-19	10.2	0.90	783	841	68.4	6.33	21.4
	21-May-19	7.0	0.62	765	822	61.6	6.39	21.3
	5-Jun-19	8.8	0.77	739	785	210.8	6.41	21.9
	18-Jun-19	1.0	0.09	771	824	-151.9	6.45	21.6
	3-Jul-19	5.2	0.44	747	774	-258.4	6.42	23.2
	16-Jul-19	0.9	0.08	807	830	-164.5	6.41	23.6
	12-Aug-19	9.6	0.84	766	813	69.8	6.42	22.0
	9-Sep-19	20.6	1.81	739	789	160.5	6.54	21.7
	7-Oct-19	42.1	3.77	747	814	208.1	6.57	20.7
	4-Nov-19	38.7	3.42	761	819	180.8	6.63	21.3
	2-Dec-19	44.1	3.93	758	821	111.5	6.66	21.0
Trial 4 - Middle of Water Column	25-Mar-19	67.6	5.96	782	838	127.4	6.93	21.5
	8-Apr-19	0.9	0.08	764	813	-164.4	6.29	21.8

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 4 - Middle of Water Column	23-Apr-19	0.5	0.04	796	835	-110.5	6.34	22.5
	7-May-19	7.5	0.66	781	841	64.5	6.32	21.3
	21-May-19	1.4	0.13	765	824	62.4	6.34	21.2
	5-Jun-19	1.9	0.17	740	788	162.7	6.40	21.8
	18-Jun-19	0.7	0.06	769	823	-152.5	6.41	21.5
	3-Jul-19	5.5	0.47	742	773	-256.9	6.39	22.9
	16-Jul-19	0.8	0.07	803	828	-158.3	6.38	23.4
	12-Aug-19	10.1	0.88	765	813	43.1	6.39	21.9
	9-Sep-19	22.0	1.93	738	789	157.9	6.55	21.6
	7-Oct-19	40.0	3.58	746	814	208.2	6.58	20.6
	4-Nov-19	30.4	2.70	760	819	178.7	6.62	21.2
	2-Dec-19	34.3	3.06	757	822	99.6	6.64	20.9
Trial 4 - Bottom of Water Column	25-Mar-19	68.2	5.01	781	838	125.1	6.92	21.4
	8-Apr-19	0.9	0.08	763	813	-161.9	6.33	21.8
	23-Apr-19	0.5	0.04	793	836	-114.1	6.34	22.4
	7-May-19	8.8	0.78	780	842	61.4	6.35	21.2
	21-May-19	1.2	0.11	764	824	20.2	6.32	21.2
	5-Jun-19	0.9	0.08	740	791	157.9	6.25	21.7
	18-Jun-19	1.3	0.11	768	824	-139.1	6.37	21.4
	3-Jul-19	10.4	0.89	736	768	-253.5	6.27	22.8
	16-Jul-19	1.3	0.11	801	829	-153.4	6.30	23.2
	12-Aug-19	9.7	0.84	767	816	12.9	6.35	21.9
	9-Sep-19	14.4	1.27	737	790	135.5	6.55	21.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 4 - Bottom of Water Column	7-Oct-19	39.0	3.50	745	814	208.2	6.59	20.6
	4-Nov-19	27.6	2.45	759	819	177.6	6.63	21.1
	2-Dec-19	25.0	2.23	760	826	79.0	6.64	20.8
Trial 5 - Top of Water Column	25-Mar-19	112.2	13.73	534	825	333.2	6.94	6.5
	8-Apr-19	1.9	0.24	519	804	120.8	6.82	6.4
	23-Apr-19	1.0	0.12	527	809	127.2	6.44	6.8
	7-May-19	0.6	0.08	535	829	91.9	6.41	6.4
	21-May-19	1.4	0.17	524	818	86.5	6.53	6.2
	5-Jun-19	3.9	0.47	513	783	145.4	6.43	7.0
	18-Jun-19	0.9	0.11	551	841	121.3	6.46	7.0
	3-Jul-19	1.2	0.14	510	789	-95.8	6.33	6.5
	16-Jul-19	0.8	0.10	549	860	-56.0	6.36	6.1
	12-Aug-19	8.3	1.02	525	817	109.3	6.25	6.3
	9-Sep-19	24.0	2.31	717	846	190.9	6.41	17.0
	7-Oct-19	59.0	7.25	567	879	238.4	6.54	6.4
	4-Nov-19	80.5	9.94	571	889	210.0	6.63	6.2
	2-Dec-19	83.8	10.15	583	889	145.2	6.59	7.0
	8-Jan-20	73.4	8.89	569	866	162.4	6.63	7.0
	15-Jan-20	83.2	10.06	561	855	176.0	6.66	7.0
	29-Jan-20	79.3	9.66	579	888	113.0	6.66	6.8
	13-Feb-20	2.1	0.24	575	885	63.8	6.68	6.7
	26-Feb-20	4.1	0.49	573	881	45.0	6.52	6.7
	25-Mar-20	5.2	0.64	568	874	91.6	6.48	6.7

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 5 - Middle of Water Column	25-Mar-19	112.5	13.78	535	825	325.1	6.94	6.6
	8-Apr-19	1.2	0.14	519	804	121.0	6.85	6.4
	23-Apr-19	0.8	0.10	523	809	120.3	6.44	6.5
	7-May-19	0.8	0.10	534	829	94.6	6.42	6.3
	21-May-19	1.2	0.15	523	817	87.3	6.53	6.2
	5-Jun-19	3.6	0.44	513	783	150.9	6.35	6.9
	18-Jun-19	1.0	0.12	551	840	127.6	6.42	7.0
	3-Jul-19	1.1	0.13	507	789	-95.2	6.32	6.3
	16-Jul-19	0.8	0.10	546	859	-52.0	6.36	5.9
	12-Aug-19	5.1	0.63	523	816	109.0	6.23	6.2
	9-Sep-19	23.2	2.26	710	846	193.4	6.40	16.6
	7-Oct-19	58.2	7.15	567	879	239.2	6.54	6.4
	4-Nov-19	81.2	10.02	570	890	210.4	6.65	6.2
	2-Dec-19	84.0	10.18	583	889	144.1	6.60	7.0
	8-Jan-20	73.5	8.91	568	865	162.3	6.66	7.0
	15-Jan-20	83.5	10.12	560	855	174.3	6.67	7.0
	29-Jan-20	78.3	9.54	580	889	111.9	6.65	6.8
	13-Feb-20	2.3	0.28	575	885	63.5	6.69	6.7
	26-Feb-20	4.1	0.50	573	881	45.2	6.52	6.7
	25-Mar-20	5.1	0.62	567	873	90.1	6.49	6.7
Trial 5 - Bottom of Water Column	25-Mar-19	115.0	14.08	535	826	308.5	6.97	6.5
	8-Apr-19	2.4	0.30	519	805	120.2	6.94	6.4
	23-Apr-19	0.9	0.11	522	808	113.1	6.45	6.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 5 - Bottom of Water Column	7-May-19	2.8	0.33	531	825	101.6	6.35	6.4
	21-May-19	1.3	0.16	526	817	96.2	6.39	6.3
	5-Jun-19	3.6	0.44	511	783	169.8	6.36	6.8
	18-Jun-19	2.6	0.31	551	840	136.0	6.45	7.0
	3-Jul-19	1.2	0.15	507	789	-84.4	6.30	6.3
	16-Jul-19	1.8	0.22	545	859	-44.5	6.28	5.9
	12-Aug-19	3.4	0.42	522	815	108.3	6.23	6.2
	9-Sep-19	23.5	2.31	703	845	195.7	6.40	16.2
	7-Oct-19	57.9	7.11	568	880	240.2	6.55	6.5
	4-Nov-19	82.6	10.19	571	890	210.7	6.67	6.2
	2-Dec-19	84.7	10.27	583	889	143.5	6.60	7.0
	8-Jan-20	75.4	9.13	568	867	162.5	6.69	7.0
	15-Jan-20	86.5	10.49	559	854	173.4	6.68	6.9
	29-Jan-20	77.1	9.38	579	888	111.0	6.66	6.8
	13-Feb-20	2.9	0.35	577	887	63.2	6.71	6.7
	26-Feb-20	4.4	0.54	573	882	45.0	6.53	6.7
	25-Mar-20	5.2	0.64	569	874	88.2	6.49	6.9
Trial 6 - Top of Water Column	25-Mar-19	90.4	7.93	781	833	183.2	7.41	21.7
	8-Apr-19	2.9	0.25	761	808	-37.5	6.66	22.0
	23-Apr-19	0.7	0.06	781	817	-12.2	6.52	22.7
	7-May-19	3.3	0.29	780	836	27.2	6.51	21.4
	21-May-19	1.9	0.17	763	820	-31.3	6.58	21.4
	5-Jun-19	13.2	1.15	738	784	183.7	6.55	22.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 6 - Top of Water Column	18-Jun-19	1.3	0.12	773	825	-39.8	6.60	21.7
	3-Jul-19	2.9	0.25	762	787	-215.9	6.50	23.3
	16-Jul-19	5.9	0.49	830	851	72.2	6.47	23.6
	12-Aug-19	42.3	3.68	791	839	84.5	6.50	22.0
	9-Sep-19	49.6	4.34	771	820	179.5	6.63	21.9
	7-Oct-19	61.5	5.50	782	851	222.3	6.66	20.7
	4-Nov-19	67.2	5.94	798	859	207.4	6.75	21.3
	2-Dec-19	76.7	6.82	796	863	114.9	6.79	21.0
	8-Jan-20	7.9	0.73	752	846	121.6	6.84	19.2
	15-Jan-20	2.6	0.24	729	831	90.3	6.80	18.6
	29-Jan-20	1.5	0.14	767	863	-111.7	6.51	19.1
	5-Feb-20	1.2	0.11	775	872	-273.2	6.57	19.1
	13-Feb-20	0.8	0.08	775	876	-116.0	6.48	18.9
	11-Mar-20	3.3	0.31	755	870	-9.8	6.48	18.0
	25-Mar-20	3.1	0.28	788	871	-72.0	6.47	19.9
Trial 6 - Middle of Water Column	25-Mar-19	89.5	7.88	776	829	184.3	7.39	21.6
	8-Apr-19	0.5	0.04	760	808	-42.0	6.63	21.9
	23-Apr-19	0.5	0.04	780	816	-50.1	6.53	22.6
	7-May-19	0.7	0.06	777	836	25.0	6.52	21.3
	21-May-19	1.5	0.14	761	819	-23.8	6.52	21.3
	5-Jun-19	0.9	0.08	738	786	109.5	6.55	21.8
	18-Jun-19	1.1	0.09	771	824	-39.6	6.56	21.6
	3-Jul-19	2.8	0.24	757	787	-214.6	6.46	23.1

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 6 - Middle of Water Column	16-Jul-19	2.5	0.21	826	850	-18.1	6.44	23.5
	12-Aug-19	41.9	3.62	790	840	67.4	6.48	21.9
	9-Sep-19	49.5	4.34	769	820	177.0	6.63	21.7
	7-Oct-19	63.2	5.66	780	851	220.4	6.66	20.6
	4-Nov-19	66.9	5.92	797	859	206.7	6.74	21.2
	2-Dec-19	75.5	6.73	795	863	109.9	6.79	20.9
	8-Jan-20	6.2	0.57	750	846	119.6	6.84	19.1
	15-Jan-20	1.5	0.14	726	830	80.9	6.80	18.4
	29-Jan-20	1.6	0.15	764	862	-112.5	6.50	19.0
	5-Feb-20	1.2	0.11	771	871	-272.9	6.57	18.8
	13-Feb-20	0.8	0.08	770	875	-118.3	6.49	18.5
	11-Mar-20	3.3	0.32	753	870	-33.6	6.48	18.0
	25-Mar-20	2.3	0.21	786	871	-80.8	6.47	19.9
Trial 6 - Bottom of Water Column	25-Mar-19	91.1	8.02	774	828	183.2	7.34	21.5
	8-Apr-19	0.7	0.06	756	807	-38.1	6.53	21.8
	23-Apr-19	0.3	0.03	775	818	-65.9	6.54	22.5
	7-May-19	1.0	0.09	775	835	10.3	6.52	21.3
	21-May-19	1.9	0.17	761	819	-19.4	6.48	21.3
	5-Jun-19	0.6	0.05	736	786	65.9	6.51	21.8
	18-Jun-19	1.4	0.12	769	824	-34.5	6.50	21.6
	3-Jul-19	2.3	0.20	754	786	-208.5	6.38	22.9
	16-Jul-19	2.7	0.23	821	848	-18.4	6.41	23.4
	12-Aug-19	41.3	3.60	790	838	52.1	6.43	21.9

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 6 - Bottom of Water Column	9-Sep-19	51.9	4.56	767	819	173.7	6.63	21.7
	7-Oct-19	60.5	5.42	779	850	217.9	6.66	20.6
	4-Nov-19	68.8	6.10	796	859	205.8	6.73	21.2
	2-Dec-19	74.9	6.42	795	864	104.1	6.79	20.8
	8-Jan-20	9.1	0.84	749	846	113.2	6.81	19.0
	15-Jan-20	1.4	0.13	724	830	72.0	6.68	18.3
	29-Jan-20	1.6	0.15	763	862	-111.8	6.51	18.9
	5-Feb-20	1.4	0.13	770	874	-271.8	6.59	18.8
	13-Feb-20	1.0	0.09	767	876	-119.0	6.50	18.5
	11-Mar-20	4.4	0.42	749	869	-35.5	6.46	17.8
	25-Mar-20	2.8	0.25	786	874	-87.3	6.48	19.8
Trial 7 - Top of Water Column	25-Mar-19	98.2	8.60	768	817	178.9	7.27	21.8
	8-Apr-19	89.6	7.82	758	805	96.5	7.19	22.0
	23-Apr-19	86.1	7.53	784	820	69.3	7.14	22.6
	7-May-19	77.9	6.87	781	837	130.7	7.25	21.5
	21-May-19	82.0	7.23	766	822	125.3	7.33	21.4
	5-Jun-19	69.9	6.11	744	790	263.7	7.32	21.9
	18-Jun-19	78.7	6.90	784	837	193.3	7.34	21.7
	3-Jul-19	79.8	6.80	770	797	144.4	7.41	23.2
	16-Jul-19	69.4	5.87	831	854	169.9	7.38	23.6
	12-Aug-19	71.4	6.24	793	840	136.1	7.34	22.0
	9-Sep-19	82.5	7.23	769	819	168.1	7.48	21.8
	7-Oct-19	81.4	7.24	781	850	206.3	7.46	20.7

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 7 - Top of Water Column	4-Nov-19	82.7	7.31	795	855	189.1	7.46	21.3
	2-Dec-19	79.1	7.03	793	859	119.6	7.46	20.9
Trial 7 - Middle of Water Column	25-Mar-19	98.0	8.30	762	816	180.0	7.25	21.5
	8-Apr-19	89.1	7.80	755	805	86.2	7.13	21.8
	23-Apr-19	85.6	7.24	785	823	84.8	7.17	22.5
	7-May-19	77.6	6.76	778	837	122.4	7.25	21.3
	21-May-19	82.7	7.31	764	822	120.7	7.29	21.3
	5-Jun-19	69.6	6.09	742	789	262.8	7.26	21.8
	18-Jun-19	77.6	6.84	782	836	183.3	7.34	21.6
	3-Jul-19	78.8	6.73	767	796	141.5	7.38	23.1
	16-Jul-19	65.8	5.58	828	853	167.4	7.35	23.5
	12-Aug-19	70.9	6.18	790	841	126.7	7.29	21.8
	9-Sep-19	82.8	7.28	767	819	167.5	7.47	21.6
	7-Oct-19	80.2	7.19	780	850	206.5	7.45	20.6
	4-Nov-19	82.5	7.30	794	855	189.8	7.41	21.2
	2-Dec-19	77.8	6.93	792	859	118.6	7.43	20.9
Trial 7 - Bottom of Water Column	25-Mar-19	97.7	8.61	760	815	183.0	7.25	21.5
	8-Apr-19	88.0	7.71	754	804	72.5	7.06	21.8
	23-Apr-19	84.6	7.16	782	820	93.7	7.18	22.4
	7-May-19	75.6	6.69	776	836	113.8	7.19	21.3
	21-May-19	78.3	6.93	761	819	116.2	7.18	21.3
	5-Jun-19	68.1	5.97	740	789	261.7	7.17	21.8
	18-Jun-19	79.6	6.00	780	837	181.2	7.16	21.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 7 - Bottom of Water Column	3-Jul-19	79.7	6.84	760	793	138.8	7.20	22.8
	16-Jul-19	76.8	6.55	822	852	164.5	7.12	23.2
	12-Aug-19	70.1	6.12	788	840	118.4	7.21	21.8
	9-Sep-19	82.9	7.30	766	820	167.2	7.42	21.5
	7-Oct-19	79.2	7.09	778	849	207.0	7.42	20.6
	4-Nov-19	82.4	7.30	792	855	191.3	7.28	21.2
	2-Dec-19	75.1	6.70	791	859	117.5	7.36	20.9
Trial 8 - Top of Water Column	25-Mar-19	60.4	5.29	764	814	171.3	7.01	21.7
	8-Apr-19	58.1	5.50	753	799	98.0	7.02	21.9
	23-Apr-19	51.1	4.39	774	812	90.9	6.96	22.5
	7-May-19	54.2	4.78	768	825	129.3	6.93	21.4
	21-May-19	52.7	4.65	752	808	129.4	6.98	21.4
	5-Jun-19	47.5	4.15	727	773	279.5	6.90	21.9
	18-Jun-19	54.2	4.75	765	817	202.7	6.92	21.7
	3-Jul-19	58.6	5.00	746	774	152.5	7.08	23.1
	16-Jul-19	48.3	4.09	807	829	180.6	7.02	23.6
	12-Aug-19	56.6	4.92	766	813	152.0	6.98	22.0
	9-Sep-19	56.8	4.99	739	790	173.2	7.02	21.6
	7-Oct-19	64.2	5.73	750	817	219.4	6.99	20.7
	4-Nov-19	62.3	5.51	762	821	192.6	7.03	21.3
	2-Dec-19	73.1	6.50	760	823	133.4	7.06	21.0
Trial 8 - Middle of Water Column	25-Mar-19	61.5	5.41	758	813	172.4	7.00	21.5
	8-Apr-19	56.7	4.97	749	799	95.8	7.03	21.8

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)
Trial 8 - Middle of Water Column	23-Apr-19	50.5	4.30	772	812	95.2	6.94	22.5
	7-May-19	51.7	4.57	766	824	129.8	6.94	21.3
	21-May-19	51.7	4.58	750	807	132.1	6.94	21.3
	5-Jun-19	42.3	3.71	725	773	280.1	6.86	21.8
	18-Jun-19	54.3	4.78	763	817	204.0	6.89	21.5
	3-Jul-19	57.0	4.89	744	774	152.6	7.04	23.0
	16-Jul-19	51.1	4.34	802	828	181.6	7.00	23.3
	12-Aug-19	57.1	4.95	764	813	152.7	6.94	21.9
	9-Sep-19	54.3	4.79	736	789	172.8	7.03	21.5
	7-Oct-19	63.4	5.68	748	817	220.0	6.99	20.6
	4-Nov-19	59.7	5.29	761	821	192.6	7.05	21.2
	2-Dec-19	69.1	6.15	759	823	131.7	7.04	20.9
Trial 8 - Bottom of Water Column	25-Mar-19	62.3	5.49	758	814	174.2	6.99	21.4
	8-Apr-19	52.6	4.62	748	799	94.0	7.05	21.7
	23-Apr-19	50.6	4.29	770	813	98.1	6.93	22.3
	7-May-19	52.3	4.63	764	824	130.6	6.97	21.2
	21-May-19	51.6	4.57	748	806	134.7	6.93	21.2
	5-Jun-19	43.3	3.80	724	773	283.3	6.80	21.7
	18-Jun-19	53.5	4.72	761	816	206.0	6.84	21.4
	3-Jul-19	56.6	4.88	739	773	155.1	6.97	22.7
	16-Jul-19	50.3	4.29	797	827	181.2	6.98	23.2
	12-Aug-19	58.4	5.11	762	812	152.8	6.91	21.8
	9-Sep-19	54.5	4.81	735	789	172.4	7.08	21.4

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)
Trial 8 - Bottom of Water Column	7-Oct-19	63.9	5.79	748	817	220.8	7.00	20.6
	4-Nov-19	59.7	5.29	760	820	192.7	7.13	21.1
	2-Dec-19	52.0	4.65	762	828	113.0	7.01	20.8

Table shading: blue = Stage 1; green = Stage 2

A2. WATER METALS DATA

Table B2-1: Dissolved (D) and Total (T) Metals in Water Collected Through Pilot-scale Testing

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Barrel Leach Test	2018-10-11	--	0.000149	--	0.000284	--	0.0000056	--	0.129	--	0.00038	--	0.00036	--	0.00125	--	0.0167
Barrel Leach Test	2018-10-15	--	0.000155	--	0.00028	--	0	--	0.127	--	0.000359	--	0.00037	--	0.00124	--	0.0167
In Pit Trial - 1L Bench-Scale (10X)	2019-02-22	0.00252	--	0.517	--	0.0406	--	0.169	--	0.183	--	0.106	--	0.319	--	3.05	--
In Pit Trial - 500mL Bench-Scale (20X)	2019-02-22	0.00484	--	1.19	--	0.0855	--	0.186	--	0.0535	--	0.209	--	0.375	--	6.9	--
Trial 1	2018-12-27	0.000981	--	0.00077	--	0.0000748	--	0.0119	--	0.00175	--	0.000703	--	0.00277	--	0.0141	--
Trial 1	2019-01-03	0.00149	0.00157	0.0011	0.00127	0.0000924	0.0000947	0.0115	0.0123	0.00172	0.00293	0.000804	0.00088	0.0031	0.00336	0.0142	0.0154
Trial 1	2019-02-01	0.00348	0.0035	0.00208	0.00221	0.000111	0.000129	0.0099	0.0136	0.00242	0.00668	0.000982	0.00102	0.0053	0.00538	0.0124	0.0156
Trial 1	2019-03-11	0.0246	0.0252	0.0573	0.06	0.00422	0.00427	0.0186	0.0183	0.0247	0.0264	0.0106	0.011	0.0408	0.041	0.322	0.316
Trial 1	2019-03-25	0.025	0.025	0.0486	0.0485	0.00393	0.00389	0.0175	0.0187	0.00906	0.0198	0.0114	0.0115	0.0442	0.0439	0.305	0.308
Trial 1	2019-04-08	0.00271	0.0108	0.0351	0.0422	0.0000916	0.000436	0.000739	0.00356	0.000774	0.00241	0.000898	0.00156	0.0376	0.0354	0.0308	0.165
Trial 1	2019-04-23	0.00262	0.0049	0.0386	0.0422	0.0000495	0.000182	0.000719	0.0019	0.000597	0.0015	0.00216	0.0026	0.0296	0.0292	0.0194	0.06
Trial 1	2019-05-07	0.00396	0.00425	0.0421	0.043	0.000036	0.00009	0.000413	0.00084	0.000811	0.00163	0.0027	0.00323	0.0267	0.0277	0.0536	0.0596
Trial 1	2019-05-21	0.00458	0.00472	0.0408	0.0435	0.0000751	0.0000916	0.000626	0.000932	0.000712	0.00161	0.00314	0.00289	0.0273	0.0283	0.0353	0.0323
Trial 1	2019-06-05	0.0057	0.0056	0.0443	0.0449	0.000127	0.000143	0.000746	0.000959	0.000356	0.00115	0.00279	0.00327	0.0268	0.0281	0.0339	0.0347
Trial 1	2019-06-18	0.00791	0.00816	0.0471	0.0486	0.0000411	0.0000633	0.000496	0.00093	0.0000931	0.000774	0.00366	0.00395	0.0231	0.0284	0.0375	0.0377
Trial 1	2019-07-03	0.00976	0.0098	0.0514	0.0527	0.000031	0.0000376	0.000591	0.000668	0.0000922	0.000353	0.00318	0.00418	0.0264	0.027	0.038	0.0392
Trial 1	2019-07-16	0.0129	0.0128	0.0544	0.0545	0.0000833	0.0000857	0.000681	0.000858	0.0000981	0.000517	0.00318	0.0031	0.0269	0.0274	0.0616	0.0618

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Trial 1	2019-08-12	0.0144	0.0143	0.0539	0.0532	0.000835	0.000832	0.00168	0.00179	0.0000675	0.000241	0.00451	0.00409	0.0249	0.0253	0.0977	0.1
Trial 1	2019-09-09	0.0151	0.0155	0.0526	0.0534	0.00136	0.00133	0.00416	0.00384	0.000112	0.000163	0.00513	0.00483	0.0286	0.028	0.135	0.124
Trial 1	2019-10-07	0.0165	0.0167	0.0501	0.051	0.00139	0.00139	0.00467	0.00478	0.0000634	0.000144	0.00489	0.00516	0.0302	0.0305	0.132	0.135
Trial 1	2019-11-04	0.0204	0.0209	0.0518	0.0526	0.00168	0.00171	0.00572	0.00583	0.000056	0.0000932	0.00625	0.0063	0.0331	0.0332	0.163	0.163
Trial 1	2019-12-02	0.0216	0.0206	0.0521	0.0525	0.00171	0.0017	0.00587	0.00572	0.0000374	0.0000578	0.006	0.00631	0.0343	0.0341	0.164	0.152
Trial 1	2020-01-08	0.0237	0.0238	0.0483	0.0495	0.00165	0.00173	0.00513	0.00554	0.0000202	0.000114	0.00731	0.00701	0.0353	0.0355	0.121	0.13
Trial 1	2020-01-15	0.0236	0.0237	0.0457	0.0462	0.00164	0.00169	0.00534	0.0055	0.0000297	0.000177	0.00712	0.00716	0.0365	0.0361	0.115	0.118
Trial 1	2020-01-29	0.0231	0.0229	0.0422	0.0432	0.00145	0.00148	0.00566	0.00571	0.000391	0.000977	0.00835	0.00935	0.0339	0.0335	0.0883	0.0884
Trial 1	2020-02-13	0.0021	0.00574	0.0566	0.0552	0.000199	0.000755	0.00107	0.00285	0.00135	0.0021	0.023	0.0352	0.0326	0.034	0.0148	0.0534
Trial 1	2020-02-26	0.00134	0.00225	0.0419	0.0432	0.0000702	0.00025	0.000394	0.00102	0.000635	0.00106	0.0137	0.0228	0.024	0.0256	0.00737	0.0224
Trial 1	2020-03-25	0.00122	0.00149	0.0292	0.0291	0.0000566	0.00014	0.000261	0.0005	0.000297	0.000674	0.041	0.0774	0.012	0.0135	0.00565	0.0136
Trial 2	2018-12-27	0.000767	--	0.00113	--	0.00008	--	0.0108	--	0.00169	--	0.000844	--	0.00255	--	0.0141	--
Trial 2	2019-01-03	0.00103	0.00108	0.0016	0.00184	0.0000863	0.0000968	0.0104	0.0116	0.00134	0.00256	0.000847	0.000976	0.00255	0.00278	0.0136	0.0158
Trial 2	2019-02-01	0.00244	0.00249	0.00388	0.00371	0.000109	0.000117	0.00913	0.0106	0.00108	0.00296	0.00108	0.00115	0.00457	0.00463	0.0126	0.0162
Trial 2	2019-03-11	0.0238	0.0232	0.0596	0.0596	0.0043	0.00415	0.0188	0.0183	0.021	0.0234	0.0107	0.0112	0.0392	0.041	0.328	0.322
Trial 2	2019-03-25	0.0235	0.0236	0.0463	0.0485	0.00382	0.00392	0.0159	0.018	0.00545	0.0152	0.0116	0.0116	0.0435	0.0434	0.292	0.302
Trial 2	2019-04-08	0.00473	0.0136	0.05	0.0521	0.000143	0.000636	0.00152	0.00393	0.000798	0.00219	0.00104	0.00201	0.0325	0.0347	0.0757	0.211
Trial 2	2019-04-23	0.00177	0.00406	0.0401	0.045	0.0000513	0.000145	0.000493	0.00109	0.000426	0.000951	0.00252	0.002	0.0271	0.0297	0.0258	0.0774
Trial 2	2019-05-07	0.00314	0.00334	0.0433	0.0438	0.000025	0.000058	0.000327	0.00101	0.000259	0.000799	0.00321	0.00375	0.026	0.0256	0.0151	0.0177
Trial 2	2019-05-21	0.00366	0.00354	0.0423	0.0411	0.0000191	0.0000318	0.000384	0.000664	0.000273	0.000729	0.00337	0.00343	0.0256	0.0262	0.0171	0.0146
Trial 2	2019-06-05	0.0044	0.00442	0.0428	0.0435	0.0000204	0.0000285	0.000421	0.000548	0.000146	0.000421	0.00295	0.00334	0.0249	0.0262	0.0202	0.0199
Trial 2	2019-06-18	0.00487	0.00492	0.0439	0.0468	<0.0000050	0.0000124	0.000177	0.00048	0.000056	0.000315	0.00215	0.00239	0.0189	0.0218	0.0203	0.0211
Trial 2	2019-07-03	0.000489	0.000716	0.0294	0.0292	<0.0000050	<0.0000050	0.000055	0.0001	0.0000399	0.00018	0.0157	0.0137	0.0143	0.0138	0.0018	0.0068 7

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Trial 2	2019-07-16	0.00105	0.00113	0.0352	0.0358	<0.0000050	0.0000052	<0.000050	0.000068	0.0000417	0.000109	0.00441	0.0076	0.0115	0.0118	0.00497	0.006
Trial 2	2019-08-12	0.00191	0.00195	0.0402	0.0402	<0.0000050	0.0000081	0.000077	0.000125	0.000012	0.00013	0.00143	0.00135	0.00881	0.00908	0.00865	0.00927
Trial 2	2019-09-09	0.00225	0.00232	0.0453	0.0432	0.0000469	0.0000493	0.000307	0.000311	0.0000245	0.000118	0.00237	0.00231	0.0085	0.00865	0.0204	0.0181
Trial 2	2019-10-07	0.00495	0.00503	0.0475	0.0468	0.000193	0.000204	0.000649	0.000653	0.0000555	0.000141	0.00229	0.00232	0.0122	0.0122	0.0478	0.0439
Trial 2	2019-11-04	0.00709	0.00733	0.0486	0.05	0.000467	0.000475	0.00106	0.00119	0.0000355	0.000116	0.00291	0.00306	0.0155	0.0155	0.0757	0.076
Trial 2	2019-12-02	0.00727	0.00718	0.0491	0.0499	0.000518	0.000525	0.00142	0.00128	0.0000241	0.0000386	0.00275	0.00294	0.0159	0.0161	0.0778	0.0702
Trial 2	2020-01-15	0.00187	0.00256	0.0328	0.0318	0.000121	0.000314	0.000506	0.000677	0.0000378	0.0000909	0.0111	0.0126	0.0149	0.0166	0.0294	0.0643
Trial 2	2020-01-29	0.00102	0.00127	0.0323	0.0318	0.000036	0.0000798	0.000236	0.00023	0.0000313	0.000127	0.0221	0.039	0.00769	0.00778	0.00732	0.0518
Trial 2	2020-02-05	0.000577	0.00127	0.0215	0.0305	<0.0000050	0.0000822	<0.000050	0.000236	0.0000051	0.000093	0.00435	0.0406	0.00666	0.00784	0.00103	0.0169
Trial 2	2020-02-13	0.000774	0.00161	0.0263	0.0311	<0.0000050	0.0000646	<0.000050	0.000228	0.000007	0.0000847	0.0128	0.0439	0.0062	0.00707	0.00072	0.0131
Trial 2	2020-03-11	0.00383	0.00369	0.0447	0.0442	0.0000142	0.0000302	0.000251	0.000207	0.0000168	0.000135	0.00164	0.00172	0.00965	0.00939	0.0202	0.0197
Trial 2	2020-03-25	0.0042	0.00412	0.0474	0.0476	0.0000697	0.000068	0.000342	0.000463	0.0000094	0.000126	0.00981	0.0104	0.0108	0.0108	0.0261	0.0259
Trial 3	2018-12-27	0.000527	--	0.00156	--	0.000383	--	0.00572	--	0.000295	--	0.000615	--	0.00345	--	0.019	--
Trial 3	2019-01-03	0.000521	0.000556	0.00151	0.00206	0.000382	0.00043	0.00539	0.00711	0.000194	0.00284	0.000573	0.000624	0.00308	0.00328	0.018	0.0263
Trial 3	2019-02-01	0.000513	0.00051	0.00146	0.00165	0.000365	0.000387	0.00523	0.00605	0.0000584	0.00136	0.000548	0.000552	0.00366	0.00364	0.0168	0.021
Trial 3	2019-03-11	0.0192	0.0191	0.0664	0.0742	0.00401	0.00399	0.0132	0.013	0.00391	0.0102	0.00954	0.00985	0.0345	0.0343	0.305	0.294
Trial 3	2019-03-25	0.0162	0.0161	0.0146	0.0294	0.000442	0.00103	0.00155	0.00748	0.000387	0.0225	0.00887	0.00902	0.029	0.0301	0.122	0.172
Trial 3	2019-04-08	0.0117	0.0121	0.0219	0.0262	0.0000321	0.00013	0.000189	0.00087	0.000408	0.00162	0.00122	0.00186	0.0227	0.0234	0.00991	0.047
Trial 3	2019-04-23	0.00415	0.0109	0.0262	0.0355	0.0000421	0.0000501	0.000363	0.000779	0.000429	0.00119	0.00189	0.0023	0.0122	0.0187	0.00896	0.031
Trial 3	2019-05-07	0.00948	0.00978	0.0253	0.0291	0.000021	0.000038	0.000382	0.000598	0.000027	0.000772	0.00202	0.00216	0.0162	0.0169	0.0195	0.0223
Trial 3	2019-05-21	0.00969	0.00993	0.0219	0.0241	0.0000538	0.0000564	0.000856	0.000863	0.0000338	0.000466	0.00205	0.00179	0.018	0.0182	0.0251	0.022
Trial 3	2019-06-05	0.00849	0.00851	0.0149	0.0176	0.0000851	0.0000886	0.00103	0.00113	0.0000389	0.000441	0.00191	0.00229	0.0163	0.0167	0.0295	0.0298
Trial 3	2019-06-18	0.00762	0.0077	0.0101	0.0135	0.0000287	0.0000489	0.000336	0.00085	0.0000683	0.000892	0.0016	0.00167	0.0136	0.0149	0.0266	0.0268

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Trial 3	2019-07-03	0.00269	0.00321	0.0211	0.0243	<0.0000050	0.0000066	0.000127	0.000177	0.0000313	0.000357	0.00303	0.00283	0.0134	0.0136	0.00723	0.00983
Trial 3	2019-07-16	0.00364	0.00361	0.0112	0.0133	<0.0000050	<0.0000050	0.000132	0.000178	0.0000166	0.000184	0.00137	0.00152	0.0111	0.011	0.00665	0.00699
Trial 3	2019-08-12	0.00268	0.00242	0.00792	0.0096	0.0000313	0.0000324	0.000447	0.000441	0.0000159	0.000143	0.000877	0.000986	0.00918	0.00892	0.0134	0.0128
Trial 3	2019-09-09	0.00186	0.00197	0.00543	0.00706	0.000121	0.00012	0.000867	0.000879	0.0000184	0.000241	0.00116	0.00113	0.00875	0.00902	0.018	0.02
Trial 3	2019-10-07	0.00158	0.00154	0.00367	0.00397	0.000198	0.000215	0.00128	0.00136	0.0000108	0.0000781	0.000959	0.000953	0.00809	0.00815	0.0253	0.0267
Trial 3	2019-11-04	0.00144	0.00154	0.00307	0.00339	0.000257	0.000273	0.00148	0.00156	<0.0000050	0.000106	0.0011	0.00102	0.00801	0.00822	0.028	0.0287
Trial 3	2019-12-02	0.00133	0.00132	0.00302	0.00327	0.000237	0.000225	0.00145	0.00143	0.0000054	0.000088	0.000957	0.000898	0.00815	0.00818	0.0232	0.0229
Trial 4	2018-12-27	0.00055	--	0.00147	--	0.000385	--	0.00535	--	0.000302	--	0.00061	--	0.00334	--	0.017	--
Trial 4	2019-01-03	0.000572	0.000621	0.00157	0.00217	0.000419	0.000478	0.00512	0.00718	0.000201	0.00421	0.000601	0.00066	0.00325	0.00329	0.0169	0.0274
Trial 4	2019-02-01	0.000584	0.000576	0.00115	0.00119	0.000228	0.000254	0.00487	0.00481	0.0000554	0.000528	0.000583	0.000596	0.00382	0.00386	0.0143	0.0161
Trial 4	2019-03-11	0.0192	0.0195	0.0734	0.0755	0.00395	0.00394	0.0141	0.0138	0.00202	0.00427	0.00988	0.00998	0.0342	0.0345	0.307	0.291
Trial 4	2019-03-25	0.0162	0.016	0.00571	0.0125	0.000723	0.0011	0.00206	0.00687	0.000326	0.017	0.00958	0.00916	0.0259	0.0254	0.106	0.147
Trial 4	2019-04-08	0.00336	0.00664	0.016	0.0157	0.0000357	0.000204	0.000109	0.00106	0.000205	0.0016	0.00247	0.00177	0.016	0.0172	0.0029	0.027
Trial 4	2019-04-23	0.00441	0.00469	0.0251	0.0263	0.0000248	0.0000539	0.00011	0.000289	0.00019	0.000444	0.00178	0.00146	0.0123	0.0131	0.00215	0.00685
Trial 4	2019-05-07	0.00567	0.00556	0.023	0.0255	0.000023	0.000043	0.00026	0.000371	0.000092	0.00108	0.00225	0.00248	0.0125	0.0125	0.0101	0.0116
Trial 4	2019-05-21	0.00569	0.0058	0.0218	0.0226	0.0000336	0.0000384	0.000458	0.000473	0.0000451	0.000341	0.00202	0.00215	0.0127	0.013	0.0172	0.0127
Trial 4	2019-06-05	0.00528	0.00532	0.0182	0.0198	0.0000425	0.0000432	0.000461	0.000478	0.0000174	0.000115	0.00173	0.002	0.0115	0.0117	0.0155	0.0144
Trial 4	2019-06-18	0.00433	0.00427	0.015	0.0197	<0.0000050	0.0000146	0.00013	0.00039	0.000132	0.00066	0.00176	0.00121	0.00837	0.00898	0.0108	0.0108
Trial 4	2019-07-03	0.000592	0.000847	0.0141	0.0145	<0.0000050	<0.0000050	<0.0000050	0.000073	0.0000076	0.000216	0.00707	0.00731	0.00337	0.00347	0.0007	0.00187
Trial 4	2019-07-16	0.000518	0.000632	0.0136	0.013	<0.0000050	<0.0000050	<0.0000050	<0.000050	0.0000098	0.0000874	0.00467	0.00813	0.00287	0.00259	0.00051	0.00206
Trial 4	2019-08-12	0.00137	0.00135	0.0133	0.0157	<0.0000050	0.0000067	0.000126	0.000141	0.0000259	0.000554	0.000726	0.000666	0.00348	0.00353	0.00746	0.0072

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Trial 4	2019-09-09	0.00122	0.00127	0.0125	0.0149	0.0000195	0.0000194	0.000349	0.000357	0.0000195	0.000209	0.000759	0.000821	0.00364	0.00367	0.00731	0.0073
Trial 4	2019-10-07	0.00108	0.00112	0.00977	0.0112	0.0000297	0.0000317	0.00046	0.000484	0.000021	0.000165	0.00068	0.000724	0.00406	0.00392	0.00945	0.00819
Trial 4	2019-11-04	0.00103	0.00106	0.00703	0.00824	0.0000394	0.0000452	0.000581	0.00065	<0.0000050	0.0000954	0.000756	0.000734	0.00436	0.00437	0.0099	0.00981
Trial 4	2019-12-02	0.000952	0.00092	0.00611	0.00669	0.0000371	0.0000352	0.000593	0.000585	0.0000089	0.0000397	0.000688	0.000669	0.00433	0.00417	0.00934	0.00918
Trial 5	2018-12-27	0.00114	--	0.00218	--	0.0005	--	0.00715	--	0.000291	--	0.000773	--	0.00589	--	0.0205	--
Trial 5	2019-01-03	0.00118	0.00133	0.00194	0.00404	0.000426	0.000668	0.00685	0.0131	0.000197	0.0122	0.000754	0.000795	0.00556	0.00587	0.0197	0.0453
Trial 5	2019-02-01	0.000377	0.000531	0.00041	0.00116	0.0000809	0.000125	0.0138	0.0149	0.000794	0.00786	0.000539	0.000572	0.00196	0.00216	0.0109	0.0184
Trial 5	2019-03-11	0.0208	0.0206	0.0495	0.0531	0.00431	0.00424	0.0195	0.0192	0.0187	0.0247	0.00995	0.00983	0.0357	0.0367	0.34	0.332
Trial 5	2019-03-25	0.0207	0.021	0.0412	0.0462	0.00419	0.00417	0.0192	0.021	0.00922	0.0252	0.0106	0.0104	0.0391	0.0396	0.343	0.347
Trial 5	2019-04-08	0.0205	0.0194	0.0447	0.0416	0.00381	0.00377	0.0116	0.0185	0.0066	0.00781	0.00969	0.00923	0.0355	0.0362	0.322	0.801
Trial 5	2019-04-23	0.0211	0.0236	0.0464	0.047	0.00331	0.00428	0.00162	0.0166	0.00647	0.0083	0.011	0.0117	0.0283	0.027	0.346	0.357
Trial 5	2019-05-07	0.0196	0.0202	0.049	0.0486	0.00115	0.00273	0.00191	0.0117	0.00412	0.00842	0.00996	0.0095	0.0262	0.0245	0.33	0.334
Trial 5	2019-05-21	0.0151	0.0154	0.0513	0.0509	0.00111	0.00213	0.00208	0.0114	0.00453	0.00847	0.00668	0.00627	0.0293	0.0263	0.333	0.335
Trial 5	2019-06-05	0.0099	0.01	0.0529	0.0537	0.000955	0.00114	0.00403	0.00712	0.00257	0.00566	0.00523	0.00496	0.032	0.0297	0.279	0.283
Trial 5	2019-06-18	0.00855	0.00941	0.0471	0.0543	0.000148	0.00119	0.00143	0.00634	0.00291	0.0108	0.00486	0.00443	0.0281	0.0321	0.234	0.233
Trial 5	2019-07-03	0.00154	0.00316	0.0265	0.0287	0.0000445	0.000297	0.000689	0.00207	0.00135	0.00537	0.00504	0.00486	0.0287	0.0222	0.0641	0.162
Trial 5	2019-07-16	0.00144	0.00298	0.0246	0.026	0.0000521	0.000183	0.000561	0.00181	0.00117	0.00406	0.00414	0.00504	0.0253	0.021	0.0525	0.14
Trial 5	2019-08-12	0.000492	0.00201	0.0252	0.0292	0.0000254	0.000163	0.000375	0.00181	0.000417	0.00396	0.00377	0.00313	0.0182	0.0188	0.00669	0.09
Trial 5	2019-09-09	0.00639	0.00654	0.0388	0.0404	0.0000589	0.0000872	0.000741	0.000902	0.00117	0.00208	0.00343	0.00392	0.0252	0.0246	0.0642	0.0641
Trial 5	2019-10-07	0.0117	0.0114	0.0452	0.0451	0.000128	0.00016	0.00102	0.00128	0.00164	0.00243	0.00481	0.00483	0.0295	0.0293	0.129	0.132
Trial 5	2019-11-04	0.0138	0.0138	0.0478	0.0496	0.000514	0.000537	0.00158	0.00181	0.00134	0.00213	0.00635	0.00651	0.0307	0.0314	0.202	0.199
Trial 5	2019-12-02	0.0154	0.0149	0.0512	0.0503	0.00134	0.00137	0.0031	0.00315	0.00144	0.00233	0.00706	0.00689	0.0319	0.0317	0.256	0.233

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Trial 5	2020-01-08	0.0171	0.0177	0.0387	0.0499	0.00211	0.00233	0.0047	0.00571	0.00018	0.00639	0.00751	0.00773	0.0271	0.0317	0.275	0.291
Trial 5	2020-01-15	0.0169	0.0174	0.037	0.0447	0.00214	0.0023	0.00506	0.00573	0.000188	0.00547	0.00749	0.00762	0.0278	0.0313	0.273	0.29
Trial 5	2020-01-29	0.0168	0.0169	0.0305	0.0371	0.00205	0.00219	0.00627	0.00598	0.000175	0.00507	0.00721	0.0136	0.0261	0.0267	0.266	0.267
Trial 5	2020-02-13	0.0166	0.0167	0.0341	0.0377	0.00114	0.00143	0.00145	0.00431	0.000503	0.00169	0.00475	0.0131	0.0297	0.0325	0.255	0.25
Trial 5	2020-02-26	0.00918	0.0107	0.0401	0.0419	0.0000476	0.0011	0.000372	0.0036	0.000167	0.00209	0.00264	0.00323	0.0293	0.0328	0.0662	0.119
Trial 5	2020-03-25	0.00111	0.0013	0.0141	0.0292	0.0000053	0.0000671	0.000133	0.000431	0.0000178	0.000682	0.00138	0.0128	0.0285	0.0293	0.005	0.0059
Trial 6	2018-12-27	0.000995	--	0.00206	--	0.000378	--	0.00483	--	0.000252	--	0.000714	--	0.00481	--	0.0149	--
Trial 6	2019-01-03	0.00102	0.0011	0.00252	0.00321	0.000384	0.000459	0.00455	0.00624	0.000199	0.00323	0.0007	0.000799	0.00438	0.00462	0.0135	0.0215
Trial 6	2019-02-01	0.000544	0.000543	0.000553	0.000745	0.0000935	0.0000992	0.0765	0.0747	0.000681	0.00307	0.00055	0.000563	0.00197	0.00205	0.0169	0.0177
Trial 6	2019-03-11	0.201	0.2	0.481	0.489	0.0362	0.0359	0.0625	0.0667	0.114	0.125	0.0918	0.0912	0.325	0.323	2.54	2.48
Trial 6	2019-03-25	0.213	0.195	0.46	0.473	0.0326	0.0331	0.0588	0.0816	0.0264	0.0979	0.101	0.101	0.328	0.333	2.34	2.42
Trial 6	2019-04-08	0.178	0.197	0.339	0.354	0.0306	0.0318	0.0104	0.0365	0.0295	0.0369	0.0871	0.0896	0.253	0.239	2.27	2.37
Trial 6	2019-04-23	0.0184	0.0125	0.333	0.318	0.000242	0.00024	0.000603	0.000521	0.000642	0.000552	0.00494	0.00527	0.193	0.147	0.0298	0.0211
Trial 6	2019-05-07	0.0348	0.0472	0.322	0.354	0.000489	0.00301	0.00116	0.00644	0.00153	0.00787	0.0142	0.0164	0.167	0.172	0.0729	0.339
Trial 6	2019-05-21	0.0375	0.0399	0.302	0.308	0.000426	0.00115	0.00122	0.00306	0.00155	0.00388	0.0154	0.0167	0.165	0.168	0.0878	0.159
Trial 6	2019-06-05	0.0342	0.0359	0.27	0.281	0.000177	0.000769	0.000739	0.00249	0.000769	0.00312	0.0151	0.016	0.147	0.151	0.0609	0.118
Trial 6	2019-06-18	0.0321	0.0318	0.249	0.256	0.0000341	0.000299	0.000226	0.00151	0.00026	0.0021	0.00558	0.00721	0.127	0.122	0.0605	0.0788
Trial 6	2019-07-03	0.00256	0.00449	0.132	0.124	<0.0000050	0.0000748	0.000098	0.000256	0.0000478	0.000494	0.0297	0.0321	0.103	0.101	0.00303	0.0206
Trial 6	2019-07-16	0.0121	0.013	0.193	0.197	0.0000058	0.000047	0.000123	0.000427	0.000144	0.000575	0.00774	0.00892	0.0825	0.0834	0.0149	0.0216
Trial 6	2019-08-12	0.034	0.0336	0.227	0.22	0.0016	0.00157	0.00388	0.00374	0.000946	0.00226	0.00993	0.0101	0.0844	0.0857	0.19	0.188
Trial 6	2019-09-09	0.053	0.0557	0.263	0.276	0.00445	0.00458	0.00796	0.00772	0.00119	0.00201	0.0236	0.0179	0.105	0.11	0.47	0.454
Trial 6	2019-10-07	0.0664	0.0667	0.271	0.276	0.00624	0.00631	0.0119	0.0125	0.00112	0.00145	0.0213	0.0219	0.124	0.125	0.641	0.646
Trial 6	2019-11-04	0.0857	0.0864	0.286	0.293	0.00794	0.00813	0.015	0.0159	0.00105	0.00166	0.027	0.0279	0.14	0.139	0.801	0.833

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Trial 6	2019-12-02	0.0876	0.0858	0.295	0.298	0.00795	0.0081	0.017	0.0163	0.000938	0.00113	0.0279	0.028	0.145	0.147	0.795	0.741
Trial 6	2020-01-15	0.104	0.104	0.304	0.303	0.00832	0.00856	0.0136	0.017	0.000118	0.00128	0.0289	0.0305	0.175	0.183	0.879	0.877
Trial 6	2020-01-29	0.00811	0.0124	0.177	0.181	0.000376	0.00188	0.00114	0.00194	0.000443	0.00113	0.0892	0.152	0.119	0.123	0.0644	0.367
Trial 6	2020-02-05	0.00222	0.00362	0.123	0.112	<0.0000050	0.000402	<0.000050	0.000636	<0.000050	0.000543	0.0253	0.0728	0.0589	0.0751	0.0005	0.085
Trial 6	2020-02-13	0.00218	0.00208	0.124	0.114	<0.0000050	<0.0000050	<0.000050	<0.000050	<0.000050	0.0000081	0.0564	0.0973	0.0504	0.0496	0.00039	0.0007
Trial 6	2020-03-11	0.00308	0.00291	0.111	0.101	<0.0000050	0.0000193	0.000087	0.000126	0.0000554	0.000128	0.00227	0.0104	0.0268	0.0268	0.00529	0.00698
Trial 6	2020-03-25	0.00315	0.00323	0.112	0.11	<0.0000050	0.0000148	0.000068	0.000081	0.0000723	0.000194	0.00953	0.0122	0.0289	0.0295	0.00408	0.00736
Trial 7	2018-12-27	0.00179	--	0.00106	--	0.0000708	--	0.0055	--	0.00149	--	0.000761	--	0.00305	--	0.00816	--
Trial 7	2019-01-03	0.00208	0.00243	0.0013	0.00181	0.0000809	0.000106	0.00547	0.00648	0.0017	0.00431	0.000822	0.000921	0.00297	0.0033	0.00868	0.0119
Trial 7	2019-02-01	0.00473	0.00435	0.00218	0.0022	0.000112	0.000109	0.00478	0.00453	0.00184	0.00282	0.000972	0.000979	0.00457	0.00438	0.00882	0.0095
Trial 7	2019-03-11	0.0265	0.0264	0.0559	0.0563	0.00422	0.00418	0.0155	0.0147	0.0205	0.023	0.0108	0.0105	0.0398	0.0397	0.329	0.312
Trial 7	2019-03-25	0.0271	0.027	0.0397	0.0411	0.00401	0.00399	0.0116	0.0121	0.00923	0.0131	0.0118	0.0116	0.0428	0.0428	0.284	0.286
Trial 7	2019-04-08	0.0264	0.0262	0.0406	0.0356	0.00363	0.00366	0.0101	0.0109	0.00712	0.00931	0.0114	0.0108	0.0416	0.043	0.237	0.252
Trial 7	2019-04-23	0.0279	0.0304	0.0356	0.0369	0.00368	0.00427	0.0101	0.0109	0.00531	0.00631	0.0145	0.0141	0.041	0.0433	0.255	0.263
Trial 7	2019-05-07	0.0262	0.0273	0.0332	0.034	0.00346	0.0036	0.00855	0.00873	0.00396	0.00487	0.0109	0.0119	0.0413	0.0418	0.228	0.235
Trial 7	2019-05-21	0.0284	0.0277	0.0319	0.0313	0.00358	0.00349	0.00875	0.00876	0.00332	0.00381	0.012	0.0117	0.0438	0.0427	0.23	0.224
Trial 7	2019-06-05	0.0282	0.0285	0.0286	0.0295	0.00336	0.00348	0.00817	0.00832	0.00266	0.00307	0.0118	0.012	0.0431	0.0432	0.204	0.209
Trial 7	2019-06-18	0.0265	0.0265	0.0279	0.0278	0.00329	0.00319	0.00793	0.00726	0.00232	0.00275	0.0128	0.0112	0.0411	0.042	0.199	0.186
Trial 7	2019-07-03	0.0291	0.0296	0.0272	0.0281	0.0031	0.0032	0.00725	0.00733	0.00253	0.00285	0.0134	0.0132	0.0462	0.0462	0.176	0.177
Trial 7	2019-07-16	0.0282	0.0285	0.0236	0.0247	0.00289	0.00291	0.00631	0.00639	0.00291	0.00318	0.0119	0.012	0.0459	0.0452	0.148	0.147
Trial 7	2019-08-12	0.0274	0.0278	0.0213	0.0213	0.00269	0.00276	0.00546	0.00548	0.00216	0.00238	0.012	0.0122	0.0408	0.0417	0.122	0.123
Trial 7	2019-09-09	0.0255	0.026	0.0203	0.0208	0.00263	0.00258	0.00538	0.00518	0.00176	0.00195	0.0127	0.0126	0.0428	0.0421	0.114	0.11

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Trial 7	2019-10-07	0.0246	0.0245	0.0182	0.0183	0.00246	0.00248	0.00498	0.00504	0.00162	0.00172	0.0118	0.0125	0.0441	0.0417	0.103	0.104
Trial 7	2019-11-04	0.0239	0.0246	0.0168	0.0173	0.00242	0.00246	0.00484	0.00504	0.00153	0.0017	0.0116	0.0125	0.043	0.0425	0.0986	0.1
Trial 7	2019-12-02	0.0243	0.0237	0.0168	0.0167	0.00235	0.00232	0.00499	0.00478	0.00121	0.00125	0.0121	0.0124	0.0437	0.0427	0.0949	0.0879
Trial 8	2018-12-27	0.000587	--	0.00189	--	0.000384	--	0.00553	--	0.000363	--	0.000565	--	0.00339	--	0.0172	--
Trial 8	2019-01-03	0.00058	0.000591	0.00207	0.00254	0.000385	0.000448	0.00527	0.00664	0.000257	0.00296	0.000573	0.000566	0.00307	0.00306	0.0161	0.0228
Trial 8	2019-02-01	0.000544	0.00053	0.00197	0.0021	0.000179	0.000248	0.00481	0.00509	0.0000232	0.00101	0.000501	0.000529	0.0034	0.00344	0.0104	0.0145
Trial 8	2019-03-11	0.0193	0.0189	0.062	0.067	0.00343	0.00335	0.00803	0.00816	0.0022	0.00662	0.00975	0.00953	0.0351	0.0346	0.289	0.277
Trial 8	2019-03-25	0.0163	0.0163	0.00427	0.0119	0.000712	0.000747	0.0029	0.00375	0.000394	0.00704	0.00883	0.00879	0.0292	0.0293	0.13	0.139
Trial 8	2019-04-08	0.0183	0.0132	0.00472	0.00687	0.000895	0.000687	0.0031	0.00342	0.000304	0.00261	0.0076	0.00717	0.0356	0.027	0.137	0.126
Trial 8	2019-04-23	0.0119	0.013	0.00381	0.00724	0.000758	0.000912	0.00341	0.00389	0.000208	0.00224	0.00719	0.00763	0.023	0.0246	0.108	0.111
Trial 8	2019-05-07	0.00955	0.0101	0.00335	0.00561	0.000757	0.000806	0.00349	0.00351	0.000126	0.00146	0.00531	0.00563	0.022	0.0221	0.0902	0.0924
Trial 8	2019-05-21	0.00892	0.00897	0.00286	0.00407	0.000746	0.000766	0.00388	0.00396	0.000138	0.000892	0.00475	0.00475	0.0232	0.023	0.0812	0.0813
Trial 8	2019-06-05	0.0078	0.00789	0.00244	0.0034	0.000716	0.000701	0.00405	0.00425	0.0000603	0.0006	0.00423	0.00427	0.0212	0.021	0.076	0.0766
Trial 8	2019-06-18	0.00645	0.00652	0.00228	0.00293	0.000658	0.000645	0.00424	0.0039	0.0000532	0.000417	0.00418	0.00366	0.0174	0.0183	0.0689	0.0637
Trial 8	2019-07-03	0.00646	0.00634	0.00212	0.00439	0.000533	0.000599	0.00388	0.00619	0.0000658	0.00557	0.00401	0.00379	0.0188	0.0193	0.0488	0.0683
Trial 8	2019-07-16	0.00588	0.00578	0.00219	0.00259	0.000427	0.000407	0.00373	0.00388	0.0000377	0.000166	0.0033	0.00347	0.0181	0.0182	0.0431	0.0601
Trial 8	2019-08-12	0.00496	0.00493	0.00197	0.00208	0.000243	0.000278	0.00331	0.00331	0.0000196	0.000106	0.00286	0.00287	0.0155	0.015	0.0292	0.0296
Trial 8	2019-09-09	0.00387	0.00398	0.00182	0.0019	0.000284	0.000282	0.00349	0.00328	0.0000181	0.0000555	0.00249	0.00243	0.0144	0.0143	0.0314	0.0272
Trial 8	2019-10-07	0.00332	0.00328	0.00168	0.00166	0.000414	0.000394	0.00341	0.00354	0.0000145	0.0000319	0.00196	0.002	0.0137	0.0135	0.0346	0.035
Trial 8	2019-11-04	0.0029	0.00297	0.0016	0.00162	0.000537	0.00058	0.0036	0.00369	0.0000305	0.0000255	0.00172	0.00171	0.0127	0.0127	0.0369	0.0365
Trial 8	2019-12-02	0.00282	0.00282	0.00174	0.00173	0.000795	0.000817	0.00385	0.00388	0.0000107	0.0000223	0.00154	0.00166	0.0123	0.0131	0.0396	0.039
Fe:As Trial - Initial	2020-05-05	0.016	0.0164	0.0616	0.0624	0.00324	0.00321	0.0115	0.0128	0.0108	0.0121	0.00839	0.00836	0.0327	0.0327	0.265	0.254

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Fe:As Trial (10:1)	2020-05-05	0.0155	0.0167	0.0284	0.064	0.00237	0.0031	0.00442	0.0138	0.00235	0.0111	0.00834	0.00866	0.032	0.0329	0.176	0.247
Fe:As Trial (10:1)	2020-05-06	0.0158	0.0163	0.0366	0.0558	0.00244	0.00295	0.00676	0.0134	0.00342	0.00897	0.00836	0.00853	0.0319	0.0327	0.182	0.226
Fe:As Trial (10:1)	2020-05-11	0.0158	0.0172	0.0268	0.0292	0.00183	0.00192	0.00172	0.00304	0.0000902	0.000824	0.0084	0.00867	0.0331	0.034	0.113	0.127
Fe:As Trial (20:1)	2020-05-05	0.0151	0.0165	0.00525	0.0616	0.00225	0.00309	0.00157	0.0134	0.000455	0.0107	0.00836	0.00825	0.0268	0.0327	0.148	0.243
Fe:As Trial (20:1)	2020-05-06	0.0148	0.0157	0.0039	0.0325	0.00209	0.00261	0.00136	0.00835	0.000335	0.00554	0.00827	0.00836	0.0274	0.0307	0.141	0.195
Fe:As Trial (20:1)	2020-05-11	0.0149	0.0162	0.00352	0.00621	0.00154	0.00164	0.00111	0.00209	0.000152	0.000671	0.0083	0.00854	0.0309	0.0304	0.0918	0.103

'--' data not available. This is during the barrel leach and bench scale testing prior to the system set up (2018-10-11 to 2019-02-22) and the commissioning period (2018-12-37) sampling event.

Table shading: purple = synthetic water testing; no colour = set-up and system commissioning; blue = Stage 1; green = Stage 2; orange = Stage 3

A3. SOIL DATA

Table B3-1: Acid Volatile Sulphides and Simultaneously Extracted Metals (AVS:SEM) in the Soil Collected From *in situ* Cells at the End of Testing

Sample Point	Data Source	Date	Acid Volatile Sulphides (μmol/g)	Simultaneously Extractable Metals (μmol/g)			
				Cadmium	Copper	Lead	Zinc
Soil Inoculum	Maxxam	09-Dec-19	<0.20	0.0107	0.417	0.232	1.91
Trial 3	Maxxam	04-Dec-19	24.6	0.0235	0.141	0.152	2.78
Trial 4	Maxxam	04-Dec-19	9.03	0.0091	0.089	0.11	1.79
Trial 8	Maxxam	04-Dec-19	10.9	0.0157	0.181	0.21	3.07

Table B3-2: Fractionation of Metals in Soil Collected From *in situ* Cells at the End of Testing (Tessier et al., 1979)

Sample Point	Data Source	Date	Fraction	Concentration (mg/kg)							
				Antimony	Arsenic	Cadmium	Copper	Lead	Selenium	Uranium	Zinc
Soil Inoculum ¹	Maxxam	23-Nov-18	1	1.04582	0.14940	0.07470	0.55279	3.54084	0.44821	<1.49402	2.56972
	Maxxam	23-Nov-18	2	0.44821	0.89641	0.25398	0.19422	3.92928	0.29880	<1.49402	15.38845
	Maxxam	23-Nov-18	3	0.59761	1.19522	0.47809	2.31574	4.30279	0.74701	2.98805	69.02390
	Maxxam	23-Nov-18	4	0.39841	0.59761	0.05976	21.31474	1.11554	<0.19920	<1.99203	14.90040
	Maxxam	23-Nov-18	5	0.370	3.0	<0.02	4.10	8.0	<2	2.85000	58.0
Trial 4	Maxxam	4-Dec-19	1	<0.10	<0.10	0.06	<0.25	0.085	<0.20	0.176	1.81
	Maxxam	4-Dec-19	2	0.059	0.731	0.221	0.809	13.4	<0.060	0.552	19.9
	Maxxam	4-Dec-19	3	0.041	1.02	0.652	6.05	11.2	0.0308	0.424	136
	Maxxam	4-Dec-19	4	0.0149	0.452	0.0489	11.8	2.09	0.127	0.0996	20.8
	Maxxam	4-Dec-19	5	0.46	3.9	<0.02	9.3	8.25	0.3	2.6	73.5
Trial 8	Maxxam	4-Dec-19	1	<0.10	0.16	0.107	<0.25	0.254	<0.20	0.407	2.11
	Maxxam	4-Dec-19	2	0.127	1.16	0.465	1.01	27.6	<0.060	1.52	42.7
	Maxxam	4-Dec-19	3	0.0504	1.34	1.91	6.04	20.3	0.063	0.524	259
	Maxxam	4-Dec-19	4	0.0313	0.729	0.0754	25.1	4.81	0.385	0.226	37.9
	Maxxam	4-Dec-19	5	0.8	7.2	<0.02	12.3	9.29	0.4	2.7	110

¹ Results converted from mg/L to mg/kg for initial soil inoculum sample

APPENDIX C.
Microbiology Result Reports
(provided in electronic format)

APPENDIX D: OFF SITE CONSTRUCTED WETLAND TREATMENT SYSTEM PILOT FINAL REPORT



Off Site Constructed Wetland Treatment System Pilot

Final Report

August 20, 2020

Prepared for:

BMC MINERALS (No.1) LTD.

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EXECUTIVE SUMMARY

BMC Minerals (No.1) Ltd. (BMC) is proposing to develop the Kudz Ze Kayah Mine Project (the Project) in southeast Yukon, Canada which is located in the Kaska Traditional Territory. A comprehensive Reclamation and Closure Plan (RCP) has been developed for the Project. Part of the RCP includes contingency measures that may be considered for implementation if the objectives during the Post-closure phase are not met. The primary contingency measure for the maintenance of water quality is a constructed wetland treatment system (CWTS), which will follow the *in situ* treatment of trace elements in the ABM Lake.

To determine the site specific design of a CWTS for the Project, a phased research approach is being followed. As part of the evaluation, an off site pilot-scale CWTS test program was completed and is presented in this report. The off site pilot-scale CWTS testing and optimization is intended to refine CWTS sizing and expected CWTS outflow water quality for the Project. This is done through the development of site-specific removal rate coefficients, design refinement, and testing of predicted water chemistries not yet present on site.

Constituents of potential interest (COPIs) were identified as those with baseline concentrations that exceeded water quality objectives (WQO) or those predicted to exceed the water quality objectives during the Project phases in the absence of appropriate mitigation measures (AEG and Minnow, 2020). Water quality modelling indicated eight COPIs (arsenic, antimony, cadmium, copper, lead, selenium, uranium, and zinc) are expected to be elevated in ABM Lake relative to the WQOs proposed for the receiving environment (AEG, 2018). These eight COPIs form the focus of the CWTS reporting.

In November 2018, the off site pilot-scale CWTSs were constructed and planted with bulrush (*Schoenoplectus* sp.) and water sedge (*Carex aquatilis*) to assess the extent of COPI treatment with two designs. Synthetic water was designed based on the 2018 “worst case” scenario from the ABM Lake, which assumes a reduced treatment efficiency of water quality predictions in the lake (AEG, 2018).

Information was gathered through the off site pilot-scale CWTS testing to inform design of a full-scale CWTS. The results of the test work showed that treatment of COPIs was more effective in the water sedge CWTS design than the bulrush CWTS, as evidenced by higher removal rate coefficients and lower COPI outflow concentrations. Arsenic, cadmium, lead, selenium, and zinc were treated below receiving environment WQO in both designs, while antimony, copper, and uranium were treated below receiving environment WQO in the water sedge CWTS only.

Minimal plant uptake of COPIs was observed, which is a targeted component of the CWTS design. Measurement of acid volatile sulphides (AVS) found much greater AVS formation in the water sedge CWTS than the bulrush CWTS, which suggests higher stabilisation and buffering capacity for COPI treatment in the water sedge CWTS. An analysis of the microbial populations revealed that the plants used in both CWTS pilot designs, which were collected from the site and surrounding area in 2018, were the source of multiple beneficial selenium-reducing, uranium-reducing, and sulphide-producing bacteria. This indicates targeted treatment mechanisms were established in the pilot CWTS and confirms that the local water sedge plant from site would be a good candidate for full-scale CWTS design.

The pilot-scale testing has provided additional proof-of-concept for CWTS for the Project, demonstrating notable treatment of COPI with the water sedge CWTS design. The pilot-scale test results support the use of a water sedge CWTS as the primary contingency measure for the maintenance of water quality in the Post-closure phase of the Project. It is recommended that the CWTS design and sizing be refined based on the removal rate coefficients (RRC) developed for each COPI based on the water sedge CWTS pilot-scale test results. The refined design and sizing should also consider any updated water quality model results. Recommended future work includes the next phases of CWTS design and

implementation, including on site demonstration-scale optimization to further refine design and testing under site specific influences.

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GLOSSARY

Accretion – The process of growth or increase of sediments through deposition and accumulation of organic material deposited solids (such as minerals) in a wetland.

Acidity – A measure of the capacity of water to neutralize base. Influences pH along with alkalinity.

Acid volatile sulphide (AVS) – Sulphide complexed with Fe (FeS) where the sulphide can preferentially exchange Fe for heavy metals (Ni, Zn, Cd, Pb, Cu, Hg) which are then more stably bound.

Alkalinity (Alk) – A measure of the capacity of water to neutralize acids. Influences pH along with acidity.

Amendment – A chemical or organic material added to encourage specific conditions (e.g., aerobic/anaerobic, pH, ORP) or as a source of something that is needed for passive treatment (e.g., nutrients, alkalinity, binding sites).

Aquatic bryophyte – A moss commonly known as aquatic moss.

Biochemical oxygen demand (BOD) – The amount of dissolved oxygen needed by aerobic microorganisms to break down organic material in water.

Biofilm(s) – A visible and often slimy-looking film (community) of bacteria (may contain other microbes).

Carbon source – A source of carbon (energy/electrons) for microbes (see **electron donors**). Examples include ethanol, methanol, acetate, sugar (glucose), molasses, wood chips, detritus (dead plant matter).

Carex aquatilis – A plant (emergent macrophyte) commonly known as water sedge.

Chemical oxygen demand (COD) – A measurement of all organic and inorganic material in the water than can be oxidized.

Constituent of Potential Interest (COPI) – Specific elements that have been identified for evaluation, including antimony, arsenic, cadmium, copper, lead, selenium, uranium, and zinc.

Constructed wetland treatment system (CWTS) – Wetlands that are designed and constructed to remove constituents from water, using natural processes to sequester them into the soils rendering them less bioavailable. They are different from wetlands that provide habitat for wildlife.

Dissolved organic carbon (DOC) – Organic (carbon based) molecules in water, that have passed through a filter of 0.45 µm.

Dissolved oxygen (DO) – Diatomic oxygen (O₂) dissolved in water; oxygen can dissolve in water by diffusion from surrounding air, as a product of photosynthesis, or through forced aeration.

Electron donor(s) – A chemical compound that donates electrons to another compound (see **carbon source**). An electron donor is a reducing agent, which that by virtue of it donating electrons, is itself oxidized (see **oxidation and reduction**).

Explanatory parameters – Quantifiable parameters that describe how water treatment reactions take place.

Evapotranspiration – The process by which water is transferred to the atmosphere by evaporation from the surface of water and by transpiration from plants.

Forebays – Pre-treatment cell areas that allow water to flow through while enabling carbon amendment and promoting reducing conditions without adverse effects plants health.

Genetic analysis – Analysis to assess the presence, identity, and diversity of different microbes in a sample.

Macrophytes – An aquatic plant, large enough to be seen by eye. Can be emergent, submergent, or floating.

Microbes – Microscopic organisms that cab be uni- or multi-cellular. This includes algae, bacteria, fungi, viruses, and yeast.

Oxidation – The loss of electrons, or increase in valence state, by a molecule, atom, or ion. Can be driven by microbes. Process is complementary to chemical reduction.

Oxidation-Reduction Potential (ORP) – A measure of the tendency of a chemical species to acquire or donate electrons, thus becoming reduced or oxidized, respectively, measured in millivolts.

Periphyton – A complex mixture of algae, cyanobacteria, heterotrophic microbes, and detritus that is attached to submerged surfaces in most aquatic ecosystems.

Photolysis – The decomposition or separation of molecules by the action of light.

Phytoremediation – Bioremediation process that uses various types of plants to remove, transfer, stabilize, and/or destroy contaminants in the soil and groundwater.

Reaction stoichiometry – The quantitative relationships among substances as they participate in chemical reactions.

Redox – Oxidation-reduction potential (in sediment), a measure of the tendency of a chemical species acquire or donate electrons, thus becoming reduced or oxidized, measured in millivolts. This measurement is relative to the water ORP.

Reduction (chemical) – The gain of electrons, or a decrease in valence state, by a molecule, atom, or ion. Can be catalyzed by microbes. Process is complementary to chemical oxidation.

Schoenoplectus - A plant (emergent macrophyte) commonly known as bulrush.

Selenium reduction – Microbially mediated reduction of soluble Se(VI) and Se(IV) to insoluble elemental selenium.

Simultaneously extracted metals (SEM) – amounts of metals such as nickel, zinc, cadmium lead, copper, and mercury in sediment, assessed in the context of AVS for excess sulphide. (also see **acid volatile sulphide**)

Sorption – The physical and/or chemical process by which one substance becomes attached to another substance.

Species (sp.) – One of the basic units of biological classification and a taxonomic rank. Rank in the classification of organisms below genus and above strain. Also can be used to refer to the oxidation state of a mineral (e.g., selenate and selenite are species of selenium).

Specific conductivity (SPC) – A measurement of electrical conductivity in water that is typically expressed in $\mu\text{S}/\text{cm}$, which has been adjusted for temperature (25°C).

Sulphide – An inorganic anion of sulphur that can form stable complexes with metals and make them insoluble in water (remove them from the water).

Sulphide production – Microbial reduction of sulphur compounds, such as sulphate, sulphite, thiosulphate, and sulphur, which produces sulphides and alkalinity.

Tessier sequential leaching extractions – procedure based on Tessier et al., 1979 which determines the form and stability of minerals in the substrate through a series of extractions

Total organic carbon (TOC) – A measurement of the total organic carbons present in water.

Total suspended solids (TSS) – A measurement of all particles in water that are larger than $2\text{ }\mu\text{m}$ (anything smaller than $2\text{ }\mu\text{m}$ considered a dissolved solid).

Transfer – Processes that treat water by transferring a constituent to another location without changing its form. For example: absorption, adsorption, dilution, dispersion, filtration, precipitation (aqueous to solid), and volatilization.

Transform – Processes that change the chemical form or state of a constituent. For example: biodegradation, biotransformation, hydrolysis, ionization, oxidation, photolysis, and reduction.

Treatment pathway – The method by which a constituent is treated (Haakensen et al., 2015).

LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
μmol	micromoles
μg	micrograms
μS	micro Siemens
AEG	Alexco Environmental Group Inc.
AVS	Acid Volatile Sulphides
BCP	Background Concentration Procedure
BMC	BMC Minerals (No.1) Ltd.
BOD	Biological Oxygen Demand
BVL	Bureau Veritas Laboratories
CCME	Canadian Council of Ministers of the Environment
cm	centimetres
COC	Chain of Custody
COD	Chemical Oxygen Demand
Contango	Contango Strategies, a subsidiary of Alexco Environmental Group Inc.
COPI	Constituent of Potential Interest
CWTS	Constructed Wetland Treatment System
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
ENV	British Columbia Ministry of Environment and Climate Change Strategy
g	gram
HRT	Hydraulic Retention Time
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
kg	kilogram
km	kilometre
L	litre
M	molar
m²	square metre
meq	milliequivalents of solute
meq/L	milliequivalents of solute per litre
mg	milligrams
mm	millimetres
mV	millivolts
ORP	Oxidation-Reduction Potential
PTS	Passive Treatment System
qPCR	Quantitative Polymerase Chain Reaction
RCP	Reclamation and Closure Plan
RRC	Removal Rate Coefficient
s	second
SEM	Simultaneously Extracted Metals
SeRB	Selenium-Reducing Bacteria
SPB	Sulphide Producing Bacteria
SPC	Specific Conductivity
SSWQO	Site Specific Water Quality Objective
TEA	Terminal Electron Acceptor

TOC	Total Organic Carbon
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
URB	Uranium-Reducing Bacteria
WQ	Water Quality
WQM	Water Quality Model
WQO	Water Quality Objective

1 INTRODUCTION

BMC Minerals (No.1) Ltd. (BMC) is proposing to develop the Kudz Ze Kayah Mine (the Project) in southeast Yukon, Canada. The Project is located in the Kaska Traditional Territory. A comprehensive Reclamation and Closure Plan (RCP) has been developed with the following main goal: *“To return the mine site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with traditional land use activities”*. The RCP illustrates the process by which closure measures have been designed to meet this goal and presents a framework for how attainment of the goal will be evaluated through Post-closure monitoring programs. Part of the RCP includes contingency measures that may be considered for implementation if the Post-closure monitoring shows that additional measures are needed to meet the closure goal. The primary contingency measure for the maintenance of water quality is a constructed wetland treatment system (CWTS), which will follow the *in situ* treatment of trace elements in the ABM Lake (Ensero, 2020).

Following an initial evaluation of the feasibility of implementing CWTS at the Project, a phased approach to design a CWTS was implemented in 2015 and Ensero Solutions (Ensero; formerly Contango Strategies, an AEG Company), was retained to undertake the phased design. An overview of the five-phase approach for CWTS design and implementation for the Project is provided in Table 1-1. Additional details of the phased approach are presented in Section 3.2.

Table 1-1: Five Phased Approach for Constructed Wetland Treatment System Design and Implementation

Phase	Objective	Status/Timelines	Report Reference
Phase 1a	Information gathering and site assessment	Completed 2016	Contango, 2016
Phase 1b	Conceptual design and sizing	Completed 2017	Contango, 2017a
Phase 2	Off site bench-scale testing	September 2019 (Interim Report)	AEG, 2019b
Phase 3	Off site pilot-scale testing and optimization	Completed 2020	This report
Phase 4	On site demonstration-scale design and monitoring	Future scope	Future scope
Phase 5	Full-scale implementation	Future scope	Future scope

This report summarizes the off site bench-scale testing (Phase 2) and off site pilot-scale CWTS commissioning and test work (Phase 3). Specifically, this report summarizes:

- Research objectives (Chapter 2);
- Background (treatment objectives, processes, and mechanisms) (Chapter 3);
- Bench-scale test work (Chapter 4);
- Pilot-scale CWTS construction (Chapter 5);
- System commissioning (Chapter 6);
- Operational period monitoring and sampling activities (Chapter 6);
- Data analysis (Chapter 7);
- Treatment of constituents of potential interest (COPs), including stagnation and freeze-thaw testing, fate and distribution of COPs in the CWTS, formation of acid volatile sulphides (AVS), microbiology communities in the CWTS, vegetation growth and the effects of forebays, hydrosol impacts, detritus and accretion in the CWTS (Chapter 8);
- Summary of key findings (Chapter 9); and

- Recommendations and next steps (Chapter 10).

2 OBJECTIVE

The overall objective of off site bench-scale and pilot-scale phases is to refine the CWTS sizing and expected CWTS outflow water quality for the Project. The CWTS sizing and expected outflow water quality were initially presented by AEG (2017) and Contango (2017a). The water quality model was subsequently updated in 2018 (AEG, 2018). This model showed that all WQOs will be met in the receiving environment without the installation of CWTS; therefore, the CWTS became a contingency measure.

Specific objectives of the pilot-scale CWTS testing program are to evaluate and optimize:

- Hydrosol conditions including substrate specifications for construction, microbial communities, and soil amendments;
- CWTS design, including evaluating bulrush and/or water sedge for COPI treatment;
- CWTS performance and stress testing using simulated influent mimicking “worst-case” scenario and varying flow rates to evaluate treatability;
- Fate and distribution of COPs in the pilot-scale system;
- Site-specific removal rate coefficients through analysis of pilot-scale treatment kinetics, overall reaction stoichiometry, and total extents of removal;
- Other aspects of the CWTS design, including detritus decomposition rates and evapotranspiration rates; and
- Seasonal fluctuations through stagnation and freeze-thaw testing.

3 BACKGROUND

3.1 TREATMENT WETLANDS

The Yukon Government states that “*reliance on long term active treatment is not considered acceptable for reclamation and closure planning*” (Yukon Energy, Mines and Resources, 2006). BMC recognizes that reliance on long term “active treatment”, such as long-term active water treatment is not acceptable. As such, the Project is designed for a long-term closure scenario of minimal monitoring and maintenance.

Passive and semi-passive water treatment has been successfully used for removal of metals and metalloids, and neutralization of acidic waters for several decades. There are many examples globally of treatment by constructed wetlands and other passive and semi-passive treatment technologies from which scientific principals can be sourced for application in new systems, along with more recent advances in technology and application (which have been summarized in Ness et al., 2014; Rodgers and Castle, 2008). Regardless of the type of wetland treatment system or geographic location, fundamentals such as thermodynamic laws, Stokes’ laws (settling), stoichiometry, and concepts of coupled biogeochemical reactions are globally applicable, crossing geographical and climatic boundaries. Moreover, there are standard calculations, such as Arrhenius’ equation, that can be applied as necessary to adjust for temperature in chemical reactions.

Successful treatment of mine-influenced water in the north and/or cold climates has been achieved by integrating an understanding of the impacts of a cold climate in the system design phases. In cold climates, passive treatment systems are able to effectively treat mine impacted water (Contango, 2017b). Treatment wetlands are common place worldwide, including in cold-climates, and there are several reported case studies in peer-reviewed scientific literature (Table 3-1).

Table 3-1: Summary of Selected Wetland Case Studies

Water Source	Location	Constituents (mg/L) ¹							Wetland Type	Comments	Reference
		Arsenic	Cadmium	Selenium	Lead	Zinc	Copper	Antimony			
Copper Mine	Minto Mine, YT	n/a	0.000336 to 0.000027	0.01 to 0.006	0.00059 to 0.00020	0.04 to 0.0032	0.15 to 0.013	n/a	Pilot-scale	Designed to mimic worst-case Post-closure water quality	Haakensen et al. (2015)
		n/a	0.000022 to 0.000008	0.0052 to 0.0033	0.00005 to 0.00003	0.03762 to 0.01224	0.0461 to 0.0288 (D-Cu)	n/a	Demonstration-scale	Spring/Summer/Fall trial using combined waste rock and dry tailings seepage water	Contango (2017c)
Smelter landfill	Trail, BC	150 to <0.5	4.7 to <0.02	n/a	n/a	n/a	n/a	n/a	On-site pilot-scale	Year-round treatment, 15,000 L/d	Duncan (2010)
Gold-cobalt-bismuth-copper mine	Fortune Minerals Mine, NWT	0.48 to 0.11	n/a	n/a	n/a	n/a	n/a	n/a	Natural wetland	Information from natural wetland treatment utilized for pilot-scale design and testing	Contango (2014c)
Silver-cooper-bismuth mine	Terra mine, NWT	0.05-0.08 to 0.005-0.07	n/a	n/a	n/a	n/a	n/a	n/a	Natural wetland	Natural wetland receiving mine tailing discharge	Sealey (2011)
Gold mine	Finland – Peatland 1	0.041 to 0.0082	n/a	n/a	n/a	n/a	n/a	0.160	Full-scale	Natural peat wetlands receiving mine tailings discharge. Year round treatment with snow cover from November to May and mean annual temperatures between -3°C and 6°C	Palmer et al. (2015)
	Finland – Peatland 4	0.14 to 0.014	n/a	n/a	n/a	n/a	n/a	0.0355			

Water Source	Location	Constituents (mg/L) ¹							Wetland Type	Comments	Reference
		Arsenic	Cadmium	Selenium	Lead	Zinc	Copper	Antimony			
Uranium mine	Curilo, Western Bulgaria	0.01-0.59 to <0.01- <0.1	0.01-0.12 to <0.01	n/a	n/a	n/a	n/a	n/a	Full-scale	Natural and CWTS receiving mine tailings discharge	Groudev et al. (2008)
Mine, milling, and smelting discharge	Butte Hill, Colorado	25.5 to 11.9 (Colorado Tailings) ²	40.5 to 0.51; 39.6 to 1.2 ²	n/a	n/a	n/a	n/a	n/a	Demonstration-scale	Series of CWTS receiving mine, milling, and smelting discharge	Gammons et al. (2000)
Natural runoff and agricultural irrigation drainage	Great Falls, Montana	n/a	n/a	0.026 to <0.001	n/a	n/a	n/a	n/a	Full-scale	Engineered natural system separated into 6 ponds using dikes	Zhang and Moore (1996)

¹ Maximum mean inflow concentration and corresponding outflow concentration.

² Concentrations in µg/L.

n/a = not applicable

Preliminary scoping and closure planning suggests that waste source control and pit water treatment (AEG, 2018) will provide substantial primary contaminant load reduction during the closure phases at the Project. CWTSSs have been identified as a feasible contingency measure for passive water treatment for the Project. This is due largely to the existence of wetland systems in the existing ecological condition in the immediate Project vicinity (Geona Creek), and the area within the proposed mine footprint can be converted to a CWTS following the cessation of mining with minimal additional disturbance.

3.2 PHASED APPROACH AND CWTS IMPLEMENTATION

For CWTSSs to be efficient and effective, they must be designed, tested, optimized, and implemented in a site-specific manner (Rodgers and Castle, 2008; Haakensen et al., 2015). This can be achieved using a phased approach, which allows for adjustments to be made and operational boundaries to be identified on a small scale (off site) prior to on site research and/or full-scale implementation. Following a phased approach (Table 1-1), the full-scale system can be built with an optimized design along with a refined operational decision tree and adaptive management plan. This type of phased approach has been developed in academic programs and applied to full-scale applications that have now operated for decades (Hawkins et al., 1997; Huddleston and Rodgers, 2008; Murray-Gulde et al., 2008; Rodgers and Castle, 2008), and is now being applied through Canadian and Northern climates (Fortune Minerals, 2014; Nordin et al., 2010; Ness et al., 2014; Contango, 2014a, 2014c, & 2016a).

Each phase in the development of the CWTS provides progressively more detailed information to inform on the CWTS design and ensure optimal operation and function the CWTS. Table 3-2 below provides an estimate of the time required for completion of each phase of constructed wetland treatment system development. The earliest period of mine operation in which that phase could be undertaken is also indicated.

Table 3-2: Conceptual Schedule of Completion of Phased Implementation of Constructed Wetland Treatment System

Phase		Time Required	Available Time in Operational/Closure Schedule	Earliest Period Applicable
Phase 1a	Information gathering and site assessment	3-6 months		Pre-operational
Phase 1b	Conceptual design and sizing			Pre-operational, once water quality predictions are available
Phase 2	Off site bench-scale testing and optimization	3-6 months	2.5 years until start of <i>Mine Construction</i> , and another 1.5 years during <i>Mine Construction</i>	Pre-operational, once water quality predictions are updated
Phase 3	Off site pilot-scale testing and optimization	8-16 months		After Phase 2 is complete
Phase 4	On site demonstration-scale implementation and monitoring	2-5 years	10 years during <i>Mining Operations</i>	Operational period
Phase 5	Full-scale implementation – North CWTS	1 year for construction and 2 years for commissioning	2 years during <i>Transition Closure</i> as Pit is filling for construction 10 years during <i>Transition Closure</i> as Pit finishes filling for commissioning	After size refinement in Phase 4

3.3 TREATMENT OBJECTIVES

A CWTS is a passive water treatment system specifically designed to treat certain COPIs that may be present in impacted waters. The following summarizes the Project specific COPIs and their associated water quality objectives (WQOs).

COPIs for the Project were identified as those with baseline concentrations that exceeded WQOs or those predicted to exceed the WQOs during the Project phases in the absence of appropriate mitigation measures (AEG and Minnow, 2020). Twenty COPIs have been identified for the Project, which include aluminum, unionized ammonia, antimony, arsenic, cadmium, cobalt, copper, weak acid dissociable cyanide, fluoride, iron, lead, manganese, nickel, nitrate, nitrite, selenium, sulphate, thallium, uranium, and zinc (AEG and Minnow, 2020). Although WQOs are not proposed for ABM Lake, the WQOs proposed for the closest receiving environment station (KZ-37) downstream of ABM Lake were used to screen the concentrations anticipated in ABM Lake in the absence of *in situ* treatment (AEG, 2018). Based on water quality modelling (without ABM Lake treatment) eight COPIs are predicted to exceed the KZ-37 WQOs for the Project (AEG, 2018). These eight COPIs are therefore discussed in this report for treatment in the CWTS (as a contingency measure) and include arsenic, antimony, cadmium, copper, lead, selenium, uranium, and zinc. The applicable WQOs for the eight CWTS COPIs are summarized in Table 3-3. While these eight CWTS COPIs comprise the focus of this report, data are available for all twenty Project COPIs except cyanide and fluoride which were not evaluated through the pilot-scale trials. Cyanide is a product of ore processing during mining operations and is not anticipated to be present in ABM Lake. Fluoride is naturally elevated in surface waters at the Site (AEG, 2019c), but is expected to be present in ABM Lake at levels well below the WQO (AEG, 2018; AEG and Minnow, 2020).

WQOs used for the CWTS pilot-scale system development were a combination of Canadian Council of Ministers of the Environment (CCME, 2018), BC Ministry of Environment (BCMOE, 2017) guidelines and site specific objectives for

Geona Creek at station KZ-37 (AEG, 2018). Updated WQOs were published in 2020 and were used for the assessment of treatment in the pilot-scale CWTS in this report. Details for the selection of 2020 guidelines are provided in the Consolidated Water Quality Objectives Report (AEG and Minnow, 2020). Unless noted otherwise, treatment of cadmium, copper, and zinc are discussed in this report in terms of dissolved concentrations for consistency with the dissolved form of these elements used for water quality objectives in the receiving environment (AEG and Minnow, 2020). Treatment of all other COPIs are discussed in this report in terms of total concentrations for consistency with total form of these elements used for water quality objectives in the receiving environment.

It is important to note that the WQOs were developed for the downstream receiving environment; however, they have been retained for comparison to the pilot-scale CWTS treated concentrations for the purposes of CWTS research. In practice, discharge from the CWTS will likely experience additional dilution from clean runoff prior to reaching the receiving environment station at which the WQOs apply. As such, the use of the WQOs for comparison with the pilot-scale CWTS discharge concentrations is considered conservative. Treatment objectives for the full-scale CWTS will be developed as part of the sizing of that system, in conjunction with the Project water quality model.

Table 3-3: Water Quality Objectives CWTS COPIs

Constituent	Water Quality Objective	Source
Antimony, Total	0.009 mg/L ¹	ENV
Arsenic, Total	0.037 mg/L	SSWQO
Cadmium, Dissolved	0.000377 – 0.000456 mg/L	ENV
Copper, Dissolved	0.00144 mg/L (station KZ-37)	BCP-SSWQO/ENV
Lead, Total	0.012 – 0.017 mg/L	ENV
Selenium, Total	0.00243 – 0.00316 mg/L	SSWQO
Uranium, Total	0.015 mg/L	CCME
Zinc, Dissolved	0.039 – 0.073 mg/L	CCME

BCP – Background Concentration Procedure.

CCME – Canadian Council of Ministers of the Environment.

ENV – British Columbia Ministry of Environment and Climate Change Strategy (formerly BC MOE).

SSWQO – Site-Specific Water Quality Objective.

¹ Ammonia-N guideline presented rather than unionized ammonia-N as no material difference anticipated.

3.4 PROXY REMOVAL RATE COEFFICIENTS

For the Project's conceptual CWTS design and sizing that was performed in Phase 1b (Table 3-2), proxy removal rate coefficients that were developed for other CWTS projects with similar chemistry and conditions to the Project site were used in advance of the development of removal rate coefficients specific to the Project (Table 3-4; AEG, 2017b). These proxy removal rate coefficients that were used to develop conceptual CWTS design and sizing for the Project are compared to the site-specific removal rate coefficients that were developed for the Project through the pilot-scale CWTS test work described herein.

Table 3-4: Proxy Removal Rate Coefficients for Constituents of Potential Interest Based on Other CWTS Projects

COPI	Proxy Removal Rate Coefficients (days ⁻¹)	Source
Antimony	-- ¹	--
Arsenic	0.077	Schwindaman et al. ²
Cadmium	0.48	Other pilot and demonstration testing ³
Copper	0.48	Other pilot and demonstration testing ³
Lead	0.723	Rodgers and Castle ⁴
Selenium	0.456	Other pilot and demonstration testing ³
Uranium	-- ¹	--
Zinc	0.48	Other pilot and demonstration testing ³

Table summarized from AEG, 2017b

¹ Proxy removal rate coefficients are not available.

² Schwindaman et al, 2014.

³ Derived from pilot- and demonstration-scale testing done by Ensero (formerly Contango Strategies, an AEG Company) for other projects in Northern Canada.

⁴ Rodgers and Castle, 2008. Warm climate biological treatment in CWTS, with 25% inefficiency factor applied for conservatism.

3.5 TREATMENT PROCESS

Passive treatment systems rely on transfers (e.g., sorption, filtration) and transformations (e.g., photolysis, geochemical/biogeochemical reactions) to remove COPIs from water (Rodgers and Castle, 2008). Biogeochemical transformation reactions are catalyzed by microbes which can be encouraged by targeted environmental conditions in a CWTS. The conceptual CWTS was designed to stimulate microbes that are naturally present at the site (Contango, 2017a). These bacteria oxidize an organic carbon source (such as decaying bulrush or water sedge) and transfer the electrons released to a terminal electron acceptor (TEA). The TEAs are generally used in the order of which is most energetically favorable by microbes. Of the major TEAs typically present in mine-impacted surface waters, Dissolved oxygen is used first, followed by nitrate (NO₃), selenate (Se(VI)), manganate (Mn(IV)), ferric iron (Fe(III)), uranyl (U(VI)), and then sulphate (SO₄) (Borch et al., 2010), creating a “redox (reduction-oxidation) ladder” (Figure 3-1). The order of TEA utilization can also be influenced by pH and TEA concentration.

Redox Potential	Electron Acceptor	Reduction Product
Oxidizing Conditions ↑ ↓ Reducing Conditions	O_2	H_2O
	NO_3	N
	SeO_4	SeO_3
	Mn (IV)	Mn (II)
	Fe (III)	Fe (II)
	U (VI)	U (IV)
	SO_4	HS

Figure 3-1: Redox Potential and Terminal Electron Acceptors

Summarized based on theoretical redox ladder (Borch et al., 2010)

The TEAs are monitored through the CWTS pilot-scale tests to evaluate conditions that have established in the system. The theoretical order of TEA consumption is not absolute, and is used to guide treatment design and performance evaluation. The pilot-scale CWTS have been designed to target sulphate-reducing conditions, to remove TEA above sulphate (e.g., nitrate, selenium, uranium; Figure 3-1) as well as to promote the formation of sulphide which then reacts with chalcophile metals (e.g., cadmium, copper, zinc) to form insoluble sulphide minerals. These insoluble sulphide minerals then precipitate from the water column and are filtered through the CWTS.

Parameters such as dissolved iron and dissolved manganese can also provide insight into the conditions in a CWTS, with increased concentrations of these parameters showing targeted reducing conditions have been achieved based on the theoretical redox ladder (Borch et al., 2010). As manganese and iron are held in the substrate as (hydr)oxides, the development of more reducing conditions can result in their transient release as the host phases are dissolved under manganese- and iron- reducing conditions.

TEA consumption can be influenced by numerous factors including the overall concentrations of reduced and oxidized TEA species, spatial distribution of organic electron donors and TEAs, other residual products, and the abundance and diversity of TEA-metabolizing microbial populations. Latent potential for these natural treatment pathways on site were identified in the site assessment (Contango, 2016). The specific mechanisms for treatment of the COPs are described in Section 3.6.

3.6 TREATMENT MECHANISMS

3.6.1 DENITRIFYING BACTERIA

Even if not in exceedance of water quality objectives, nitrate often requires treatment to subsequently achieve treatment of other constituents such as selenium and uranium, as well as metals and metalloids through sulphide production (Borch et al., 2010; Tan et al., 2016). Nitrate is typically more desired as an electron acceptor by microbes over selenium and sulphate, therefore, microbes will preferentially reduce nitrate. Nitrate can be removed from water through denitrification by different types of microbes, including nitrate-reducing bacteria which can reduce nitrate

(NO₃) to nitrite (NO₂), and also denitrifying organisms that are capable of fully reducing nitrate to nitric oxide (NO), nitrous oxide (N₂O), and subsequently to dinitrogen gas (N₂, which is the most abundant gas in air).

3.6.2 SELENIUM-REDUCING BACTERIA

The targeted selenium treatment pathways in the CWTS include direct reduction in the water column of selenate (Se(VI)) to selenite (Se(IV)) and sorption to moss, detritus, and substrates, and subsequent microbial reduction of soluble (sorbed) selenite (Se(IV)) to insoluble elemental selenium (Se(0)). This reductive process can also be achieved directly in the water column alone but it is more effective when associated with mosses and biofilms due to their sorptive properties that bring the selenium in contact with beneficial selenium-reducing bacteria (SeRB). There are several different types of selenate and selenite-reducing bacteria that reduce these soluble forms of selenium to insoluble elemental selenium (e.g., Gonzalez-Gil et al., 2016; Nancharaiah et al., 2015; Sharma et al., 2015).

3.6.3 URANIUM-REDUCING BACTERIA

Under uranium-reducing conditions, uranium is treated through microbially mediated reduction of soluble uranyl (U(VI)) to uranium in its +4 oxidation state (U(IV)) by uranium-reducing bacteria (URB), followed by U(IV) precipitation as uraninite (Lovley et al., 1991; Shelobolina et al., 2007). Uranyl is reduced under similar conditions as sulphate (anaerobic/reducing); there is overlap between the types of organisms that can produce sulphides and those that are able to treat uranium through reductive processes.

3.6.4 SULPHIDE-PRODUCING BACTERIA

Sulphide production is a key biogeochemical mechanism for water treatment in the CWTS and is carried out by sulphide-producing bacteria (SPB) through the reduction of sulphur-containing compounds (e.g., sulphate, sulphite, thiosulphate, sulphur). This process produces sulphides which bind metals and metalloids (such as antimony, arsenic, cadmium, copper, lead, nickel, thallium, and zinc) as sulphide minerals to produce insoluble precipitates. These SPB thrive in anaerobic conditions with soil redox ranges between -100 and -250 mV (Mitsch and Gosselink, 2007). The percentage and abundance of SPB can be monitored in the CWTS, where they are expected to increase as the system commissions.

4 BENCH-SCALE TEST WORK

The purpose of the bench-scale test work (Phase 2) was to refine the recipe for synthetic water, which was used during the latter part of commissioning and throughout the pilot-scale testing and optimization as influent to the CWTS systems. Bench-scale test work was conducted concurrently with CWTS pilot-scale construction and early commissioning (i.e. when tap water was flowing through the wetland cells).

The synthetic water recipe was based on the 2018 water quality model (AEG, 2018) for overflow from the ABM Lake during the Post-closure phase of the Project. Table 4-1 presents the base case treatment efficiencies from the 2018 water quality model. To evaluate the most conservative water chemistry, it was assumed that the *in situ* ABM Lake treatment was not as effective as initially predicted. It was assumed that *in situ* treatment resulted in 0% to 50% COPI removal rather than the 50% to 95% expected for the base case (Table 4-1). No changes were made to the arsenic concentration in the synthetic water since significant arsenic removal is not expected via *in situ* treatment. Although this scenario is not predicted to occur in the Post-closure phase (based on treatment observed in the concurrent ABM Lake treatment trials) this assumption ensures that the CWTS is designed for a “worst case” scenario (Ensero, 2020).

Table 4-1: Assumed Base and “Worst Case” Percent Removals for ABM Lake *in Situ* Treatment (for Water Quality Influent to the Constructed Wetland Treatment System)

<i>In Situ</i> Treatment Reduction (% Removal)		
Constituent	Base Case	“Worst Case”
Antimony	50%	0%
Arsenic	0%	0%
Cadmium	90%	50%
Copper	95%	50%
Lead	50%	25%
Selenium	50%	25%
Uranium	50%	25%
Zinc	90%	50%

The synthetic water included all constituents predicted to be in the water chemistry, as parameter interactions can impact treatment of certain COPs. Some constituents can interfere with CWTS function, while others can affect treatability of elements in beneficial or detrimental ways (Haakensen et al., 2015). The treatability of water therefore needs to be evaluated as a whole, and not solely focused on COPs. The synthetic water target concentrations are presented in Table 4-2.

All test work was completed at Ensero’s laboratory in Saskatoon. To generate the synthetic water, constituents were added to the City of Saskatoon municipal water (tap water) to achieve the targeted concentrations. Prior to adding constituents to the tap water, the water quality of the tap water (reported by the City of Saskatoon; November 2018) was compared to the target water chemistry to identify those constituents needing amendment. The compounds added to the tap water, where required, are presented in Table 4-2.

Copper concentrations in the synthetic water were higher than targeted concentrations, due to background levels in the tap water which ranged from 0.014 to 0.082 mg/L dissolved copper. Similarly, concentrations of ammonia, chloride, nitrite, and nitrate in tap water were higher than targeted concentrations. These background concentrations will not impact testing or development of a site specific removal rate coefficient, and are not at toxic levels for wetland plants (Contango, 2014b; Contango, unpublished; Friesen et al., 2017; Riley, 2000; Sobolewski et al., 1995). The synthetic influent recipe and the average concentrations achieved in the influent throughout pilot-scale CWTS testing are presented in Table 4-2.

Table 4-2: Target and Average Constituent Concentrations for Synthetic Water for Pilot-scale Constructed Wetland Treatment System Testing

Constituent	Compound Added to Influent	Target – Total Concentration (mg/L) ¹	Average Concentration in Synthetic Water (mg/L) ²	
			Total	Dissolved
Aluminum ³	-	0.010	0.029	0.013
Ammonia ³	-	0.018	0.64	
Antimony	KSbO ₃ •3H ₂ O	0.019	0.021	0.020
Arsenic	Na ₂ HAsO ₄ •7H ₂ O	0.058	0.061	0.060
Cadmium	CdCl ₂ •2H ₂ O	0.0020	0.0020	0.0020
Calcium	CaSO ₄ •2H ₂ O	107	108	108
Chloride ³	-	0.53	61.5	
Cobalt	CoSO ₄ •7H ₂ O	0.0026	0.0027	0.0026
Copper ³	-	0.009	0.027	0.025
Hardness	-	437	338	
Iron ³	-	0.01	0.016	0.003
Lead	Pb(NO ₃) ₂	0.022	0.022	0.015
Manganese	MnSO ₄ •H ₂ O	0.066	0.054	0.050
Nickel	NiCl ₂ •6H ₂ O	0.0078	0.0088	0.0089
Nitrate ³	-	0.0250	0.360	
Nitrite ³	-	0.001	0.054	
Selenium	Na ₂ SeO ₄	0.007	0.008	0.008
Sulphate ⁴	-	231	232	
Uranium	Uranium Standard	0.026	0.029	0.029
Zinc	ZnSO ₄ •7H ₂ O	0.192	0.165	0.161
Total Alkalinity as CaCO ₃	-	-	67.6	
pH	HCl	7-8	7.33	

¹ Target “worst case” concentrations based on 50% efficiency of base case *in situ* ABM Lake treatment

² Average concentration through pilot-scale CWTS operational testing period (May 18, 2019 – Jan 13, 2020).

³ Not added to the synthetic influent, as background concentrations in tap water were greater than target.

⁴ Added through other constituents that contain sulphate and in tap water.

5 CONSTRUCTED WETLAND TREATMENT SYSTEM DESIGN AND CONSTRUCTION

Pilot-scale test work was initiated in November 2018, following receipt of the influent water quality (Chapter 4). The design was based on a hypothetical scenario where the *in situ* treatment of the ABM Lake water did not meet the predicted performance in the Post-closure phase of the Project thus resulting in the need for the implementation of a contingency CWTS to ensure that the water quality in the receiving environment meets the Project's WQOs. The design was also based on species that were identified to be naturally occurring during the initial site assessment (Contango, 2016), and that were subsequently collected during the site visit in 2018.

The anaerobic CWTSs were built in triplicate both to ensure replicability of the experiments, and to allow for replicate specific tests to be conducted (e.g., stagnation, freeze-thaw). The pilot-scale test work design is shown in Figure 5-1. Cells were named A through C from influent to outflow. Series 1 through 3 were planted with bulrush (*Schoenoplectus*) and series 4 though 6 were planted with water sedge (*Carex aquatilis*) collected from the site and surrounding area (Section 5.1.2). Synthetic influent flowed to each series from a single influent tank with metered flow. Forebays were added to four of the series (1, 3, 4, and 6) to evaluate the addition of carbon amendments.

The pilot-scale system design details are provided in Section 5.1 , including substrate and plant species selection and collection. Details of the system commissioning are provided in Section 6.1 including system adjustments, straw addition, and monitoring.

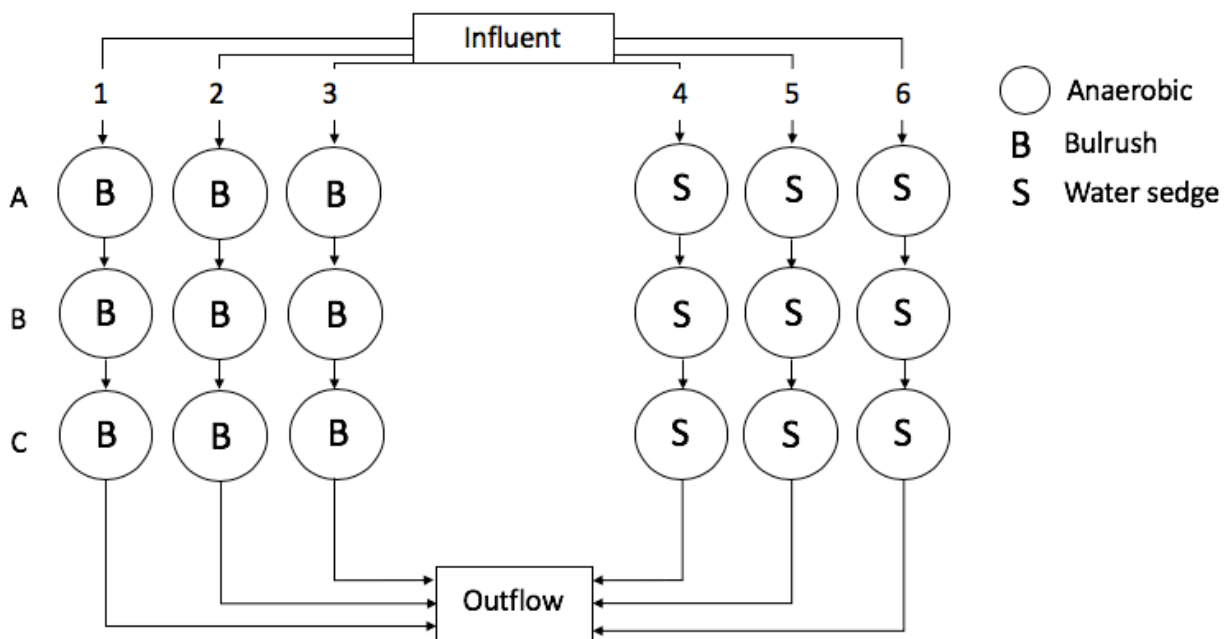


Figure 5-1: Diagram of Pilot-scale Constructed Wetland Treatment System

From left to right: series 1-3 show the anaerobic bulrush cells and series 4-6 show anaerobic water sedge cells. Aquatic moss was also added to each cell. All series had three cells flowing from A through C. Forebays were added before the A cells of series 1, 3, 4, and 6.

5.1 SYSTEM ASSEMBLY

The off site CWTS pilot-scale systems were constructed in a controlled climate facility at the Ensero laboratory in Saskatoon, Saskatchewan. The pilot-scale system was built using 55 gallon plastic barrels to represent individual treatment cells with horizontal surface flow in a series. Individual cells were used to facilitate sample collection

throughout a series and to gather information on treatment kinetics and performance limits through an individual system design. Details of the two sets of systems are provided in Table 5-1.

Table 5-1: Pilot-scale Constructed Wetland Treatment System Construction Details

Series	System Design	Construction Description	Substrate	Water Depth	Vegetation
1 to 3	Anaerobic CWTS with bulrush (<i>Schoenoplectus</i>) and aquatic moss	Three series constructed as replicates, each with three cells Cell dimensions: diameter 57 cm, height 93 cm, volume 237 L	Sand and woodchip substrate added to a height of 30 cm in each cell	50 cm	Bulrush harvested in 2018 from Coffee Lake (approximately 150 km from the Project site) Aquatic moss harvested from site
4 to 6	Anaerobic CWTS with water sedge (<i>Carex aquatilis</i>) and aquatic moss	Three series constructed as replicates, each with three cells Cell dimensions: diameter 57 cm, height 65 cm, volume 166 L	Sand and woodchip substrate added to a height of 30 cm in each cell	30 cm	Water sedge harvested from the Project site in 2018 Aquatic moss harvested from site

5.1.1 SUBSTRATE

The selected substrate mixture of 90% medium to coarse sand and 10% wood chips (Photograph 5-1) was designed to achieve the targeted hydraulic conductivity, facilitate reducing conditions, ensure structural stability, and prevent resuspension. Medium to coarse sand was used in the CWTS consisting of grains with a diameter between 0.2 to 1 mm and a critical resuspension linear flow velocity of 2 to 10 cm/s. The resulting mixture had a porosity of approximately 23%. Slow release fertilizer was also added into the substrate to promote growth of the plants during commissioning. Organic material (wood chips) was supplemented into the sand to provide carbon for the CWTS while the system matures.



Photograph 5-1: Substrate Added to Cells During Pilot-scale Constructed Wetland Treatment System Construction

Substrate consisted of 90% sand and 10% woodchips by volume.

5.1.2 PLANT SELECTION

The pilot-scale CWTS was designed to create conditions that are: sustainable; minimize uptake of constituents into vegetation; and, promote direct mineralization and decreased bioavailability. Considerations regarding plant selection included: physiology (e.g. radial oxygen loss, water depth tolerance); biomass production per year versus decomposition rate (accretion factor); bioconcentration tendencies; effective plant density; flow rate tolerance; structural capacity; capacity for prevention of sediment resuspension; transpiration rate; and provision for microbial habitat and nutrients.

A site assessment (conducted in August 2015) resulted in two plant species of interest being chosen for the pilot-scale CWTS (Contango, 2016) – water sedge and bulrush. These plant species were collected during the July 2018 site visit and were maintained in Ensero’s nursery facility until construction of the pilot-scale CWTS.

Water sedge and aquatic mosses were found ubiquitously at the Project, at all sites sampled in the 2015 site assessment (Contango, 2016), including along Geona Creek and Finlayson Creek. As such, water sedge and aquatic mosses were collected directly from the Project site for the pilot-scale CWTS. Bulrush was not found at the Project, but was found at nearby Coffee Lake, at km 350 of the Robert Campbell Highway and was collected from Coffee Lake for use in construction of the pilot-scale CWTS.

Bulrush are of interest for CWTS design as they are known to create reducing conditions in treatment wetlands (Murray-Gulde et al., 2005; Rodgers & Castle, 2008). Additionally, bulrush have a greater water depth tolerance than

sedge species (approximately 100 cm versus 30 cm), and thus may provide a greater range of design options. The greater water depth would allow for a longer hydraulic retention time (HRT) in the same footprint, which may be useful depending on flow rates and land area available for full-scale construction. Greater water depths would also decrease the turbulence in the wetland during periods of high water flow and high winds, and increase the time available for suspended solids to settle in the wetland.

Sedge offer a range of flexibility in CWTS function, as either oxidizing or reducing conditions can be established using different substrates (sand or gravel) and water depths in the design. Sedge roots generally have low radial oxygen loss and can promote reducing zones even at water depths of 20 to 30 cm (Haakensen et al., 2015). Pilot-scale studies conducted for other mine sites in Yukon for metal and metalloid treatment of circum-neutral water have confirmed that sedge are readily amenable to transplantation, can host an abundance of beneficial microbes, and can promote conditions for mineralization of a range of elements, with very little COPI uptake (Haakensen et al., 2015).

Wetland plants are also known to be peat forming with high accretion rates, thus trapping minerals in the soils which decreases bioavailability, prevents resuspension, and maintains low overall concentrations of COPI (e.g., Murray-Gulde et al., 2008). Over time, precipitated COPI minerals aggregate to former larger particles, which decreases their solubility (e.g., Moreau et al., 2004). Furthermore, the amorphous iron sulphides that initially form under sulphate-reducing conditions within CWTS and which can co-precipitate COPI metals will transform with aging to more crystalline forms which are more resistant to solubilization, forming an important sink for trace metals (Huerta-Diaz et al., 1998). Burial of these phases with time also enhances their stability by limiting their exposure to any oxidizing fluids or gases that may occasionally intrude on the CWTS.

In addition to water sedge or bulrush, each series was supplemented with aquatic bryophytes (mosses). Mosses have long been known as metal accumulating organisms useful in remediation (Aldrich & Feng, 2000). Aquatic mosses are particularly useful in CWTS as they have a high sorption capacity and contribute to both sulphide-producing conditions and accretion of soils. In contrast to macrophytes (e.g., water sedge and bulrush), mosses tend to uptake large amounts of elements, both through sorption and filtration (Aldrich & Feng, 2000; Gstoettner & Fisher, 1997). Mosses are a relatively benign sink for these elements, as they are not a food source for invertebrates or higher animals and as such do not contribute greatly to bioaccumulation (Haines & Renwick, 2009; Longton, 1997; Suren & Winterbourn, 1991).

6 METHODS FOR SYSTEM COMMISSIONING AND OPERATION

6.1 SYSTEM COMMISSIONING

The commissioning period enables plants and microbes to acclimate and mature in the pilot-scale system prior to the commencement of testing. The commissioning period began on November 23, 2018 with completion of the pilot-scale CWTS construction. After construction, all cells were filled to a water depth of 10 cm with tap water. As plants matured, the water depth was increased gradually to a final depth of 50 cm in the bulrush cells and 30 cm in the water sedge cells, with flow beginning after full depth was reached. Synthetic water (influent) (Chapter 4) began flowing through the CWTS on March 5, 2019 once the plants were thriving and the synthetic water recipe was finalized. Hydraulic Retention Times during commissioning were 16 days in the bulrush series and 13 days in the water sedge series. The Hydraulic Retention Time in the water sedge series was adjusted to 9.5 days to prevent cells from becoming too reducing following the addition of straw while the plants were establishing (Section 6.1.1). Temperatures during commissioning were set to 30°C during the day and 15°C at night for the first three months of commissioning to expedite plant growth. For the last two months of commissioning, temperatures were on average 25°C during the day and 15°C at night to continue promoting plant establishment and based on temperature influences by external seasonal temperature fluctuations.

6.1.1 ADJUSTMENTS DURING COMMISSIONING PERIOD

Adjustments administered and defined through pilot-scale testing will be used to inform on site demonstration-scale and full-scale CWTS implementation. The adjustments are primarily aimed at promoting plant and microbial growth during commissioning. Adjustments were made throughout the commissioning period until May 17, 2018, when the system transitioned to the operational period (Table 6-1). These adjustments generally fall in the following categories:

1. Gradual water depth adjustment;
2. Gradual carbon (straw) addition (Section 6.1.2); or
3. Flow adjustment.

These adjustments are dictated based on the requirement to obtain reducing conditions, where higher water depth, more available carbon substrate, and/or lower flow rates promote more reducing conditions.

Table 6-1: Adjustments to Pilot-scale Constructed Wetland Treatment Systems During Commissioning

Date	Adjustments to Pilot-scale System
23-Nov-18	Construction completed. Water at a depth of 10 cm in all cells.
28-Nov-18	Adjusted water depth. Bulrush (series 1 and 2) depth increased to 30 cm. Water sedge (series 4 and 5) depth increased to 20 cm.
10-Dec-18	Adjusted water depth. Bulrush (series 3) depth increased to 30 cm. Water sedge (series 6) depth increased to 20 cm.
14-Dec-18	Adjusted water depth. Bulrush (series 1 and 2) depth increased to 50 cm. Water sedge (series 4 and 5) depth increased to 30 cm.
04-Jan-19	Adjusted water depth. Bulrush (series 3) depth increased to 50 cm. Water sedge (series 6) depth increased to 30 cm.
07-Jan-19	Started flow. Bulrush (series 1 and 2) set to 20 mL/min (16-day HRT). Water sedge (series 4 and 5) set to 15 mL/min (13-day HRT).
14-Jan-19	Started flow. Bulrush (series 3) set to 20 mL/min (16-day HRT). Water sedge (series 6) set to 15 mL/min (13-day HRT).
24-Jan-19	Soil redox probes installed in every cell.
12-Feb-19	Straw added to all cells.
05-Mar-19	Synthetic influent began flowing through CWTS. Straw added to all cells.
12-Mar-19	Straw added to all cells.
15-Mar-19	Increased flow in water sedge CWTS to 20 mL/min (9.5-day HRT) as dissolved oxygen levels were very low.
19-Mar-19	Straw added to bulrush cells.
22-Mar-19	Outflow water sampling event.
26-Mar-19	Straw added to water sedge cells.
08-Apr-19	Straw added to all cells.
15-Apr-19	Outflow water sampling event.
16-Apr-19	Additional water sedge transplanted into cells 5C and 6C. Water sedge sourced from the KZK Site and kept in a nursery at Ensero.
18-Apr-19	Straw added to bulrush cells.
29-Apr-19	Straw added to bulrush cells.
06-May-19	Straw added to bulrush cells.
17-May-19	Decreased flow in water sedge CWTS to 12 mL/min (16-day HRT) to match bulrush CWTS for low flow testing period. Start of testing period.
21-May-19	Accretion bags installed (Section 6.11).

HRT = hydraulic retention time.

6.1.2 STRAW ADDITION

Organic carbon is necessary in a CWTS as it is used as an electron donor by beneficial microbes and facilitates the development of reducing conditions that drive COPI treatment in a mature system (e.g., Murray-Gulde et al., 2008). In a mature CWTS, the growth of water sedge and bulrush provides a renewable organic carbon source to the CWTS, thereby limiting the need for carbon supplementation in an operating wetland in most instances (Rodgers & Castle, 2008; Murray-Gulde et al., 2008). While a new CWTS matures and plants establish, a supplemental organic carbon source is typically needed. The amount of carbon supplemented in commissioning was estimated based on the amount of carbon expected to be provided by a mature system based on previous wetland studies (Table 6-2; Contango, unpublished). The biomass produced by a given plant type per square meter of wetland is intended to be refined through on site demonstration-scale testing.

Based on results from previous pilot-scale CWTS studies with a similar design to the KZK pilot-scale trial, mature bulrush and water sedge CWTS were anticipated to add 50 g/m² and 1272 g/m² of dry organic material per year, respectively. Table 6-2 presents the amount of straw that was added to each cell to supplement organic carbon during commissioning. Additional straw was added to the bulrush cells to try to promote more reducing conditions and to help commission the system. The straw was added in nine increments over twelve weeks to ensure the plants had enough time to adjust to the changes in conditions.

Table 6-2: Total Straw Added to Each Cell Based on Plant Species

Series	Plant Type	Theoretical Organic Material Added per Year (dry wt. g/m ²) ¹	Total Straw Added to Each Cell (dry wt. g)	Total Straw Added to Series (dry wt. g/m ²) ²
1 – 3	Bulrush	50	100	392
4 – 6	Water Sedge	1270	277	1080

¹ Based results from previous CWTS studies with a similar design to the KZK pilot-scale trial (Contango, unpublished).

² Based on the total amount of straw added to full series divided by the surface area of each series (0.766 m²); three cells per series.

6.1.3 SAMPLING AND MONITORING DURING COMMISSIONING PERIOD

Sampling and *in situ* testing was performed during pilot-scale commissioning to evaluate commissioning progress. Periodic nutrient testing was conducted to ensure that sufficient nitrogen and phosphorous were present in the system to optimize plant growth. Once influent was initiated through the system to prime for operations (March 5, 2019), water samples were collected and sent for analysis of routine cations, total metals and dissolved metals to evaluate conditions and to inform load removal (Section 7.1). Influent and outflow water samples were collected on March 22 and April 15, 2019 according to methods described in Section 6.3. Additionally, YSI and soil redox measurements were taken on a weekly basis to monitor conditions in the pilot-scale CWTS during commissioning according to methods described in Section 6.3.

6.2 OPERATIONAL TEST PERIODS

The operational test period was initiated on May 18, 2019 based on conditions in the pilot-scale CWTS (Section 8.1). Operational testing consisted of three stages, which were ordered to guide decision-making throughout the operational period (Figure 6-1). Operational testing consisted of four flow periods: low flow, medium flow, high flow, and very low flow (Figure 6-1).

Flow rates were set during each testing period to achieve a range of HRTs in the pilot-scale CWTS. The range of HRTs was estimated based on the monthly flows presented in the water quality model (AEG, 2018) and potential HRTs that may occur in the full-scale system (Table 6-3). Minimum, maximum, and average flows from May to October were used to calculate the wetland sizes predicted to be needed for the full-scale CWTS using inflow chemistry (Chapter 4), WQOs for the downstream receiving environment (Section 3.3), and proxy removal rate coefficients (Section 3.4). This was done using the rearranged rate removal coefficient equation that is described in Section 7.2 (Equation 7-1). The flow rates in Table 6-3 and the calculated wetland sizes were then used to calculate the range of HRTs that may be observed using the HRT equation (Equation 6-1), which guided the selection of HRTs for testing in the pilot-scale CWTS. The HRT and flow rates for each flow period of the pilot-scale trials are provided in Table 6-4.

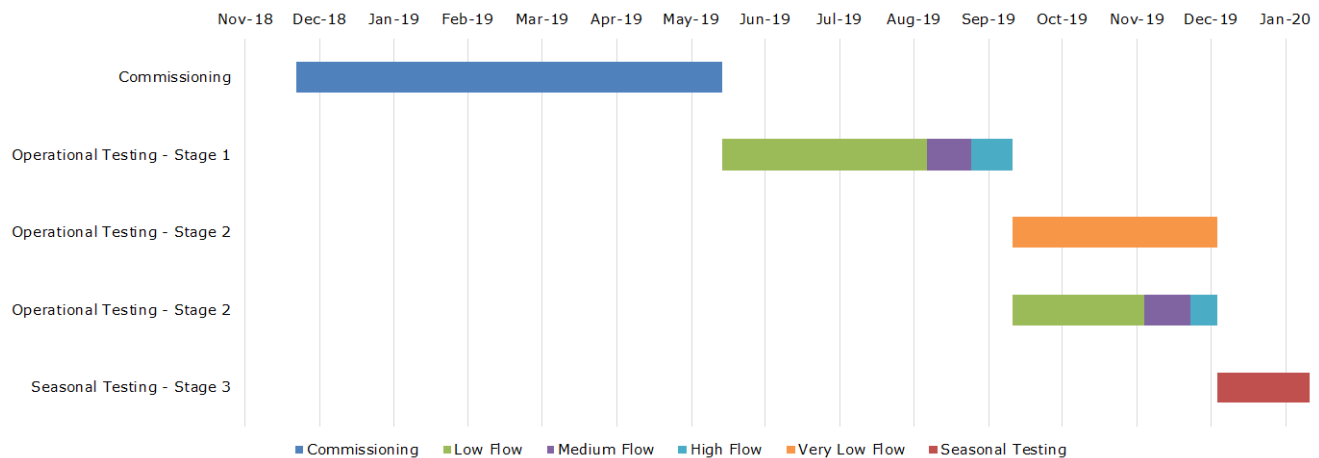


Figure 6-1: Testing Schedule for Pilot-scale Constructed Wetland Treatment System

Operational testing in stage 2 includes testing with very low flow (series 2 and 5), and with low, medium and high flow (series 1, 3, 4, and 6). Seasonal testing includes stagnation and freeze-thaw testing.

Table 6-3: Monthly Flow Volume and Daily Flow Rates of Water Leaving the ABM Lake During Post-closure (Year 27) from AEG (2018)

Month	Water Quality Model Flow Volume (m ³)	Daily Flow Rate (m ³ /day)	Month	Water Quality Model Flow Volume (m ³)	Daily Flow Rate (m ³ /day)
January	56,903	1,835	July	440,704	14,216
February	43,320	1,547	August	293,571	9,470
March	49,958	1,611	September	219,167	7,305
April	44,074	1,469	October	142,250	4,588
May	212,184	6,844	November	75,499	2,516
June	478,841	15,961	December	63,678	2,054

Table 6-4: Hydraulic Retention Times and Flow Rates for Each Testing Period in Bulrush and Water Sedge Pilot-scale Constructed Wetland Treatment System

Flow period	HRT (days)	Flow rate (mL/min)	
		Bulrush	Water Sedge
Very low flow	25	13	7.5
Low flow	16	20	12
Medium flow	5	65	38
High flow	1.5	210	127

$$t = \frac{V}{Q}$$

Where:

t is the hydraulic retention time

V is the volume of water in the system

Q is the flow rate

Equation 6-1: Hydraulic retention time based on known volume and flow rate

6.3 FOREBAY CONSTRUCTION

Forebays were added to series 1 and 3 (bulrush) and 4 and 6 (water sedge) on September 17, 2019 to evaluate carbon supplementation through a forebay. Forebays were constructed from 18 L buckets and located at the start of each series, intercepting the influent before it was received by the A cell. A total of 100 g of straw was added in two 50 g increments to each forebay.

6.4 WATER MONITORING

Water monitoring occurred in conjunction with each sampling event during the operational phase from May 18, 2019 to January 13, 2020. *In situ* water DO (mg/L), temperature (°C), pH, conductivity (micro Siemens per centimeter [$\mu\text{S}/\text{cm}$]), specific conductivity (SPC; $\mu\text{S}/\text{cm}$), and ORP (mV) were measured following the collection of all water samples from the outflow of each cell. Measurements were conducted with a YSI Professional Plus handheld unit calibrated according to the manufacturer's instructions. There were at minimum three sampling events per flow period (Section 6.2). The sampling events were conducted at a frequency according to the HRT of a given flow period to ensure a full HRT had passed between sampling events (e.g., at a 25 day HRT during the very low flow period, sampling events were at minimum 26 days apart). Routine monitoring frequency and samples collected are presented in Table 6-5.

Water sampling was conducted according to Ensero's sampling protocols, developed following the "*Standard methods for the examination of water and wastewater*" (Rice et al., 2012), which was co-produced by the American Public Health Association, the American Water Works Association, and the Water Environment Federations.

Water samples were collected from downstream to upstream (e.g., C cell to A cell) in the pilot-scale CWTS to ensure that water sampling did not affect sample collection from the downstream cell (e.g., disrupting flow rates or suspending

solids). Water samples were collected from the outflow of each cell and the influent for all sampling events for analysis of total and dissolved metals, as well as routine cations and anions. Additional samples were collected once per flow period for analysis of parameters, including acidity, total suspended solids (TSS), chemical oxygen demand (COD), biological oxygen demand (BOD), dissolved organic carbon (DOC), total organic carbon (TOC). Samples were collected in clean, laboratory supplied sample bottles appropriate for each analysis parameter. Sample collectors wore clean and new nitrile gloves. Bottles were capped immediately after filling. All samples were collected in labelled bottles that identified the sample location, date and time of collection, field filtering and/or preservation and analysis requested. Samples were filtered and/or preserved according to the analytical service provider's instructions (Bureau Veritas Laboratories [BVL]). All samples were stored in coolers with freezer packs to remain cold (4°C), but not frozen, during sampling and during transport to BVL. The sampling schedule is provided in Table 6-5. Chain of Custody (COC) forms were completed at the time of sampling and contained all information from the sample bottle labels. COCs signed by the sampler were packed inside the coolers used to transport samples to the laboratory.

Modified sampling techniques were used for sampling during the freeze-thaw testing and stagnation testing as described in Section 6.9 and Section 6.10.

Table 6-5: Water Sampling Constituents and Schedule in Operational Testing Stages 1 & 2

Test Constituents	Frequency	Sample Location	Total Number of Samples	Number of Sampling Events
Temperature (°C)	Every sampling event: minimum three sampling events per flow period at frequency according to HRT (Table 6-4)	All cells and influent	328	22
pH				
Dissolved oxygen (DO) (mg/L)				
Conductivity (µS/cm)				
Oxidation reduction potential (ORP) (mV)				
Specific conductivity (SPC) (mV)				
Influent rates (mL/min)	Every sampling event: minimum three sampling events per flow period at frequency according to HRT (Table 6-4)	Influent rate into each series was measured	132	22
Total suspended solids (mg/L)	Once per flow period; third sampling event of each flow period (final HRT)	Outflow water from each series, and influent	103	7
Total dissolved solids (mg/L)				
Acidity (mg/L)				
Biological oxygen demand (mg/L)				
Chemical oxygen demand (mg/L)				
Dissolved organic carbon (mg/L)				
Total organic carbon (mg/L)				
Alkalinity (total CaCO ₃), HCO ₃ ⁻ , CO ₃ ²⁻ , Cl, Ca, Mg, K, Na, SO ₄ , Hardness (as CaCO ₃) (mg/L) Cation-Anion Balance (meq/L)	Every sampling event: minimum three sampling events per flow period at frequency according to HRT (Table 6-4)	Outflow water from each cell, and influent	328	22
Low level total and dissolved metals by ICP-MS (Al, Sb, As, Ba, Be, Bi, B, Cd, Ca, Cs, Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, P, K, Rb, Se, Ag, Na, Sr, S, Te, Tl, Th, Sn, Ti, W, U, V, Zn, Zr) (mg/L)	Every sampling event: minimum three sampling events per flow period at frequency according to HRT (Table 6-4)	Outflow water from each cell, and influent	328	22
Nitrate + Nitrite (as-N) (mg/L)				
Ammonia as N	Every sampling event in Stage 2: minimum three sampling events per flow period at frequency according to HRT (Table 6-4)	Outflow water from each cell, and influent	138	12

6.5 SUBSTRATE TESTING

The substrate in the pilot-scale CWTS was tested during construction of the systems as well as at the end of the pilot CWTS testing. Additionally, *in situ* soil redox potential (mV) was monitored during commissioning and in conjunction with each sampling event during the operational phase from May 18, 2019 to January 13, 2020. The substrate sampling schedule is presented in Table 6-6.

In situ soil redox potential was measured during each sampling event following the collection of water samples. Soil redox potential (mV) was measured using inert electrodes (copper wire probes with platinum tips) that were

permanently installed in the substrate of the cells and remained there for the duration of the operations phase of the pilot-scale program to ensure accurate readings (Faulkner et al., 1989). During sampling events, a reference electrode (Accumet Silver Chloride) was suspended in the water column above the inert electrode. The redox potential was then measured in millivolts by a voltmeter.

An initial sample of the sand and woodchip mixture (used as substrate in the pilot-scale CWTS) was sent for analysis prior to construction of the system to ensure the substrate was free of significant amounts of leachable metals and to determine initial concentrations of constituents in the substrate (Section 6.1.3). Substrate samples were collected at the end of pilot scale testing from each series, on December 17, 2019 following very low flow testing (series 2 and 5), on December 20, 2019 following freeze-thaw testing (series 3 and 6), and on January 13, 2020 following stagnation testing (series 1 and 4). Additional sampling was performed for acid volatile sulphides and simultaneously extracted metals (AVS+SEM) prior to the stagnation and freeze-thaw testing (December 13, 2019) from series 1, 3, 4, and 6. Samples were sent to BVL for evaluation of AVS+SEM, detailed salinity, nutrients, sequential leach Tessier extraction, TOC, total metals (by ICP-MS), and sulphate concentrations.

Substrate samples were collected by gloved hand from the top ~5 cm of substrate in each CWTS cell in the systems. All samples unless noted otherwise were placed into labelled bags provided by BVL and any excess water was poured off after collection. AVS+SEM and Tessier samples were collected in 125 mL glass jars provided by BVL and capped under water with minimal headspace. Following United States Environmental Protection Agency method 821-R-91-100 (USEPA, 1991), the samples were then put into a glove bag under a nitrogen atmosphere to minimize oxidation of the sample. The surface of the sample was flushed to deoxygenate the overlying water and ensure any minimal headspace that remained was oxygen free (USEPA, 1991). All samples were stored in coolers with freezer packs to remain cold (4°C), but not frozen, during sampling and during transport to BVL.

Table 6-6: Substrate Sampling Constituents and Frequency

Test Constituents	Frequency	Sample Location	Total Number of Samples	Number of Sampling Events
Texture (% of each size fraction)	Prior to construction ²	Initial sand and woodchip mixture	1	1
% Saturation	Prior to construction ²	Initial sand and woodchip mixture ²	19	2
Total organic carbon (mg/kg)	At end of pilot-scale testing	Substrate from each cell (or pooled from replicate cells)		
Soil redox (mV)	Every sampling event in Table 6-5	All cells	396	22
AVS+SEM ¹ (μmol/kg)	Prior to construction ² Prior to freeze-thaw and stagnation testing At end of pilot-scale testing	Initial sand and woodchip mixture ² Composite series 1 & 3 and 4 & 6 A and C cells (Pre-stagnation and freeze-thaw testing samples) A and C cells of all series (final take-down samples)	17	3
Sodium adsorption ratio (SAR)	Prior to construction ² At end of pilot-scale testing	Initial sand and woodchip mixture ² Substrate from each cell	19	2
Available nutrients (N, P, K, S) (mg/kg)				
Sulphate (SO ₄) (mg/kg)				
Conductivity (μS/cm)				
Sequential leach Tessier extraction (Al, Sb, As, Ba, Be, Bi, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mn, Mo, Ni, P, K, Se, Ag, Na, Sr, Tl, Sn, Ti, U, V, Zn) (mg/kg)				
Total metals by ICP-MS ³ (Al, Sb, As, Co, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, P, K, Se, Ag, Na, Sr, Tl, Sn, Ti, U, V, Zn, Zr) (mg/kg)				
Leachable metals (Al, Sb, As, Ba, Be, Bi, B, Cd, Cr, Co, Cu, Pb, Mn, Mo, Ni, K, Se, Ag, Na, Sr, Tl, Sn, U, V) (mg/kg)	Prior to construction ²	Initial sand and woodchip mixture	1	1

¹AVS+SEM: Acid-Volatile Sulphide + Simultaneously Extracted Metals.

²Analyses completed prior to construction on sand and woodchip mixture.

³ICP-MS: Inductively coupled plasma mass spectrometry.

COPs were evaluated at the end of the operations period via the Tessier sequential extraction method (Tessier et al., 1979) to aid in understanding the COP mineral formation as well as mineral association in the substrate (Table 6-7). This information helps guide CWTS design decisions, which aim to target biogeochemically stable mineral forms.

Table 6-7: Summary of Extractable Fractions From Tessier Sequential ICP-MS Analysis ¹

Fraction	Description	COPs Unstable When
1	Exchangeable fraction for adsorbed elements	Readily released (i.e., soluble and exchangeable)
2	Element fraction bound to carbonates	Decreased pH
3	Element fraction bound to Fe-Mn oxides	Reducing conditions
4	Element fraction bound to organic matter and sulphides	Oxidizing conditions
5	Residual element fraction (primary and secondary minerals)	Not expected to be released in solution over time under conditions normally encountered in nature

¹Tessier et al., 1979.

6.6 PLANT AND ORGANICS SAMPLING

Water sedge and bulrush samples were collected from each series at the end of pilot-scale testing (Table 6-8). During sampling, all above water plant biomass was collected from each CWTS cell and weighed. Only the above water plant biomass was sampled and analyzed as it is the portion of the plant that is not in direct contact with the water and is therefore representative of the concentrations of metals in the plant tissue. Plants were cut off at the water level using sterilized shears and nitrile gloves were worn throughout sampling. Samples were placed into pre-weighed sterile plastic bags and weighed. All of the above water plant biomass that was harvested from the cell was then sent to BVL for analysis of total metals and percent moisture. Replicates were based on replicate pilot-scale series.

Samples of organic material in the water column were collected from each cell in each series by gloved hand at the end of pilot-scale testing (Table 6-8). Organics samples included all organic material that was suspended in the water column (i.e. moss, decomposing straw, and duckweed). Samples were placed into pre-weighed plastic bags provided by BVL and any excess water was poured off after collection. The full amount of organics from the cell was weighed and then sent to BVL for analysis of total metals and percent moisture. Replicates were based on replicate pilot-scale series. All samples were stored in coolers with freezer packs to remain cold (4°C), but not frozen, during sampling and during transport to BVL.

Table 6-8: Plant and Organics Sampling Constituents and Frequency

Test Constituents	Frequency	Sample Location	Total Number of Samples	Number of Sampling Events
% Moisture	At end of pilot-scale testing	Above water plant biomass (water sedge and bulrush), and organics within the water column	36	1
Total Metals by ICP-MS (Al, Sb, As, Co, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, P, K, Se, Ag, Na, Sr, Tl, Sn, Ti, U, V, Zn, Zr)				

6.7 LABORATORY QUALITY CONTROL SAMPLE ANALYSIS

Laboratory analysis were performed by BVL. Overall quality control sample analysis from method blanks, laboratory duplicates, matrix spikes and blank spikes met the BVL laboratory acceptability criteria and consequently the data were issued.

6.8 MICROBIAL SAMPLING

Microbes are the catalysts for the beneficial biogeochemical reactions occurring in the CWTS. Microbial testing can be used to compare microbial communities established in different locations (e.g., substrate, moss, or plant roots) and over time throughout CWTS operation. The microbial communities in the CWTS were tested with the initial materials used to construct the CWTS (November 23, 2019), as well as after each stage of the operational test periods outlined in Section 6.2 to evaluate the distribution and establishment of beneficial microbes in each CWTS design. Microbial samples that were analyzed during the site assessment in 2016 are discussed in Contango 2016.

Microbial testing included genetic quantification of bacteria associated with specific sample types via quantitative polymerase chain reaction (qPCR), as well as genetic sequencing via the 16S ribosomal RNA gene to identify the bacterial community and distribution of the beneficial organisms described in Section 3.6). Samples were collected by clean nitrile gloved hand from the substrate, plant roots, and moss in specific cells at each sampling event and placed in sterile tubes provided by Ensero's microbiology laboratory. Samples were composited between replicates series from the A or C cells for the end of operational stage 1 testing samples. One additional sample of each sample type was collected from the water sedge A cell post-stagnation on January 7, 2020 to evaluate the effects of stagnation. The samples were stored in a freezer prior to quantification and genetic sequencing analysis at Ensero's lab.

The bacterial DNA was extracted from the samples using Ensero in-house methods. Targeted DNA sequencing was used to identify bacteria present in each sample via polymerase chain reaction (PCR) amplification of the v3/v4 region of the 16S ribosomal RNA gene as per the manufacturer's instructions for MiSeq v3 paired-end 300 bp sequencing (Illumina) for all samples and positive and negative controls. After sequencing, the forward and reverse reads were merged and all sequences were quality filtered before clustering and classification. Quantification was performed through the amplification and measurement of the 16S ribosomal RNA gene, including positive and negative controls and standard curve, using the Biorad CFX Real-Time PCR Detection System.

The parameters and frequency of testing for microbes are outlined in Table 6-9, with dates of microbial sample collection in Table 6-10.

Table 6-9: Microbial Sampling Parameters and Frequency

Test Parameters	Frequency	Sample Location	Total Number of Samples	Number of Sampling Events
Quantification analysis	Initial samples from substrate, plant roots, and moss	Substrate, moss, and root pooled from replicate A and C cells	55	4
Genetic sequencing analysis for bacterial community composition and distribution of beneficial organisms	At the midpoint of testing (Aug)			
	At end of Stage 2 testing			
	At the end of stagnation ¹			

¹ Samples were collected from cell 4A following stagnation.

Table 6-10: Dates and Locations of Microbial Sample Collection

Sample Date	Sample Period	Location	Sample Types
23-Nov-18	Initial – Start of Commissioning	Bulrush root, water sedge root, moss, substrate	Moss, root, and substrate
14-Aug-19	End of Operational Testing: Stage 1	Bulrush A cells (composite), bulrush C cells (composite), water sedge A cells (composite), water sedge C cells (composite)	
3-Dec-19	End of Operational Testing: Stage 2	Bulrush series 2 A and C cells, water sedge series 5 A and C cells	
12-Dec-19	End of Operational Testing: Stage 2	Bulrush series 1 and 3 A and C cells, water sedge series 4 and 6 A and C cells	
7-Jan-20	End of Operational Testing: Stage 3 Stagnation Testing	Water sedge cell 4A	

6.9 FREEZE-THAW TEST

A freeze-thaw test was performed on the pilot-scale CWTS to evaluate potential COPI release through a freeze-thaw cycle with the different CWTS designs. The freeze thaw test is intended to evaluate initial release of COPIs immediately upon the CWTS thawing, as the pilot-scale CWTS plants do not recover from the rapid freeze-thaw, subsequent treatment was not evaluated. In other words, the freeze-thaw test on the pilot-scale CWTS is intended to provide information on treated COPI stability and potential release through the freeze-thaw cycle, and not subsequent treatment as water flows through the CWTS. In an on site system, the CWTS would freeze in the winter months and would thaw (including clean overlying snow) in the spring, and plants would begin growing and promoting water circulation through the root zones. While the ABM lake is expected to flow year-round owing to continued Fault Creek and groundwater contributions in the winter, treatment in the CWTS through the winter months is not expected (AEG, 2018).

Freeze-thaw testing was performed on one bulrush (series 3) and one water sedge (series 6) pilot-scale system after stage 2 of the operational period (Section 6.2). This was done by moving each cell to an area outside of the testing facility to freeze in the outside temperatures of -16 to -11°C (daytime) and -29 to -22°C (nighttime) for four days. Snowfall was monitored during this period with < 1 cm of snowfall during the freezing period. Prior to moving the cells outside, water samples were collected using methods described below and were analyzed for low level total and dissolved metals, anions, alkalinity, and ammonia. Similarly, the above water plant biomass was harvested for analytical testing as described in Section 6.6 to evaluate concentration of COPI in the plant material. The organics in the water column (moss, straw, detritus) were not sampled until after the freeze-thaw trial (Section 6.6).

After the freeze period, the cells were brought back into the temperature-controlled testing facility and left to thaw at an average temperature of 18°C (Photograph 6-1). Three days after, the water columns within each cell were visually determined to have thawed throughout the entire column. Water samples were collected with clean laboratory supplied sample bottles appropriate for each analysis parameter. Sample collectors wore clean and new nitrile gloves. Bottles were capped immediately after filling. All samples were collected in labelled bottles that identified the sample location, date and time of collection, field filtering and/or preservation and analysis requested. Samples were filtered and/or preserved according to the analytical service provider's instructions (BVL). All samples were stored in coolers with freezer packs to remain cold (4°C), but not frozen, during sampling and during transport to BVL. Chain of Custody (COC) forms were completed at the time of sampling and contained all information from the sample bottle labels. COCs signed by the sampler were packed inside the coolers used to transport samples to the laboratory.

In situ water pH, specific conductance, dissolved oxygen, ORP, and temperature were measured and recorded for each cell using a YSI probe and multimeter calibrated according to the manufacturer's instructions on the morning of the sampling day.



Photograph 6-1: Frozen Constructed Wetland Treatment System Cells Brought Inside for Thawing

Water sedge (front and back left, series 6) and bulrush cell (back right, series 3).

6.10 STAGNATION TEST

Although there are no stagnation periods predicted for the influent to the CWTS for the Project based on predicted overflow from the ABM Lake Post-closure (AEG, 2018), stagnation testing was conducted on the pilot CWTS to evaluate performance under a drought scenario in a potentially warming climate. The stagnation testing was performed after stage 2 of the operational period (Section 6.2). A summary of the stagnation test is provided in Table 6-11.

Evapotranspiration rates were measured in the CWTS during the stagnation period. Total evapotranspiration from the CWTS is the combined effects of open water evaporation and plant transpiration (Beebe et al., 2014). The purpose of calculating the evapotranspiration of a CWTS is to understand the amount of water lost per day over the surface area of a wetland, which in turn can concentrate COPIs and influence the constituent load to the receiving environment.

Flow was stopped in one series from both the water sedge and bulrush systems (series 1 and 4) to undergo stagnation for 24 days. Water levels were measured daily for calculation of evapotranspiration rates and *in situ* water pH, specific conductance, dissolved oxygen, ORP, and temperature were measured and recorded weekly for each cell using a YSI probe and multimeter calibrated according to the manufacturer's instructions.

Water samples were collected from within each cell after 14 days of stagnation (mid-point of the stagnation period). Water samples were analyzed for total and dissolved metals, ammonia, alkalinity, as well as routine cations and anions.

All water samples collected through the stagnation test described here were grab sampled using clean, laboratory supplied sample bottles appropriate for each analysis parameter. Sample collectors wore clean and new nitrile gloves. Bottles were capped immediately after filling. All samples were collected in labelled bottles that identified the sample location, date and time of collection, field filtering and/or preservation and analysis requested. Samples were filtered and/or preserved according to the analytical service provider's instructions (BVL). All samples were stored in coolers with freezer packs to remain cold (4°C), but not frozen, during sampling and during transport to BVL. Chain of Custody (COC) forms were completed at the time of sampling and contained all information from the sample bottle labels. COCs signed by the sampler were packed inside the coolers used to transport samples to the laboratory.

Following the 24 day stagnation period, flow was restarted to each system at the high flow rate for each CWTS design (Table 6-4). The high flow rate was selected for testing to provide information on a worst-case scenario where a stagnation period that promotes more anoxic/reducing conditions to establish in the CWTS is followed by a high flow event which rapidly provides oxygenated water to the system. The stability of treated COPI was evaluated through this transition as fresh water flowed through the CWTS, where outflow water of each cell was collected as it overflowed into the following cell (i.e., initial first flush of water through each cell). The outflow water from each cell was analyzed for low level total and dissolved metals, anions, and alkalinity.

Subsequently, the CWTS were maintained at the high flow rate and treatment through the CWTS was evaluated on two separate testing events to evaluate post-stagnation treatment in each CWTS design. Water samples were collected from downstream to upstream (e.g., C cell to A cell) to ensure that water sampling did not affect sample collection from the downstream cell (e.g., disrupting flow rates or suspending solids). Water samples were collected from the outflow of each cell and the influent for the two post-stagnation sampling events for analysis of total and dissolved metals, as well as routine anions. Additional samples were collected at the second post-stagnation sampling event for analysis of parameters, including acidity, total suspended solids (TSS), chemical oxygen demand (COD), biological oxygen demand (BOD), dissolved organic carbon (DOC), total organic carbon (TOC), and ammonia.

Table 6-11: Summary of Stagnation Testing

Day	Date	Event
0	13-Dec-19	Start of stagnation period (influent flow stopped) and daily monitoring of water level
14	27-Dec-19	Midpoint water sample collection and <i>in situ</i> parameter testing
24	6-Jan-20	End of stagnation period and daily monitoring of water level; Flow restarted to each system at high flow rate
24-25	6-Jan-20 7-Jan-20	Outflow water from each cell collected as it overflowed into the following cell
27	9-Jan-20	Post-stagnation sampling event, water collected from outflow of each cell and <i>in situ</i> parameters tested
31	13-Jan-20	Post-stagnation sampling event, water collected from outflow of each cell and <i>in situ</i> parameters tested

6.11 DETRITUS AND ACCRETION MEASUREMENTS

Vertical accretion rate is a key factor in determining wetland stability. It is defined as the measure of accumulation from organic and mineral materials on the wetland surface, and is highly dependent on the amount of decomposed material present in the CWTS. To assess vertical accretion rates of water sedge and bulrush in the pilot-scale CWTS over time, a detritus decomposition study was conducted using dried plant material based on methodologies described in literature (Chimney and Pietro, 2006; Hammerly et al., 1989).

The following steps outline the methods for the detritus and accretion study:

- 24 bags containing 5 g of either bulrush or water sedge were submerged into the A and C cells of the corresponding plant series with control polyester filter fibre material bags to determine decomposition rates in the CWTS. The first and last cells of the CWTS were selected for comparison of decomposition rates through the series.
- Additional bags containing 3 g of either bulrush or water sedge were submerged into the A cells of the corresponding plant series with control polyester filter fibre material bags to evaluate potential variability between starting mass of plant material.
- Bags were removed from each A and C cell at specific sampling events. Three sampling events were selected for bag removal:
 - o Four weeks (29 days) after bag installation;
 - o 16 weeks months (112 days); and
 - o 28 weeks (199 days), at the end of testing.
- Once removed, material was taken from bags, rinsed, and dried according to Chimney and Pietro, 2006 and Hammerly et al., 1989. Material was then weighed to determine the change in mass from starting material.

There were no differences in the percent decomposition observed between the detritus bags placed in the influent and outflow cells of the series, or between the 5 g and 3 g mass bags. All data were therefore averaged for a given timepoint.

The difference in dry weight of plant material over time was evaluated as a representation of the amount of biomass that was decomposed. Additionally, the pilot-scale CWTS cells were cut open upon completion of pilot-scale testing and the vertical accretion was directly measured in cm by placing a ruler against the cut open cells and measuring the depth of accumulated organic and mineral materials above the initial soil level.

7 DATA ANALYSIS METHODS

7.1 PERCENT REMOVAL AND LOAD REMOVAL IN WATER

The percent removal of a COPI was calculated based on the COPI influent and outflow concentrations through each pilot-scale CWTS. The amount of each COPI treated through the pilot-scale CWTS was also calculated (load removal) over the duration of the pilot-scale trials, based on the COPI influent and outflow concentrations and flow rate in each pilot-scale CWTS.

7.2 REMOVAL RATE COEFFICIENTS

An important factor for CWTS design is the rate of treatment, also known as the removal rate coefficient (RRC). The removal rate coefficient is based on the treatability of a specific compound and the HRT of the CWTS, both of which are site-specific based on water chemistry and CWTS designs and characteristics. RRCs are developed through pilot-scale test work and refined with demonstration-scale CWTS on site (Rodgers and Castle, 2008). Once developed, the RRCs are used to size the full-scale CWTS, or predict the expected outflow concentrations of a specific COPI in a wetland of the same design based on flow rates, influent concentrations, and available footprint.

First order removal rates are often used to model treatment of COPI in a CWTS (e.g., Eggert et al., 2008; Horner et al., 2012, Lizama et al., 2011; Schwindaman et al., 2014; Spacil et al., 2011). The removal rate coefficient was calculated

for each COPI using the HRT (t), influent (C_i) and outflow (C_f) concentrations of a given COPI. The calculation for the first-order removal rate is provided in Equation 7-1. The RRC was calculated for each sampling event during the operational test period and the RRC was averaged for a given HRT period. The natural logarithm of the COPI concentration was also plotted against the HRT to evaluate the strength of the relationship for first-order removal.

$$RRC = \frac{-\ln\left(\frac{C_f}{C_i}\right)}{t}$$

Where:

RRC is the first-order removal rate coefficient for a given constituent/design

t is the hydraulic retention time

C_i is the influent concentration of the COPI

C_f is the outflow concentration of the COPI

Equation 7-1: Calculation of First-order Removal Rate Coefficient

7.3 FATE AND DISTRIBUTION

The fate and distribution of COPIs in the pilot-scale CWTS were evaluated. The amount of a COPI that was removed from the influent by each CWTS was calculated using total COPI concentrations in the influent compared to the outflows as described in Section 7.1. The concentration of a COPI from: the top 5 cm of substrate (Section 6.5); above water plant tissues (bulrush, water sedge; Section 6.6); and organics (Section 6.6) at the end of CWTS testing were used to evaluate the fate and distribution of COPI that were retained in the CWTS. The remainder of the load retained in the CWTS for each COPI was considered held in 'other' locations, including substrate deeper than 5 cm, plant roots, biofilms on the walls of the CWTS cells, and forebay straw (where applicable), which were not individually analyzed.

The amount of each COPI retained in the top 5 cm of substrate was calculated based on the change in concentration of the COPI from the start (initial) to the end of the pilot-scale trials (Section 6.5). The change in concentration was calculated when it was outside of the margin of error reported by BVL. The change in the dry weight mg/kg concentration of each COPI were then multiplied by the dry weight of the substrate that is in the top 5 cm of the CWTS to calculate the amount of COPI retained in this location.

The amount of each COPI in the above water plant biomass was calculated based on the dry weight mg/kg concentration of each COPI, multiplied by the dry weight of the above water biomass that was collected at the end of the pilot-scale trials (Section 6.6). Similarly, the amount of each COPI in the organics in the water column was calculated based on the dry weight mg/kg concentration multiplied by the dry weight of the organics collected at the end of the pilot-scale trials (Section 6.6). The dry weight of both plant and organic samples was calculated using the wet weight of samples and the percent moisture data.

7.4 FREEZE-THAW TEST

The amount of a COPI that was released through the freeze-thaw test (Section 6.9) was calculated based on the difference in dissolved concentration of each COPI in the water before and after the freeze-thaw test, multiplied by the water volume in each cell. This amount was then used with the load of a given COPI retained in each CWTS series through the pilot-scale trials (Section 7.1) to calculate the percent load of each COPI released and correspondingly retained through the freeze-thaw testing.

8 RESULTS AND DISCUSSION

8.1 PLANT ESTABLISHMENT THROUGH CWTS COMMISSIONING AND OPERATION

During the commissioning period, plant health was monitored to evaluate commissioning progress, as well as to assess timelines needed to commission the system. In addition to achieving conceptual *in situ* explanatory parameter targets presented in Section 8.2 and Table 8-1, a commissioning target of a 50% increase in plant growth density from the time of planting (i.e. a 50% increase of four stems per treatment cell would be six stems per cell) was established. A 50% increase in plant density was successfully achieved by the end of commissioning compared to the beginning of commissioning for both bulrush and water sedge. Photograph 8-1 to Photograph 8-5 show the pilot-scale systems over time and establishment of moss in the CWTS.



Photograph 8-1: Water Sedge During the Commissioning (November 30, 2018; Left) and Operations (May 17, 2019; Right) Period of the Pilot Showing Increase in Plant Growth and Density



Photograph 8-2: Bulrush During the Commissioning (November 30, 2018; Left) and Operations (May 17, 2019; Right) Period of the Pilot Increase in Plant Growth and Density



Photograph 8-3: Off Site Pilot-scale Constructed Wetland Treatment Systems on August 23, 2019

Bulrush (left) and water sedge (right) pilot-scale CWTS systems.



Photograph 8-4: Off Site Pilot-scale Constructed Wetland Treatment Systems on November 22, 2019

Bulrush (left) and water sedge (right) pilot-scale CWTS systems.



Photograph 8-5: Moss Growth, Along With Duckweed, in a Bulrush Cell on June 26, 2019

8.2 EXPLANATORY PARAMETERS

Explanatory parameters are quantifiable metrics of a CWTS environment that can be used to assess commissioning progress and determine what treatment processes are likely occurring in the CWTS. Certain parameters, such as dissolved oxygen, oxidation-reduction potential, and soil redox, are useful *in situ* parameters to understand conditions in a CWTS environment. Theoretical targets for these *in situ* parameters are defined at the start of a pilot-scale CWTS trial based on literature and previous CWTS experience for anaerobic designs (Table 8-1). The theoretical targets are then used to guide decisions during CWTS commissioning while the system is establishing, before other water quality parameters are routinely monitored through operational testing. The theoretical targets are then refined through the pilot-scale trials to provide operational criteria for the CWTS based on water quality monitoring and treatment performance that is observed in the system.

During commissioning of the CWTS, the *in situ* measurements for dissolved oxygen, oxidation-reduction potential, and soil redox were compared to the theoretical targets to evaluate system commissioning (Table 8-1). The water sedge CWTS had DO, ORP, and soil redox measurements in the theoretical target range by the end of the commissioning period. The bulrush CWTS had dissolved oxygen and oxidation reduction potential measurements above the theoretical targets, while the soil redox was consistently achieving the theoretical target suggesting reducing conditions were established in the substrate. The commissioning period transitioned to the operational test period on May 17, 2019 based on plant establishment (Section 8.1) and reducing conditions in the substrate of both pilot-scale CWTS designs (Table 8-1).

Table 8-1: *In Situ* Explanatory Parameter Measurements in the CWTS at the End of Commissioning and Theoretical Targets

Plant Type	Parameter		Theoretical Target ¹	Measurements ²					Average
				25-Apr-19	01-May-19	06-May-19	09-May-19	14-May-19	
Bulrush	Water	DO (mg/L)	<2.0	3.88	3.30	4.48	3.37	4.29	3.86
		ORP (mV)	<50	92.5	133.9	114.0	74.0	79.3	98.7
	Substrate	Soil Redox (mV)	<-50	-54.2	-89.9	-96.9	-100.4	-92.8	-86.8
Water Sedge	Water	DO (mg/L)	<2.0	0.40	0.71	0.71	0.83	N/A	0.66
		ORP (mV)	<50	-89.4	26.2	-24.0	-36.5	N/A	-30.9
	Substrate	Soil Redox (mV)	<-50	-125.6	-143.8	-136.7	-143.7	N/A	-137.5

DO – Dissolved Oxygen; ORP – Oxidation-Reduction Potential.

N/A – Not measured at this timepoint.

¹ Theoretical target based on literature and previous CWTS experience, used to guide decisions and monitor commissioning.

² Average of all cells in series 1, 2 & 3 for bulrush and series 4, 5 & 6 for water sedge.

During the commissioning and operational test periods the bulrush CWTS typically had DO measurements > 2.0 mg/L (Figure 8-1; Appendix A, Table A1-1). In contrast, the water sedge CWTS had decreasing DO values through commissioning, and typically had DO concentrations < 2 mg/L through later stages of commissioning and through the operations period until the final phase of testing (high flow during operational stage 2 testing) where DO concentrations increased slightly above 2 mg/L. Treatment of COPIs was more efficient in the water sedge systems (Section 8.3) indicating that the theoretical target DO concentration of < 2 mg/L is favourable for treatment. Variability in DO concentrations was observed during the stagnation period in both CWTS designs, with high values measured at the mid

point of the stagnation period which corresponded to the water sampling event (Figure 8-1 and Figure 8-2). Low DO concentrations were observed in the cells following the freeze-thaw test (Figure 8-1 and Figure 8-2).

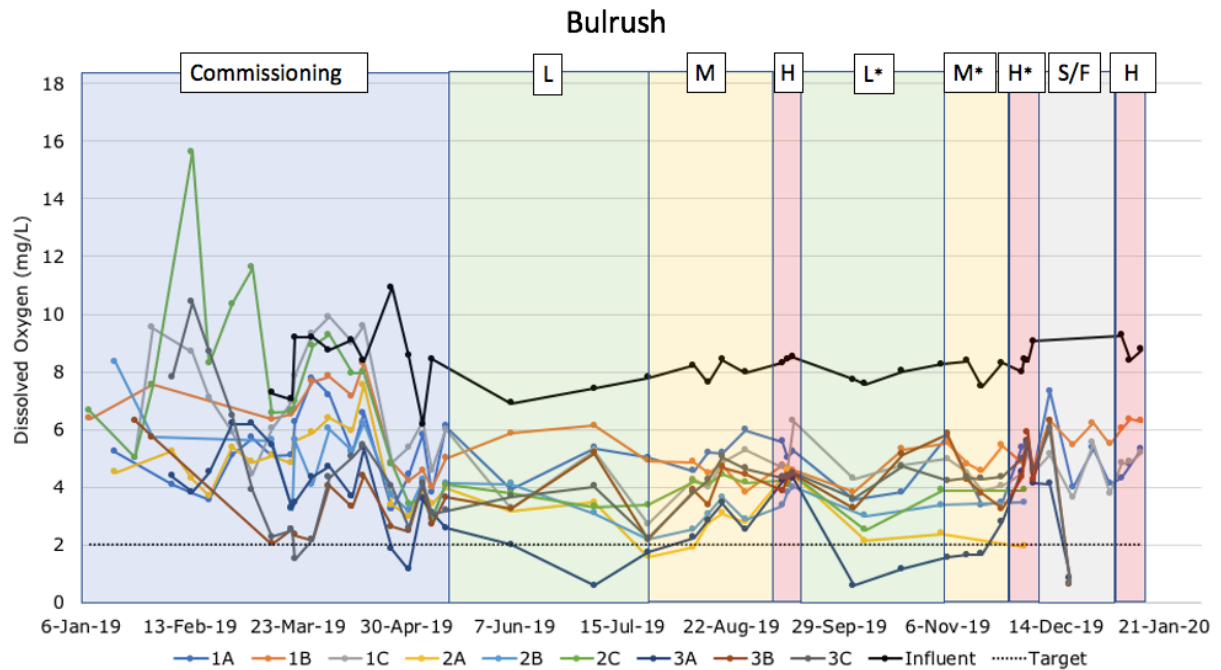


Figure 8-1: Water Dissolved Oxygen Over Time in the Bulrush CWTS

Blue shading indicates the commissioning period. Green shading with "L" indicates low flow period. Yellow shading with "M" indicates medium flow period. Red shading with "H" indicates high flow period. Period with "*" indicates stage 2 operational period where series 2 was in very low flow testing. Grey shading with "S/F" indicates the stagnation (series 1) or freeze trial (series 3) periods. Theoretical DO target of < 2 mg/L shown with dotted line.

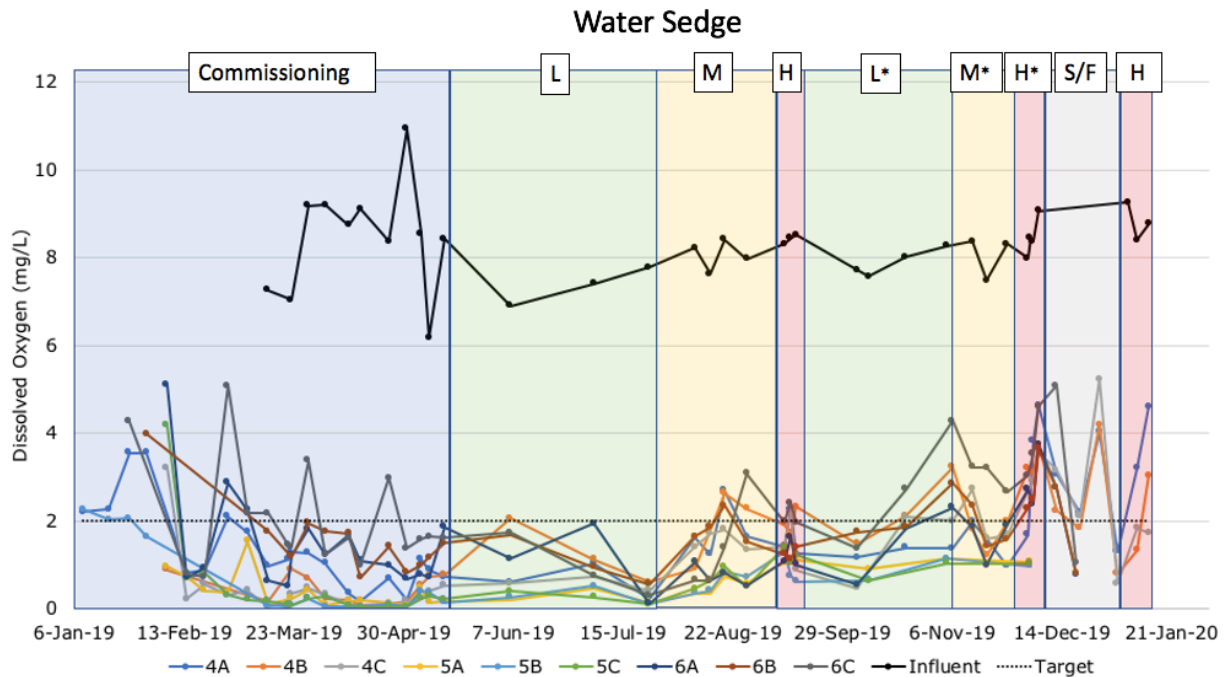


Figure 8-2: Water Dissolved Oxygen Over Time in the Water Sedge CWTS

Blue shading indicates the commissioning period. Green shading with “L” indicates low flow period. Yellow shading with “M” indicates medium flow period. Red shading with “H” indicates high flow period. Period with “*” indicates stage 2 operational period where series 5 was in very low flow testing. Grey shading with “S/F” indicates the stagnation (series 4) or freeze trial (series 6) periods. Theoretical DO target of < 2 mg/L shown with dotted line.

The ORP measurements for the bulrush CWTS design were typically greater than +50 mV through the duration of the pilot-scale trials (Table 8-1, Figure 8-3; Appendix A, Table A1-1). In comparison, the water sedge CWTS design had ORP measurements that ranged from – 50 mV to + 200 mV through the commissioning and operational testing periods, with measurements consistently lower than the bulrush CWTS design (Figure 8-4; Appendix A, Table A1-1). ORP measurements are best used as a rapid qualitative guide in the context of CWTS conditions, with redox-active species (iron and manganese) and their relative trends providing a more precise indicator of conditions that are conducive to the target treatment mechanisms. The concentrations and trends of redox-active constituents and their relative position in the redox ladder were therefore also evaluated (discussed below). Based on treatment of COPs observed in the water sedge systems (summarized in Section 8.3), the operational range for ORP in the water sedge CWTS is broader than the theoretical target that was defined at the start of the trials.

A decrease in ORP measurements was observed during the stagnation period and through the freeze-thaw test event in both CWTS designs, with the exception of an increased measurement at the mid point of the stagnation period which corresponded to the water quality sampling event where grab samples were collected from within the cell rather than collected from the outflow, as the system was not flowing (Figure 8-3 and Figure 8-4; Section 6.10).

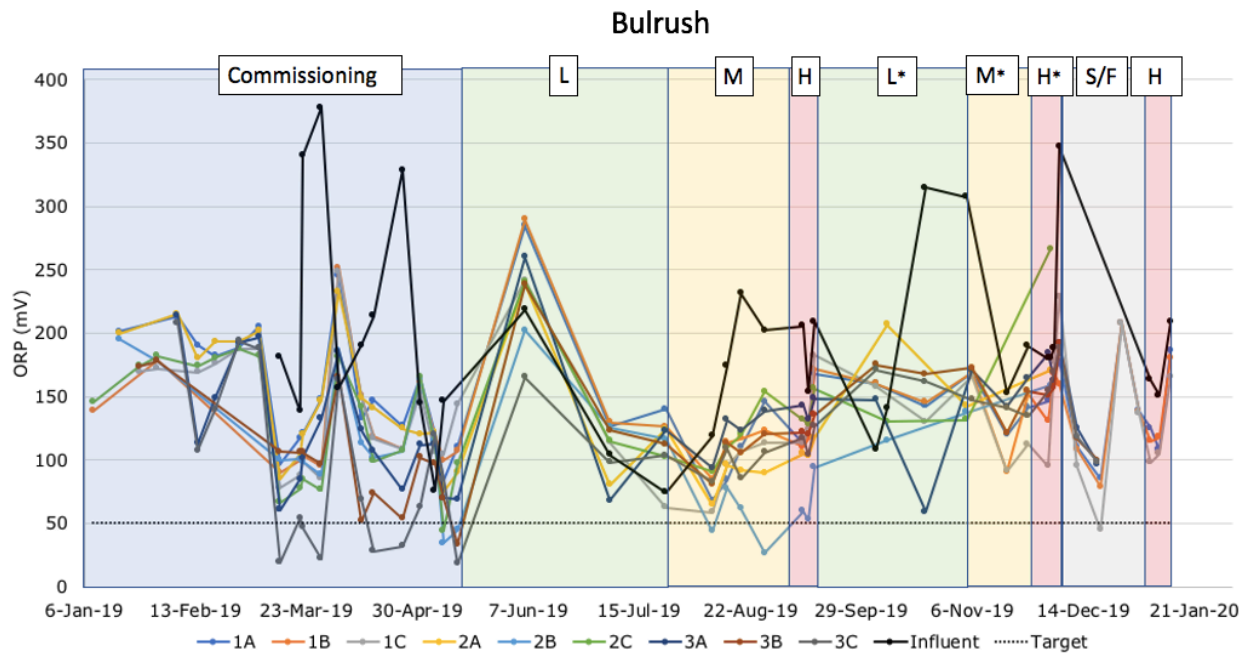


Figure 8-3: Water Oxidation-reduction Potential Over Time in the Bulrush CWTS

Blue shading indicates the commissioning period. Green shading with "L" indicates low flow period. Yellow shading with "M" indicates medium flow period. Red shading with "H" indicates high flow period. Period with "*" indicates stage 2 operational period where series 2 was in very low flow testing. Grey shading with "S/F" indicates the stagnation (series 1) or freeze trial (series 3) periods. Theoretical ORP target of < 50 mV shown with dotted line. Fluctuations in influent ORP likely due to variations in concentrations of the major redox couple(s) to which the ORP electrode responds.

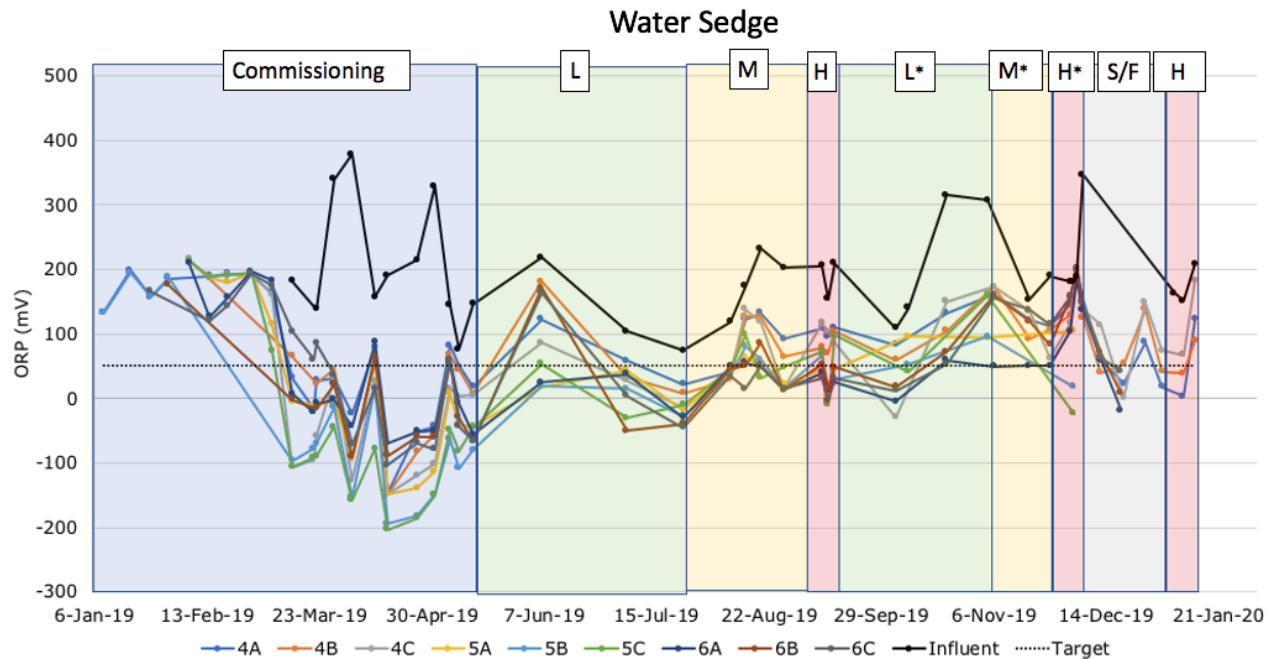


Figure 8-4: Water Oxidation-reduction Potential Over Time in the Water Sedge CWTS

Blue shading indicates the commissioning period. Green shading with “L” indicates low flow period. Yellow shading with “M” indicates medium flow period. Red shading with “H” indicates high flow period. Period with “*” indicates stage 2 operational period where series 5 was in very low flow testing. Grey shading with “S/F” indicates the stagnation (series 4) or freeze trial (series 6) periods. Theoretical ORP target of < 50 mV shown with dotted line. Fluctuations in influent ORP likely due to variations in concentrations of the major redox couple(s) to which the ORP electrode responds.

Soil redox typically remained below -50 mV in most cells throughout the commissioning and operational periods in both the bulrush and water sedge CWTS regardless of the flow period (Figure 8-5 and Figure 8-6, respectively; Appendix A, Table A1-1). Measurement of soil redox continued through the stagnation period, with measurements remaining stable in all except for a temporary increase in cell 5B (Figure 8-5 and Figure 8-6). Soil redox measurements after the freeze-thaw test event increased, however, this may be due to displacement of soil redox probes through the freeze-thaw cycle (Figure 8-5 and Figure 8-6).

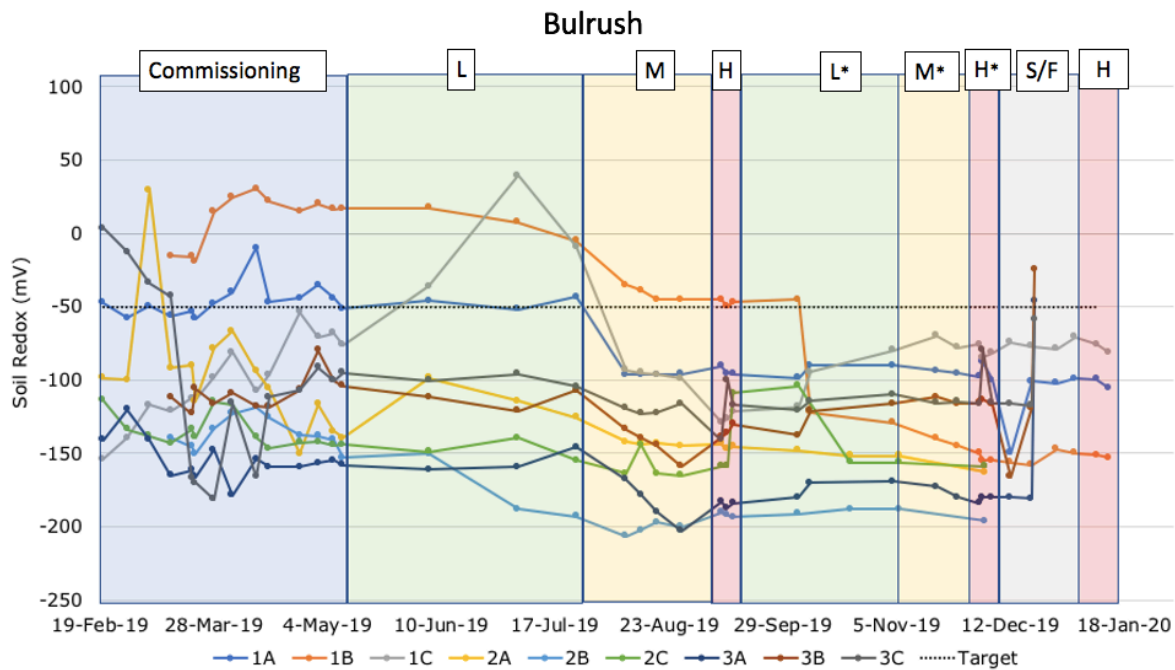


Figure 8-5: Soil Redox Over Time in the Bulrush CWTS

Blue shading indicates the commissioning period. Green shading with "L" indicates low flow period. Yellow shading with "M" indicates medium flow period. Red shading with "H" indicates high flow period. Period with "*" indicates stage 2 operational period where series 2 was in very low flow testing. Grey shading with "S/F" indicates the stagnation (series 1) or freeze trial (series 3) periods. Theoretical soil redox target of < -50 mV shown with dotted line.

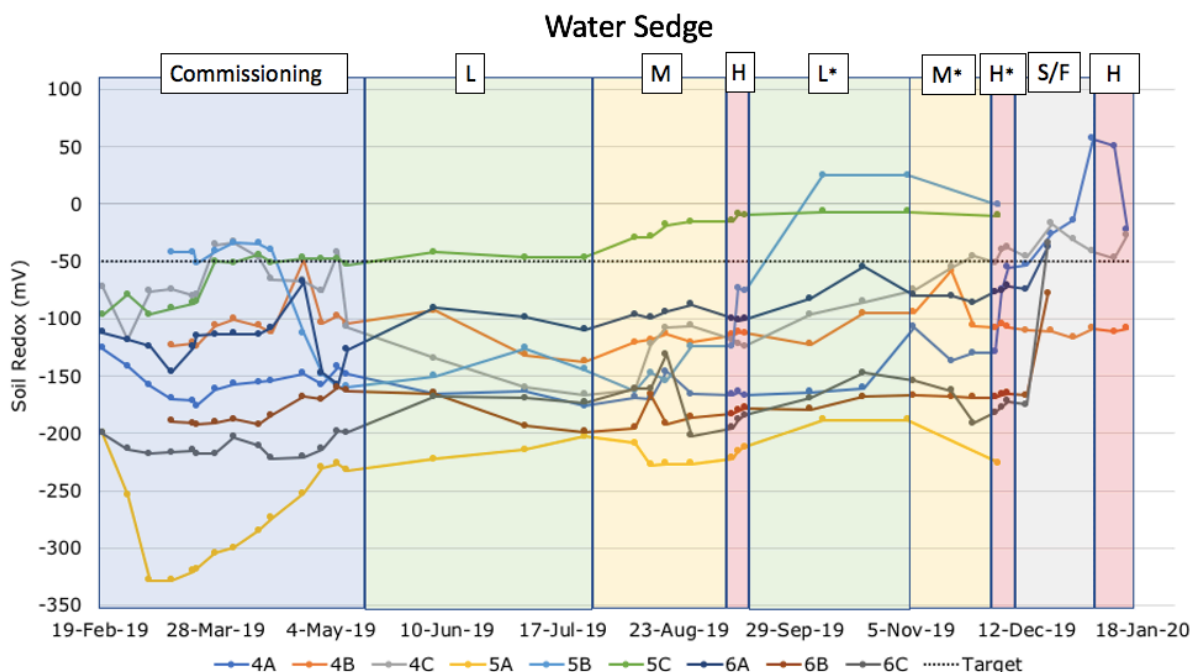


Figure 8-6: Soil Redox Over Time in the Water Sedge CWTS

Blue shading indicates the commissioning period. Green shading with "L" indicates low flow period. Yellow shading with "M" indicates medium flow period. Red shading with "H" indicates high flow period. Period with "*" indicates stage 2 operational period where series 5 was in very low flow testing. Grey shading with "S/F" indicates the stagnation (series 4) or freeze trial (series 6) periods. Theoretical soil redox target of < -50 mV shown with dotted line.

The concentration and trends of redox-active constituents such as iron and manganese were also evaluated to provide insight on conditions within the CWTS (Section 3.5). Manganese and iron are commonly held in the substrate as (hydr)oxides, the development of more reducing conditions often results in their transient release as the host phases are dissolved under manganese- and iron- reducing conditions. Dissolved iron consistently increased through the CWTS in all flow periods in all water sedge systems and dissolved manganese had slight increases in lower flow periods (Figure 8-7 and Figure 8-8). The variability of dissolved iron concentrations that were observed across timepoints in the CWTS is likely due to the low concentrations and rapid oxidation/precipitation kinetics of dissolved iron that are observed at the circumneutral pH of the trials. The increases in dissolved manganese and iron concentrations are indicative of reducing conditions in the water sedge CWTS. In contrast, the bulrush CWTS had little or no increase in dissolved iron and manganese (Figure 8-7 and Figure 8-8). Overall, this suggests that throughout operations the water sedge CWTS was at or below the iron reducing stage on the redox ladder (redox ladder background provided in Section 3.5) and overall promoted a more reducing environment than the bulrush systems.

Although some iron and manganese mobilization was observed in the water sedge systems, the concentrations were approximately one order of magnitude below their respective WQOs for KZ-37 (Figure 8-8 and Figure 8-9). Ferrous iron released from the CWTS is expected to rapidly oxidize and precipitate at the circumneutral, well oxygenated waters of Geona Creek, while dilution downstream of the CWTS will further lower the concentrations of iron and manganese. As such, the transient mobilization of iron and manganese observed in the pilot CWTS are not expected to result in elevated iron and manganese concentrations downstream at KZ-37.

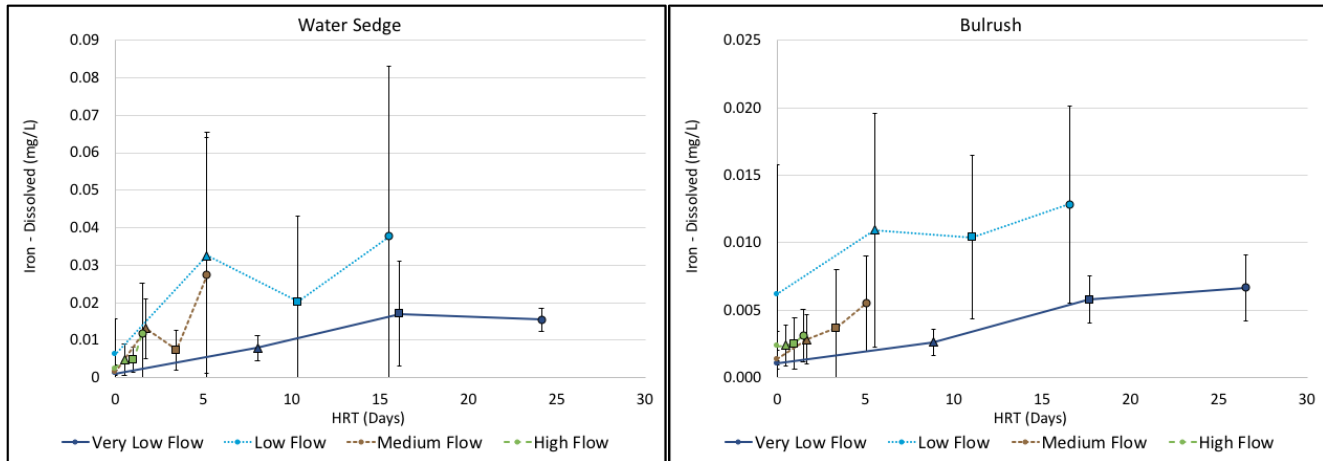


Figure 8-7: Average Dissolved Iron Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for dissolved iron was 0.00002 mg/L.

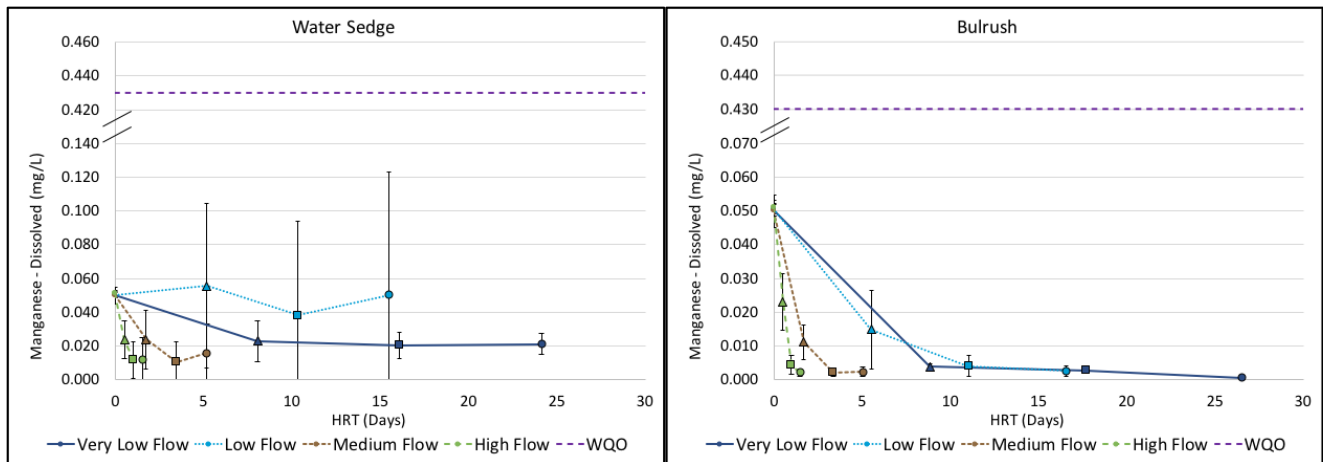


Figure 8-8: Average Dissolved Manganese Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for dissolved manganese was 0.00050 mg/L. The lower limit of the receiving environment WQO is indicated with a dotted line (0.432 mg/L).

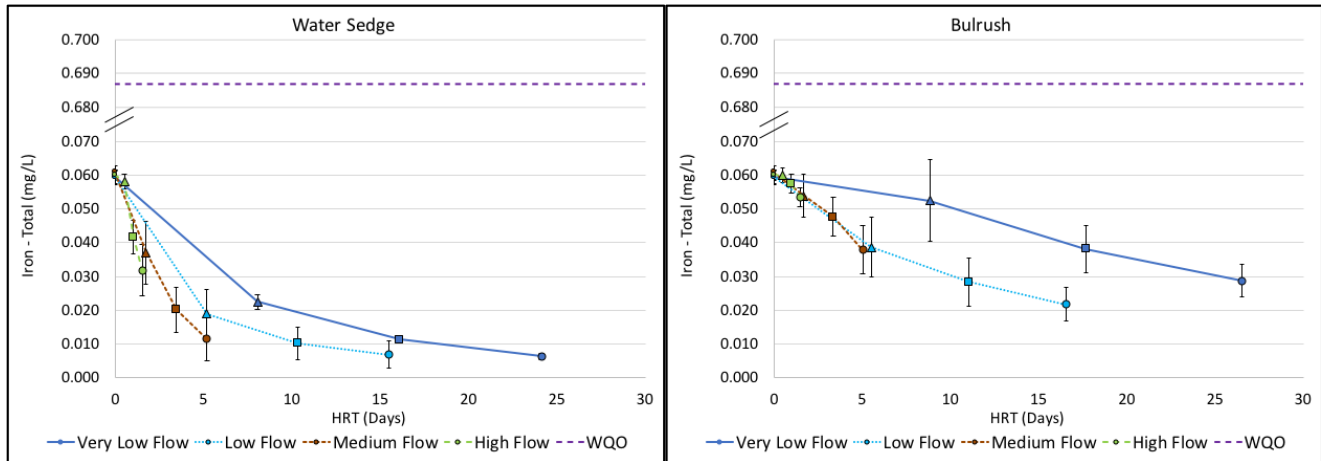


Figure 8-9: Average Total Iron Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for total iron was 0.00002 mg/L. The receiving environment WQO is indicated with a dotted line (0.687 mg/L). Predicted total concentrations are 0.01 mg/L (Table 4-2).

Other *in situ* parameters that were monitored in the water of the CWTS included temperature, specific conductivity (SPC), and pH. The average water temperature was higher during early commissioning attributed to higher temperature targets during early commissioning to expedite plant growth (Section 6.1). The temperature setpoint was decreased for the last two months of commissioning and the first stage of operations, and the temperature varied based on external seasonal temperature fluctuations. On October 15, 2019, the internal temperature of the pilot-scale facility was set to 21°C during the day and 14°C at night to mimic July temperatures (data from the National Climate Archives at Faro, Yukon). This, combined with gradually decreasing external seasonal influences of temperature led to a decrease in water temperatures during the second half of pilot-scale testing (Figure 8-10 and Figure 8-11). Temperatures during stagnation were consistent with those observed in later pilot-scale testing, while the temperature of cells upon thawing after the freeze-thaw trial were 7°C to 11°C.

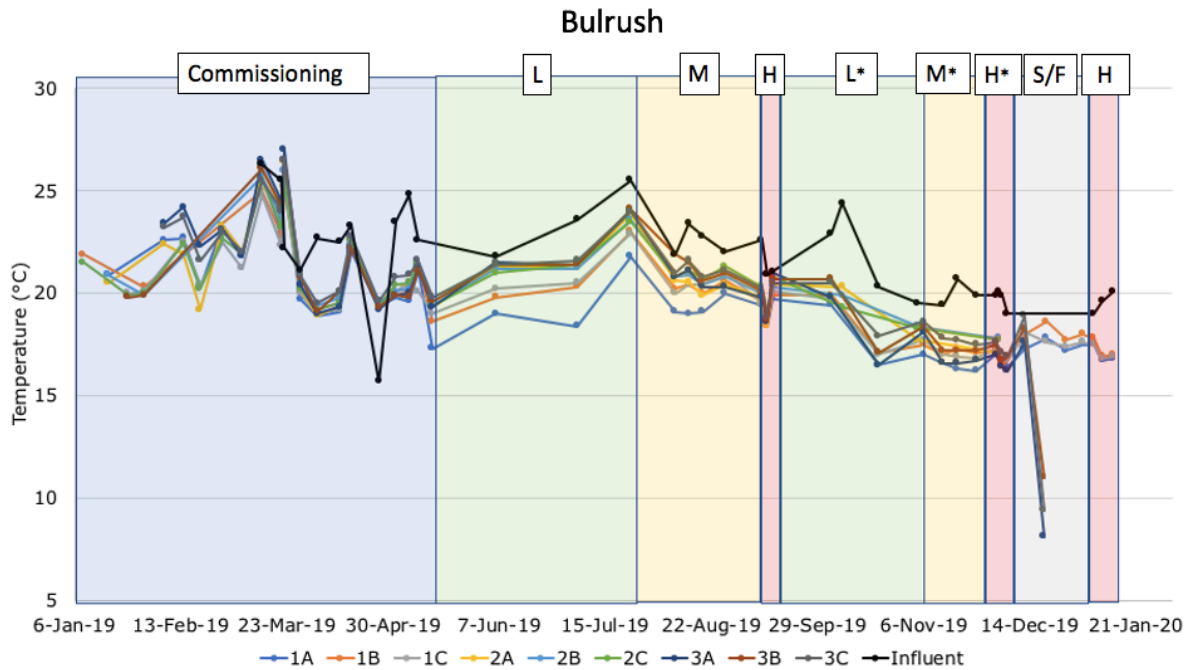


Figure 8-10: Temperature Over Time in the Bulrush CWTS

Blue shading indicates the commissioning period. Green shading with “L” indicates low flow period. Yellow shading with “M” indicates medium flow period. Red shading with “H” indicates high flow period. Period with “*” indicates stage 2 operational period where series 2 was in very low flow testing. Grey shading with “S/F” indicates the stagnation (series 1) or freeze trial (series 3) periods.

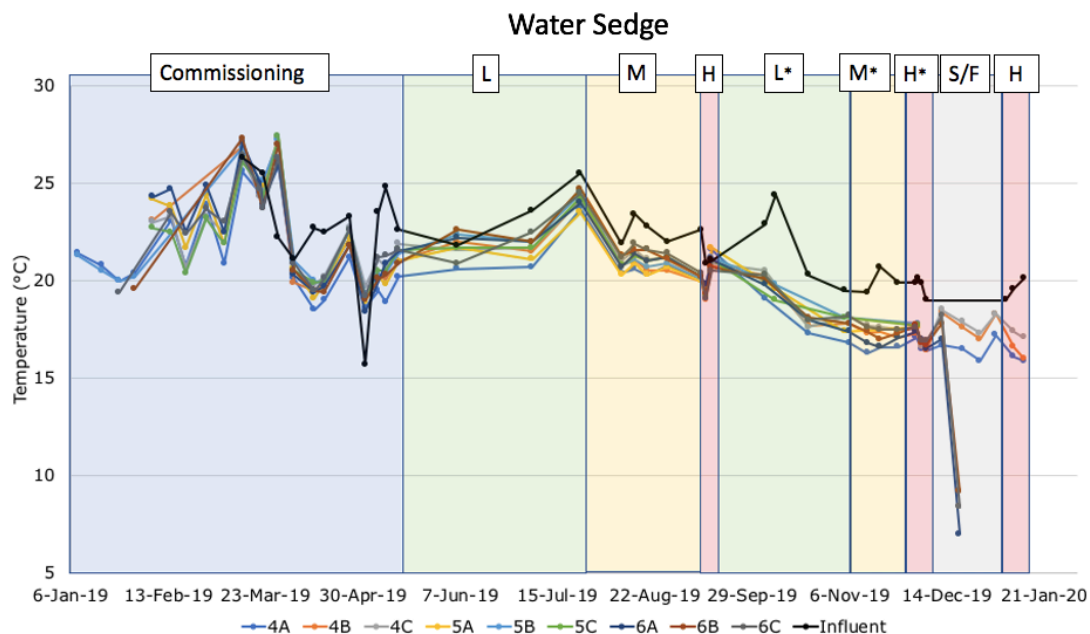


Figure 8-11: Temperature Over Time in the Water Sedge CWTS

Blue shading indicates the commissioning period. Green shading with “L” indicates low flow period. Yellow shading with “M” indicates medium flow period. Red shading with “H” indicates high flow period. Period with “*” indicates stage 2 operational period where series 5 was in very low flow testing. Grey shading with “S/F” indicates the stagnation (series 4) or freeze trial (series 6) periods.

The SPC in the CWTS remained relatively stable through the commissioning and operational period following the introduction of synthetic water to the pilot-scale systems (March 5, 2019; Figure 8-12 and Figure 8-13), except for during the very low flow period where an increase in SPC (particularly in water sedge CWTS) was observed. This increase was likely a result of evapotranspiration (water loss concentrating constituents; Section 8.3.1). The SPC during the stagnation and freeze-thaw trials were also higher than observed during operations.

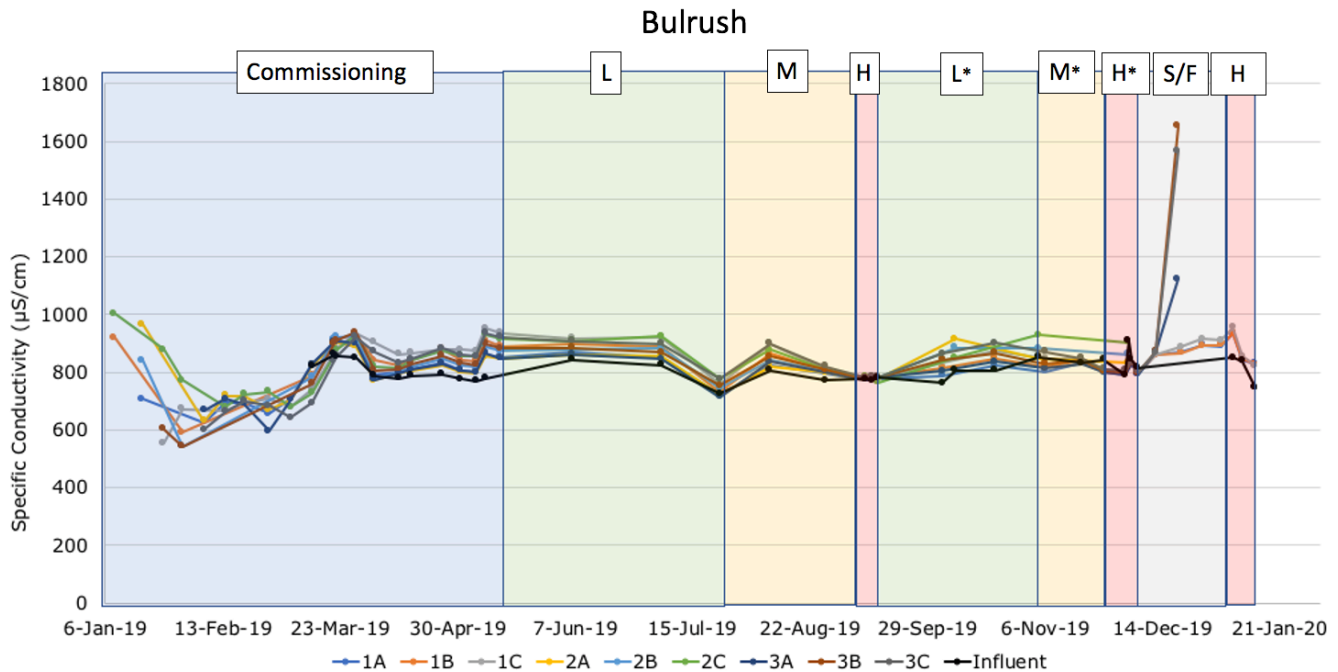


Figure 8-12: Specific Conductivity Over Time in the Bulrush CWTS

Blue shading indicates the commissioning period. Green shading with “L” indicates low flow period. Yellow shading with “M” indicates medium flow period. Red shading with “H” indicates high flow period. Period with “*” indicates stage 2 operational period where series 2 was in very low flow testing. Grey shading with “S/F” indicates the stagnation (series 1) or freeze trial (series 3) periods.

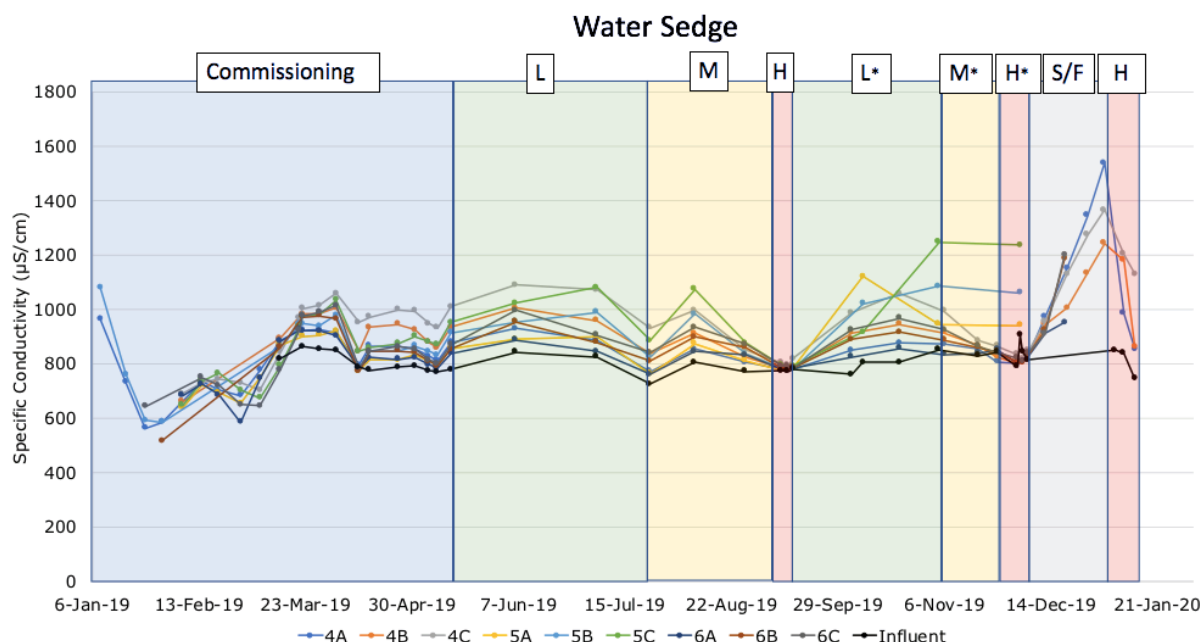


Figure 8-13: Specific Conductivity Over Time in the Water Sedge CWTS

Blue shading indicates the commissioning period. Green shading with “L” indicates low flow period. Yellow shading with “M” indicates medium flow period. Red shading with “H” indicates high flow period. Period with “*” indicates stage 2 operational period where series 5 was in very low flow testing. Grey shading with “S/F” indicates the stagnation (series 4) or freeze trial (series 6) periods.

The pH decreased in the CWTS gradually through commissioning, particularly following the introduction of synthetic water into the systems on March 5, 2019 (Figure 8-14 and Figure 8-15). During early commissioning, there was a brief decrease in influent pH observed due to a decrease in alkalinity in the tap water used to create the synthetic influent. The synthetic influent was subsequently adjusted to achieve target pH of 7-8. Despite variation in the influent pH, the pH remained stable throughout the pilot-scale testing period with the water sedge CWTS having a slightly lower pH than bulrush CWTS (Figure 8-14 and Figure 8-15). During stagnation, pH measurements increased slightly and were similar to the influent pH. Changes in influent pH did not appear to significantly affect COPI concentrations in the influent water, which remained relatively stable throughout the test work (Appendix A, Table A4-1).

During the operating phase, the pH of the bulrush and water sedge CWTS (approximately 6.3 to 7.0) was lower than the influent water (approximately 6.9 to 8.0). This is likely due to carbon dioxide oversaturation from mineralization of organic carbon under the reducing conditions in the CWTS. The slightly lower pH observed for the water sedge than the bulrush CWTS likely reflects the stronger reducing conditions observed for the water sedge system (Figure 8-3 and Figure 8-4) and associated greater carbon mineralization. Degassing of carbon dioxide will occur as the water discharged from the CWTS equilibrates with the atmosphere, which will cause the pH to rise. Therefore, perturbations to the circumneutral pH waters of Geona Creek are not expected from upstream operation of a CWTS.

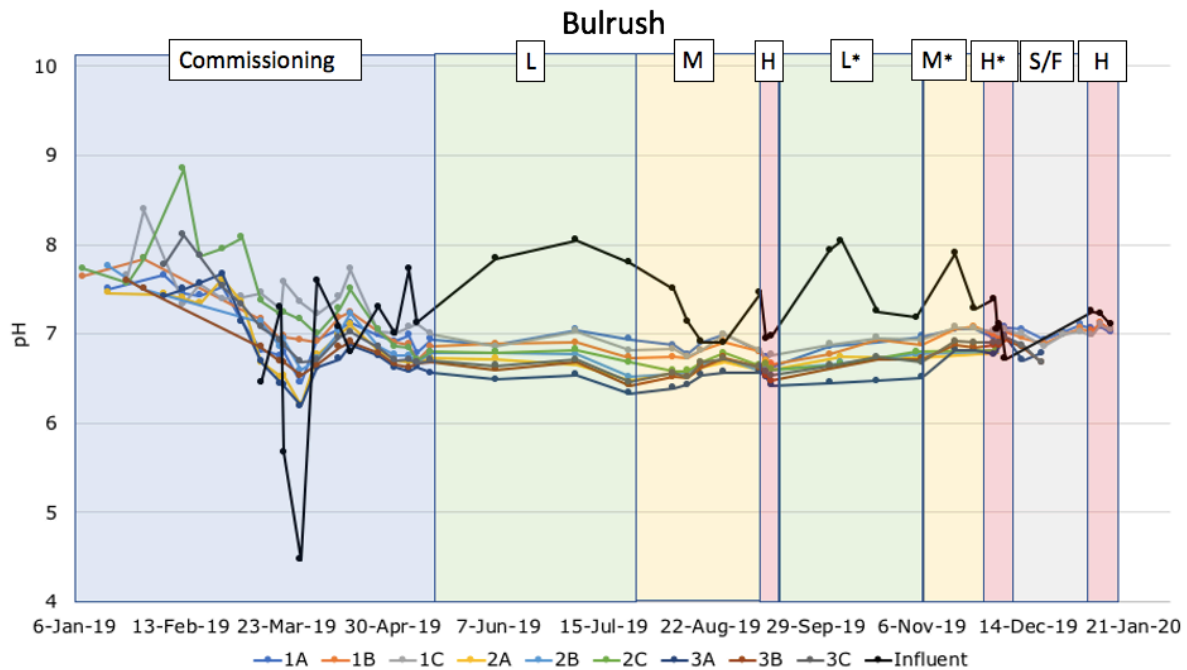


Figure 8-14: pH Over Time in the Bulrush CWTS

Blue shading indicates the commissioning period. Green shading with "L" indicates low flow period. Yellow shading with "M" indicates medium flow period. Red shading with "H" indicates high flow period. Period with "*" indicates stage 2 operational period where series 2 was in very low flow testing. Grey shading with "S/F" indicates the stagnation (series 1) or freeze trial (series 3) periods.

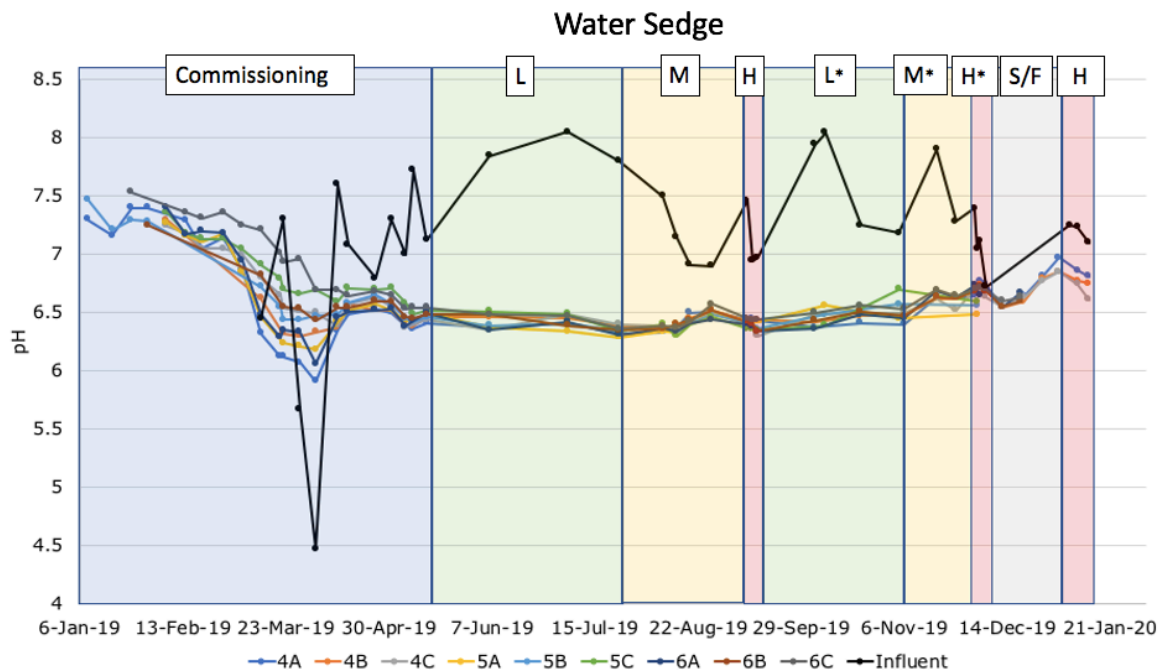


Figure 8-15: pH Over Time in the Water Sedge CWTS

Blue shading indicates the commissioning period. Green shading with "L" indicates low flow period. Yellow shading with "M" indicates medium flow period. Red shading with "H" indicates high flow period. Period with "*" indicates stage 2 operational period where series 5 was in very low flow testing. Grey shading with "S/F" indicates the stagnation (series 4) or freeze trial (series 6) periods.

8.3 TREATMENT OVERVIEW

The Removal Rate Coefficient (RCC) is assessed through pilot-scale testing, and is based on the treatability of a specific COPI and the Hydraulic Retention Time (HRT) of the system, both of which are site-specific based on water chemistry, wetland design, and characteristics (Section 7.2). As such, RCC must be developed in a site-specific manner for each COPI.

The RCCs presented in this report are a representative approximation for the predicted “worst case” scenario overflow from the ABM Lake (Table 4-2). Each CWTS design was tested for the ability to treat COPIs (antimony, arsenic, cadmium, copper, lead, selenium, uranium, and zinc) through conversion of dissolved metal and metalloid fractions in the water to less bioavailable and filterable forms, through microbial reduction, and/or through nutrient uptake.

The average RCCs in days⁻¹ for each COPI in the two CWTS designs are presented in Table 8-2, along with the proxy RCCs used to develop the initial CWTS size estimates for the Project (Section 3.2; AEG, 2017a) and pilot-scale testing plan. RCCs in the water sedge CWTS were generally higher than RCCs from the bulrush CWTS. Similarly, RCCs developed through the pilot-scale test work with the water sedge CWTS design were typically higher than the proxy RCCs previously used. Removal rate coefficients calculated for each sampling event are presented in Appendix A (Table A2-1 and Table A2-2).

The bulrush systems received a higher load of COPIs than the water sedge systems based on a higher flow rate in the bulrush to obtain the same HRT across both designs. This is because bulrush has a greater water depth tolerance compared to water sedge. Therefore, the load removed per day (presented in the subsequent sections) reflects the overall load that entered the system.

The treatment of each COPI, percent removal, and RCCs are discussed in detail in the following COPI sections (Sections 8.4.1 through 8.4.3). The effect of stagnation and freeze-thaw testing periods for each CWTS design are also described, along with the fate, distribution, and stability of treated COPIs.

Table 8-2: Average Removal Rate Coefficients for Constituents of Potential Interest Based on Pilot-scale Constructed Wetland Treatment System Testing (day⁻¹)

COPI	Bulrush CWTS	Water Sedge CWTS	Proxy
Antimony	0.02314	0.133	--
Arsenic	0.0766	0.300	0.077
Cadmium	0.399	0.989	0.48
Copper	0.611	0.813	0.48
Lead	1.490	1.501	0.723
Selenium	0.0439	0.271	0.456
Uranium	0.121	0.361	--
Zinc	0.123	0.508	0.48

'--' no proxy rate removal coefficient available. Sources for proxy removal rate coefficients are in Table 3-4.

All removal rate coefficients are first order (day⁻¹). All COPIs use dissolved concentrations for removal rate coefficient calculations rather than total concentrations as dissolved values are more representative of targeted treatment through transformation and transfer from the CWTS water. Removal rate coefficients calculated for each sampling event are presented in Appendix A (Table A2-1 and A2-2).

8.3.1 EVAPOTRANSPIRATION

Evapotranspiration was measured in the CWTS during stagnation testing by daily measurement of the water levels in the stagnating cells as described in Section 6.10. The results revealed differences between bulrush and water sedge CWTS rates of water loss, with more water loss from water sedge (7.7 L/day/m²) than bulrush (2.3 L/day/m²) (Figure 8-16; Appendix A, Table A3-1). The higher evapotranspiration rate in the water sedge is likely due to more biomass in those systems compared to the bulrush. The evapotranspiration differences were largest in water sedge during the low flow and very low flow periods, when 27% and 43% of the water entering the CWTS was lost to evapotranspiration, respectively. This resulted in the concentration of COPIs and subsequently higher outflow concentrations. Once corrected for evapotranspiration, the percent removals during very low flow resemble that of the corrected low flow testing period. Water loss through evapotranspiration is an important factor for CWTS sizing, and is intended to be further refined through on site testing in the presence of multiple climatic variables that will ultimately impact evapotranspiration rates in the full-scale CWTS.

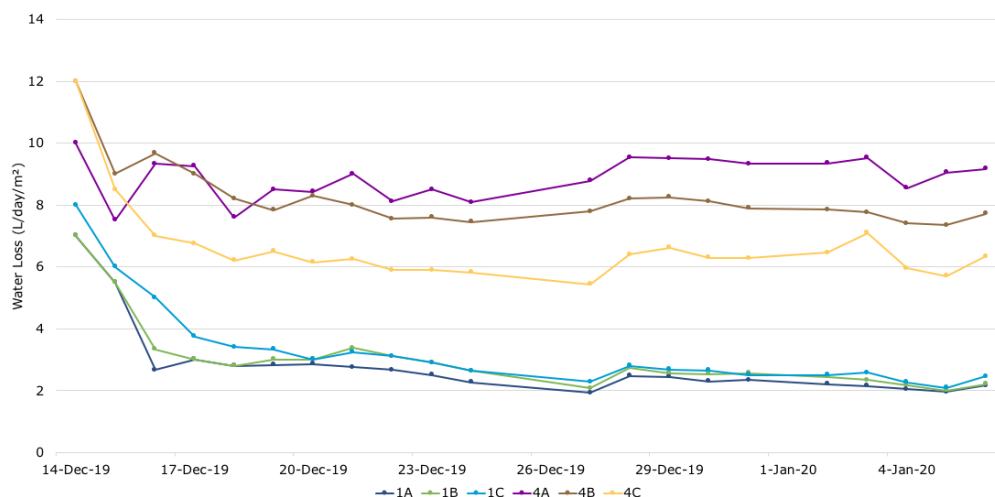


Figure 8-16: Water Loss (L/day/m²) from Stagnating Cells in Bulrush and Water Sedge CWTS

Bulrush cells: 1A, 1B, 1C; Water Sedge cells: 4A, 4B, 4C

8.4 METAL AND METALLOID CONSTITUENTS OF POTENTIAL INTEREST

The treatment of several COPs in this group was very similar, particularly cadmium, copper, and lead, which will be discussed together (Section 8.4.1). Arsenic, antimony, and zinc also exhibited generally similar treatment (Section 8.4.2). Selenium and uranium treatment are discussed together as they are directly reduced by microbes (Section 8.4.3).

8.4.1 CADMIUM, COPPER, AND LEAD

8.4.1.1 Treatment Evaluation

The average concentrations of dissolved cadmium, and total lead entering the CWTS remained stable throughout the pilot-scale trials (average of 0.0020 mg/L and 0.022 mg/L, respectively; Table 4-2; all measurements in Appendix A, Table A4-1). Dissolved and total concentrations for cadmium and copper were similar throughout CWTS testing, while lead was predominantly measured as total lead (Appendix A, Table A4-1). The concentrations of cadmium and lead in the influent were equivalent to the 2018 “worst case” water quality model (WQM) predicted concentrations (Table 4-2). Copper influent concentrations were higher than the 2018 “worst case” WQM targets due to elevated levels in the tap water, and were on average 0.025 mg/L dissolved copper (Table 4-2). This is not expected to impact testing or development of a site specific removal rate coefficient for copper (Chapter 4).

Both water sedge and bulrush designs exhibited substantial dissolved cadmium removal, with consistent treatment to below the receiving environment WQO (0.000377 mg/L to 0.000456 mg/L) except for the bulrush CWTS during the high flow test periods (1.5-day HRT) and one point each in medium and low flow testing events (Table 8-3). The water sedge CWTS exhibited higher percent removal (92% to greater than 99%) of dissolved cadmium in all flow periods compared to the bulrush CWTS (55% to 93%; Table 8-3, Figure 8-17).

Table 8-3: Dissolved Cadmium Treatment Summary Through Pilot-scale Constructed Wetland Treatment System Testing Periods

Summary (Average)	Bulrush				Water Sedge			
	Very Low	Low	Medium	High	Very Low	Low	Medium	High
Influent (mg/L) ¹	0.00204	0.00203	0.00199	0.00197	0.00204	0.00203	0.00199	0.00197
Outflow (mg/L) ₁	0.00019	0.00011	0.00019	0.00088	0.00001	0.00001	0.00002	0.00016
% Removal ²	91%	93%	90%	55%	>99%	>99%	99%	92%
Load Removed (mg/day) ³	0.03	0.06	0.17	0.35	0.02	0.04	0.11	0.33

Period identified by flow where: Very low flow: 25-day HRT; low flow: 16-day HRT; medium flow: 5-day HRT; high flow: 1.5-day HRT.

Green shading indicates concentrations were at or below the lower limit of the receiving environment WQO (0.000377 – 0.000456 mg/L). The detection limit was 0.0000050 mg/L.

¹ Averages calculated using results from all sampling events at a given flow period (e.g. 5-day HRT for medium flow testing is average of 6 sampling events). Raw data can be found in Appendix A, Table A4-1.

² % removal calculated for each sampling event based on influent and outflow concentrations and then averaged for each flow testing period. % removal has not been corrected for water loss through evapotranspiration.

³ Load removed calculated for each sampling event based on influent and outflow concentrations and volume of water through the system and then averaged for each flow testing period.

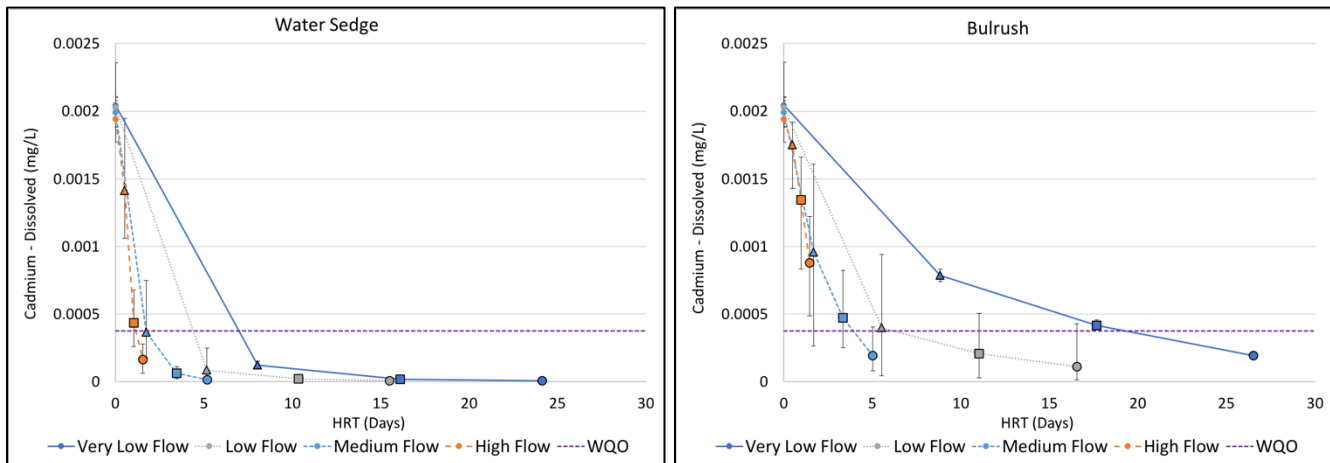


Figure 8-17: Average Dissolved Cadmium Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for dissolved cadmium was 0.0000050 mg/L. The lower limit of the receiving environment WQO is indicated with a dotted line (0.000377 – 0.000456 mg/L).

Copper also displayed significant treatment in both CWTS designs during all flow periods, with greater than 92% removal in the water sedge and greater than 82% removal in the bulrush systems (Table 8-4). Dissolved copper concentrations in the synthetic water varied as concentrations in the tap water varied (Figure 8-18). The water sedge design achieved dissolved copper concentrations below the receiving environment WQO (0.00144 mg/L) during the medium flow (5-day HRT), low flow (16-day HRT), and very low flow periods (25-day HRT), and was close to the receiving environment WQO during the high flow (1.5-day HRT) period (Table 8-4 and Figure 8-18). The bulrush CWTS design did not achieve dissolved copper concentrations below the WQO during any flow period (Table 8-4, Figure 8-18).

Table 8-4: Dissolved Copper Treatment Summary Through Pilot-scale Constructed Wetland Treatment System Testing Periods

Summary (Average)	Bulrush				Water Sedge			
	Very Low	Low	Medium	High	Very Low	Low	Medium	High
Influent (mg/L) ¹	0.0170	0.0152	0.0192	0.0303	0.0170	0.0152	0.0192	0.0303
Outflow (mg/L) ¹	0.0023	0.0024	0.0019	0.0034	0.0002	0.0004	0.0006	0.0021
% Removal ²	87%	82%	90%	88%	99%	97%	97%	92%
Load Removed (mg/day) ³	0.32	0.44	1.69	8.49	0.23	0.32	1.04	5.05

Period identified by flow where: Very low flow: 25-day HRT; low flow: 16-day HRT; medium flow: 5-day HRT; high flow: 1.5-day HRT.

Green shading indicates concentrations were at or below the receiving environment WQO (0.00144 mg/L). The detection limit was 0.000050 mg/L.

¹ Averages calculated using results from all sampling events at a given flow period (e.g. 5-day HRT for medium flow testing is average of 6 sampling events). Raw data can be found in Appendix A, Table A4-1.

² % removal calculated for each sampling event based on influent and outflow concentrations and then averaged for each flow testing period. % removal has not been corrected for water loss through evapotranspiration.

³ Load removed calculated for each sampling event based on influent and outflow concentrations and volume of water through the system and then averaged for each flow testing period.

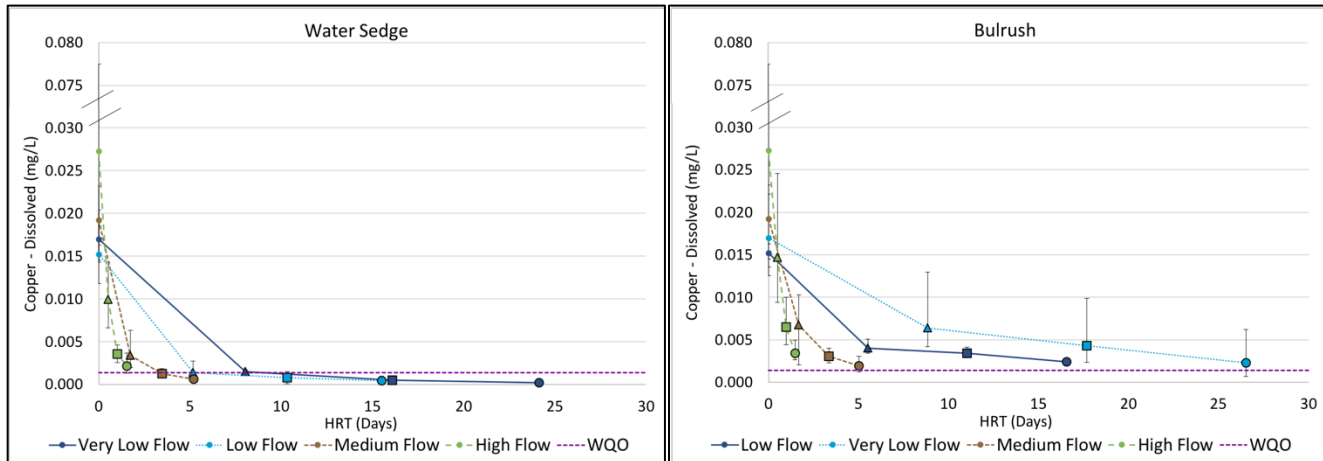


Figure 8-18: Average Dissolved Copper Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for dissolved copper was 0.000050 mg/L. The receiving environment WQO is indicated with a dotted line (0.00144 mg/L). Predicted total concentrations are 0.009 mg/L in the "worst case" 2018 WQM (AEG, 2018).

Significant treatment of total lead was achieved in both CWTS designs. The pilot-scale CWTS achieved greater than 98% removal of total lead, and treatment to below the lower boundary of the receiving environment WQO (0.012 mg/L to 0.017 mg/L) in all designs and flow periods (Table 8-5, Figure 8-19).

Table 8-5: Total Lead Treatment Summary Through Pilot-scale Constructed Wetland Treatment System Testing Periods

Summary	Bulrush				Water Sedge			
	Very Low	Low	Medium	High	Very Low	Low	Medium	High
Influent (mg/L) ¹	0.0239	0.0250	0.0199	0.0209	0.0239	0.0250	0.0199	0.0209
Outflow (mg/L) ¹	0.00001	0.00003	0.00005	0.00034	0.00001	0.00003	0.00004	0.00026
% Removal ²	>99%	>99%	>99%	98%	>99%	>99%	>99%	99%
Load Removed (mg/day) ³	0.42	0.72	1.87	6.47	0.28	0.47	1.08	3.68

Average concentrations of total lead for each flow period provided.

Period identified by flow where: Very low flow: 25-day HRT; low flow: 16-day HRT; medium flow: 5-day HRT; high flow: 1.5-day HRT.

Green shading indicates concentrations were at or below the receiving environment WQO (0.012 – 0.017 mg/L). The detection limit was 0.000020 mg/L.

¹ Averages calculated using results from all sampling events at a given flow period (e.g. 5-day HRT for medium flow testing is average of 6 sampling events). Raw data can be found in Appendix A, Table A4-1.

² % removal calculated for each sampling event based on influent and outflow concentrations and then averaged for each flow testing period. % removal has not been corrected for water loss through evapotranspiration.

³ Load removed calculated for each sampling event based on influent and outflow concentrations and volume of water through the system and then averaged for each flow testing period.

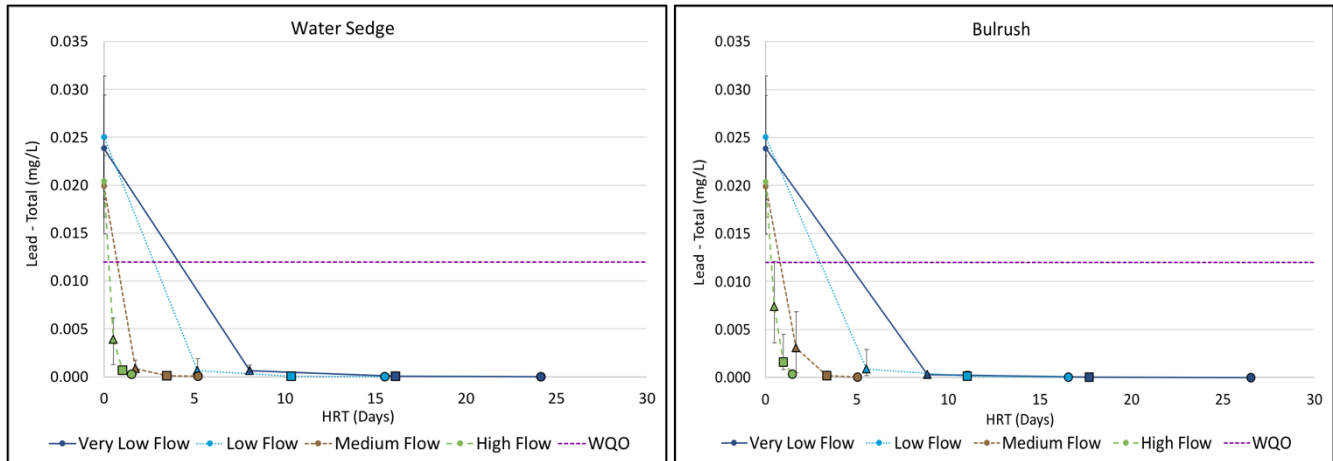


Figure 8-19: Average Total Lead Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for total lead was 0.000020 mg/L. The lower limit of the receiving environment WQO is indicated with a dotted line (0.012 – 0.017 mg/L).

The water sedge design had a much higher RRC for cadmium (faster treatment) compared to the bulrush (Table 8-2). Copper treatment was also better in the water sedge compared to the bulrush, while treatment of lead was similar between the two designs with no notable difference between the RRCs (Table 8-2).

8.4.1.2 Fate, Distribution, and Stability

The fate and distribution of cadmium, copper, and lead removed from the water during pilot-scale testing (including commissioning) were evaluated for each CWTS design (Section 7.3). The concentration of each COPI was measured at the end of the pilot-scale trials in the top ~5 cm of substrate, the above water plant tissues, and the organic material in the water column of the cell (moss, straw, and duckweed). The wet mass of plant tissue and organic material collected during the final sampling event (Appendix A, Table A5-1) and the percent moisture (Appendix A Table A5-2) were used alongside COPI concentrations in the plant and organic material (Appendix A, Table A5-3) to estimate the load of each COPI in the plant or organic material at the end of the pilot-scale trials. This was similarly done to estimate the load of each COPI in the top ~5 cm of substrate (Appendix A, Table A6-1). The distribution of the COPI in the pilot CWTS was then evaluated, with load retained in 'other' locations within the CWTS cells which were not measured including substrate deeper than 5 cm, plant roots, biofilms on the walls of the CWTS cells, and forebay straw (where applicable).

Of the load of cadmium that entered the series through the pilot-scale test work, 0.014 to 0.026 grams (g) of cadmium was retained (Table 8-6), which corresponds to 76% to 84% and 95% to 98% of the load that entered the CWTS retained in each of the bulrush and water sedge CWTS, respectively (Table 8-6). For copper, 0.146 to 0.389 g was retained, which corresponds to 82% to 84% and 93% to 95% of the load that entered the CWTS retained in each of the bulrush and water sedge CWTS, respectively. For lead, 0.148 to 0.344 g of lead was retained, which corresponds to 99% of the load that entered the CWTS retained in all series (Table 8-6).

Of the load that entered each series, the distribution of that load into the top ~5 cm of substrate, the above water plant tissues, and the organic material in the water column of the cell was evaluated. Cadmium, copper, and lead concentrations in the top 5 cm of substrate at the end of the pilot-scale trials were within method accuracy of the respective starting substrate concentrations (Appendix A, Table A6-1).

There were low concentrations of copper, lead, and cadmium in both plant types as targeted (Appendix A, Table A5-3), with less than 1% of the load retained in the bulrush and less than 1.1% of the load retained in the water sedge tissues (Table 8-6).

In the bulrush CWTS design, organics in the water column accounted for 13% to 57% of the retained cadmium, copper, and lead. In the water sedge CWTS design, organics in the water column accounted for 4% to 17% of the retained cadmium, copper, and lead (Table 8-6). The variability in load retained in the organics within each series is partially explained by the amount of organics that were present in each cell by the end of the pilot-scale trials (Appendix A, Table A5-1), while the bulrush series also demonstrated more variability in COPI concentration in the organics in each a series (particularly for cadmium and copper; Appendix A, Table A5-3). A comparison of bulrush and water sedge reveals more cadmium, copper, and lead retention in the organics in the bulrush compared to the water sedge CWTS, which was likely due to more moss in the bulrush CWTS.

The remainder of the retained cadmium, copper, and lead was therefore in the deep substrate/roots zone and 'other' locations described above for both designs (43% to 87% and 83% to 96% for bulrush and water sedge, respectively; Table 8-6). Storage of COPIs in areas such as the root zone and deeper substrate provides stability to the COPI as well as being buried over time through accretion. Based on the complexity of treatment wetland systems, it is common to encounter components of the mass balance that are not accounted for (Kadlec and Wallace, 2009).

Table 8-6: Load of Copper, Cadmium, and Lead Retained and Percent Distribution Within the CWTS

Series	Load Retained (g)	Load Retained (%) ¹	Percent of Load Retained (%) ²			
			Top 5 cm Substrate ³	Above Water Plant Tissue ⁴	Organics in Water Column ⁵	Deep Substrate/Root Zone & Other ⁶
Cadmium						
Bulrush 1	0.025	76	NM	0.0	57	43
Bulrush 2	0.019	87	NM	0.0	26	74
Bulrush 3	0.026	84	NM	0.1	18	82
Water Sedge 4	0.020	95	NM	0.4	4.0	96
Water Sedge 5	0.014	97	NM	0.1	9.8	90
Water Sedge 6	0.019	98	NM	0.2	17	83
Copper						
Bulrush 1	0.389	82	NM	0.1	54	46
Bulrush 2	0.189	84	NM	0.1	30	70
Bulrush 3	0.297	84	NM	0.2	19	80
Water Sedge 4	0.288	93	NM	1.0	3.8	95
Water Sedge 5	0.146	95	NM	1.0	7.7	91
Water Sedge 6	0.219	94	NM	1.1	14	85
Lead						
Bulrush 1	0.344	99	NM	0.0	31	69
Bulrush 2	0.235	99	NM	0.0	13	87
Bulrush 3	0.317	99	NM	0.1	18	82
Water Sedge 4	0.220	99	NM	0.2	4.9	95
Water Sedge 5	0.148	99	NM	0.3	6.0	94
Water Sedge 6	0.206	99	NM	0.3	12	88

NM: Not measurable (final concentrations of COPs were within method error of initial concentrations. Method error was 20% for initial and 30% for final samples).

¹ Calculated by dividing the load retained (g) by the load in (g) over the entire pilot trial. Load in varies based on the retention time of each series.

² Calculated by dividing the load retained in respective area of the CWTS by the overall load retained for each series.

³ Top 5 cm of substrate collected from each CWTS cell.

⁴ All above water plant tissue collected from each CWTS cell.

⁵ Organic material in water column including moss, straw, and duckweed collected from each CWTS cell.

⁶ Percent retained in the 'other' category is the remaining load retained that was not accounted for by the top 5 cm substrate, above water plant tissue, and organic material in water column. This includes deeper substrate, plant roots, biofilms on the walls of the CWTS cells, and forebay straw (where applicable).

Copper in the top 5 cm of substrate was predominantly associated with the sulphide- and/or organic-bound (Fraction 4) or residual mineral (Fraction 5) form in all systems (Figure 8-20; Appendix A, Table A6-2). The amount of copper in Fraction 4 increased through the pilot-scale tests (compared to the initial distribution where there was no copper in Fraction 4). The increase in Fraction 4 was accompanied by a decrease in the iron and manganese oxide-bound form (Fraction 3). This likely reflects reductive dissolution of a portion of the copper-bearing iron (oxyhydr)oxides and re-precipitation of the released copper as a sulphide phase, either as a discrete copper sulphide or co-precipitated with iron sulphide, and/or bound to organics. It is notable that the water sedge systems contained greater amounts of copper in Fraction 4 than the bulrush systems, suggesting that the more reducing conditions in the water sedge systems led to copper being in a stable form in these systems. Copper extracted in Fraction 5 is expected to be stable within the CWTS substrate since strong acids are required to liberate this copper in the Tessier extraction scheme. Similarly, copper

present in Fraction 4 is also expected to be stable within the CWTS since strongly oxidizing conditions are required to release this copper whereas reducing conditions are sustained within the CWTS. Deposition and burial of copper sulphides associated with Fraction 4 within the CWTS will further lower their potential for interaction with more oxidizing waters and provide long term sequestration within the CWTS.

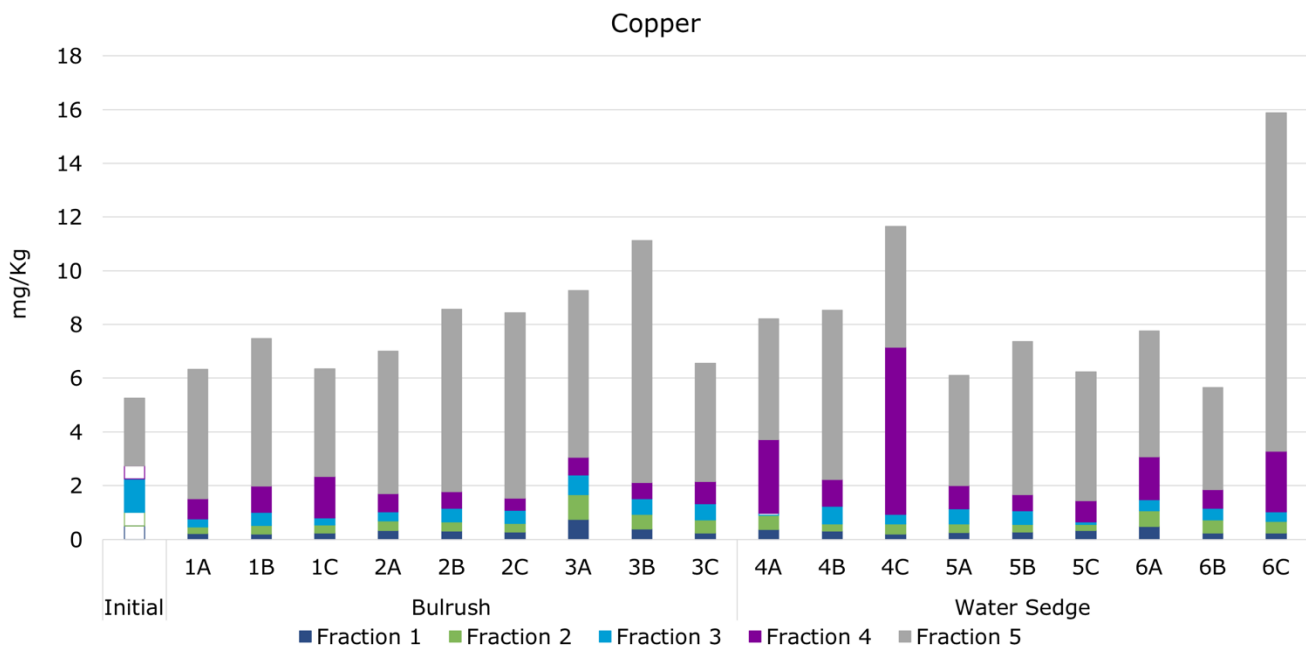
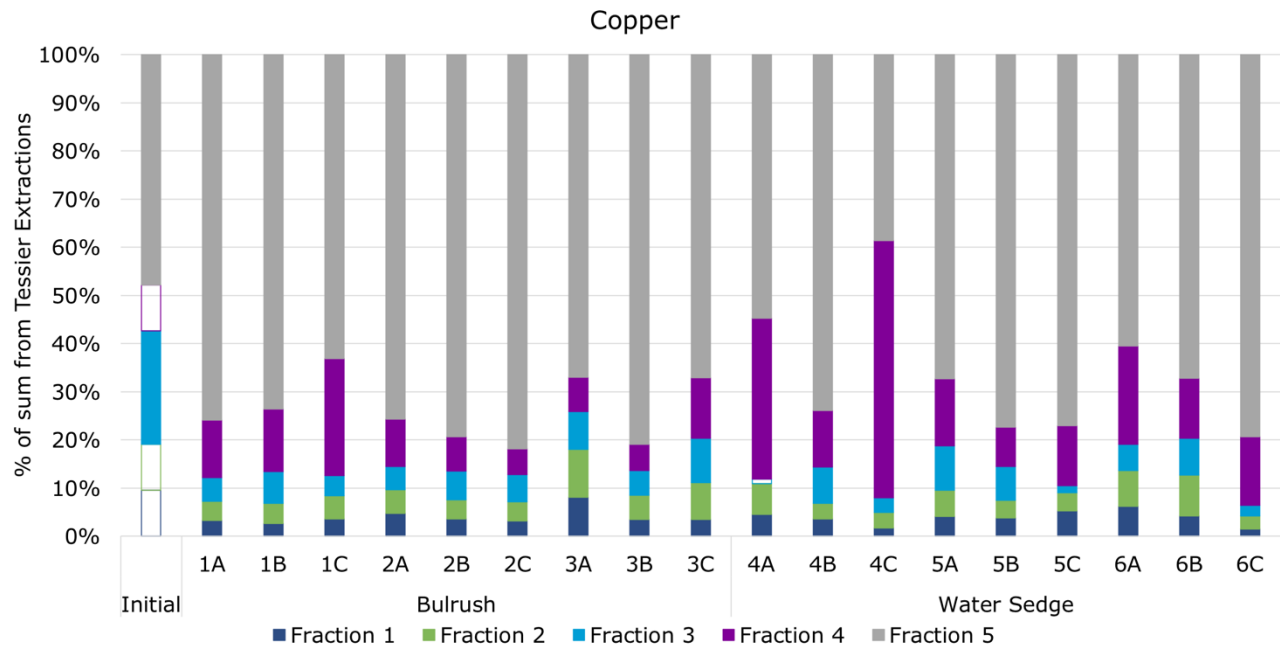


Figure 8-20: Fraction Distribution of Copper in the CWTS Pilot Design Expressed as a % of the sum From Tessier Extractions (Top) and as mg/kg (Bottom)

Results of Tessier sequential extraction determining mineral forms of copper in the top 5 cm of substrate. Whited out areas are values at or below detection limits.

Cadmium and lead influent concentrations into the CWTS were too low to evaluate any notable changes in form associated with the substrate. The starting substrate was predominantly below detection limits for the sequential Tessier extraction. However, lower detection limits were available for the testing performed at the end of the pilot-scale trials. These lower detection limits enabled some interpretation of the Fractions. Cadmium was largely distributed between Fractions 2 and 3 (Figure 8-21). Fraction 1 generally accounted for 10% to 15% of the cadmium inventory, although a higher proportion (approximately 30%) was observed in samples 3A, 4A, and 6A. These data indicate that cadmium is largely bound with carbonate (Fraction 2) and iron and/or manganese (oxyhydr)oxide (Fraction 3) phases. Cadmium readily forms carbonate minerals and can substitute for calcium within calcite. Given that acidic influent to the field CWTS is not anticipated, cadmium sequestered in carbonate minerals is expected to be stable within the CWTS. Furthermore, the alkalinity produced by the reducing reactions within the CWTS will contribute to cadmium removal in carbonate form and foster the stability of such carbonate minerals. Although a portion of the poorly crystalline iron and manganese (oxyhydr)oxides within the CWTS will undergo reductive dissolution, the subsequent elevated dissolved ferrous iron concentrations tend to promote recrystallization of such minerals to form more crystalline iron (oxyhydroxides such as goethite and lepidocrocite), for which cadmium has a strong affinity. Cadmium associated with such phases is expected to be stable, and cadmium released following reductive dissolution of its manganese or iron (oxyhydr)oxide host will likely be re-precipitated as a sulphide phase under sulphate-reducing conditions within the CWTS. Although the elevated Fraction 1 cadmium content found for some samples may suggest potential for desorption, it should be noted that the 1 molar (M) magnesium chloride solution used for this extraction step has an ionic strength that is much higher than the freshwaters expected to feed the CWTS in the field, and so represents a conservative bound for cadmium desorption. It is expected that cadmium released in this fashion would be available for re-precipitation within carbonate and/or sulphide phases in the CWTS. No marked difference in the cadmium distribution across the Tessier fractions was observed between the bulrush and water sedge experiments, apart from a slightly higher proportion of Fraction 4 associated cadmium in the water sedge substrate, consistent with the more reducing conditions observed for these systems.

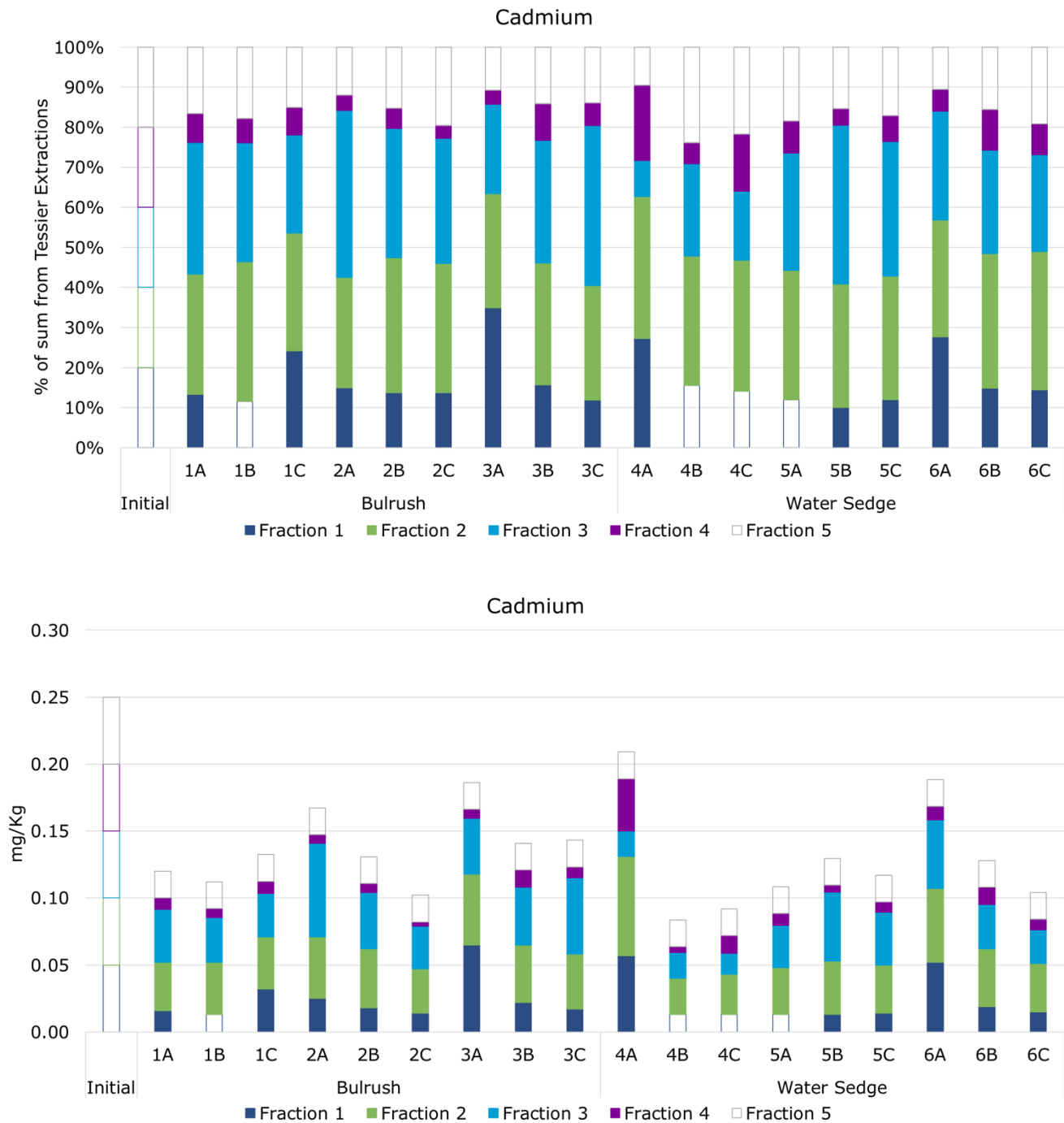


Figure 8-21: Fraction Distribution of Cadmium in the CWTS Pilot Design Expressed as a % of the sum From Tessier Extractions (Top) and as mg/kg (Bottom)

Results of Tessier sequential extraction determining mineral forms of cadmium in the top 5 cm of substrate. Whited out areas are values at or below detection limits.

Approximately 80% to 90% of the lead in the CWTS substrate was extracted with the residual Fraction 5 (Figure 8-22). This indicates that the lead is primarily stored as a recalcitrant mineral form that is resistant to solubilization and is expected to remain stably sequestered within the CWTS following removal from solution. No marked change in lead distribution across the Tessier extraction pools was noted in the substrate collected from the bulrush and water sedge systems, except for cell 4A, which had the highest Fraction 2 and 4 proportions (7% and 6%, respectively). This may be related to the strong reducing condition of this cell, resulting in lead removal in carbonate and sulphide forms associated with Fractions 2 and 4, respectively.

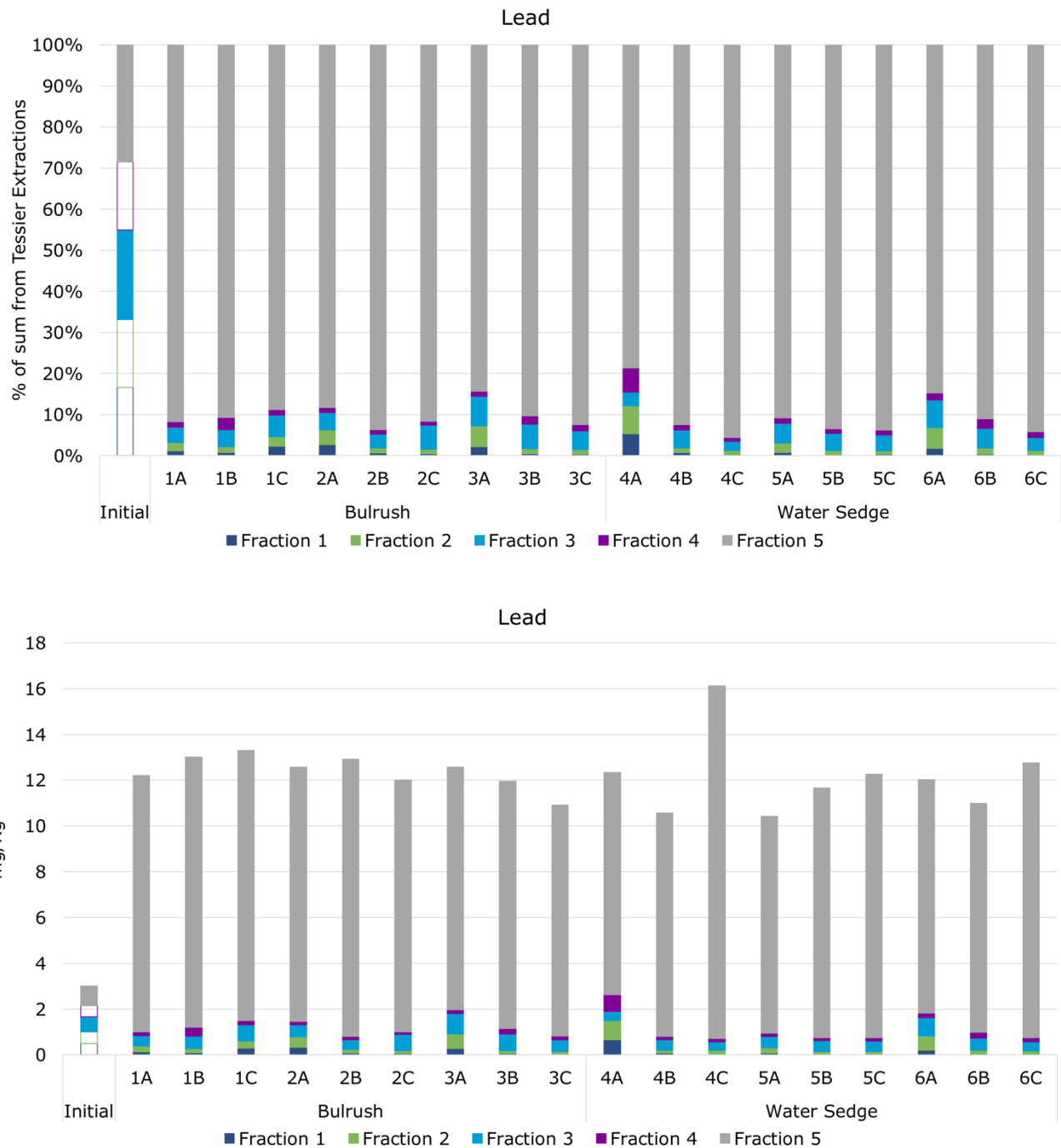


Figure 8-22: Fraction Distribution of Lead in the CWTS Pilot Design Expressed as a % of the sum From Tessier Extractions (Top) and as mg/kg (Bottom)

Results of Tessier sequential extraction determining mineral forms of lead in the top 5 cm of substrate. Whited out areas are values at or below detection limits.

8.4.1.3 Freeze-thaw Testing

A freeze-thaw test was performed on the pilot-scale CWTS to evaluate potential COPI release through a freeze-thaw cycle with the different CWTS designs. The freeze thaw test was intended to evaluate initial release of COPIs immediately upon the CWTS thawing; as the pilot-scale CWTS plants do not recover from the rapid freeze-thaw, subsequent treatment was not evaluated. In other words, the freeze-thaw test on the pilot-scale CWTS is intended to provide information on treated COPI stability and potential release through the freeze-thaw cycle, and not subsequent treatment as water flows through the CWTS. In an on site system, the CWTS would thaw (including clean overlying snow) and plants would begin growing in the spring, promoting water circulation through the root zones and treatment of COPIs.

The cadmium, copper, and lead that was retained in the CWTS remained predominantly stable through a freeze-thaw process (Table 8-7). Over 97% of the load of cadmium and copper stored in the CWTS through the pilot-scale trials was retained through the freeze-thaw testing, and over 99% of the load of lead. The water sedge CWTS design had a greater percent of cadmium and copper retained in the CWTS through the freeze-thaw trial than the bulrush CWTS design.

Table 8-7: Load of Cadmium, Copper, and Lead Released and Percent Retained Through Freeze-Thaw Testing.

COPI	Pilot-scale CWTS	Load retained (g)	Load released through freeze-thaw (g)	Percent retained
Cadmium	Bulrush (series 3)	0.026	0.0009	97%
	Water sedge (series 6)	0.019	0.0002	99%
Copper	Bulrush (series 3)	0.297	0.010	97%
	Water sedge (series 6)	0.219	0.004	98%
Lead	Bulrush (series 3)	0.317	0	> 99%
	Water sedge (series 6)	0.206	0	> 99%

8.4.1.4 Stagnation Testing

Although there are no stagnation periods predicted for the influent to the CWTS for the Project based on predicted overflow from the ABM Lake Post-closure (AEG, 2018), stagnation testing was conducted on the pilot CWTS to evaluate performance under a drought scenario in a potentially warming climate. After the stagnation period, water was flowed through the pilot-scale CWTS at the high flow rate for each respective series (Section 6.10). The high flow rate was selected for testing to provide information on a worst-case scenario where a stagnation period that promotes anoxic/reducing conditions to establish in the CWTS is followed by a high flow event which rapidly provides oxygenated water to the system. The stability of treated COPI was therefore evaluated through this transition as fresh water flowed through the CWTS (Initial Flush). Subsequent treatment of each COPI was also evaluated through two high flow rate testing events (Post-stagnation 1 and 2) for comparison to treatment during the high flow rate test periods prior to stagnation (Pre-stagnation).

Stagnation had minimal effect on stability and treatment of cadmium, copper, and lead (Figure 8-23, Figure 8-24, and Figure 8-25, respectively). Both CWTS designs showed treatment of cadmium, copper, and lead through the initial flush after the stagnation period, with no leaching or increased concentrations of COPIs compared to the influent concentration during the initial flush post stagnation. Treatment of all COPIs was similar to pre-stagnation test events at the high flow 1.5 day HRT within one to two HRT periods. While there were instances where the outflow concentration was greater than the receiving environment WQO for cadmium and copper, results were consistent with

treatment observed pre-stagnation (Section 8.4.1.1) indicating rapid recovery of the CWTS. Furthermore, as noted above the stagnation trials are intended to provide information on a worst-case scenario with a high flow rate and short retention time through the system, whereas a gradual increase of flows to the CWTS would be a more likely scenario following a stagnation event due to a drought. The water sedge system consistently achieved outflow concentrations below the receiving environment WQOs for these COPIs in the very low, low, and medium flow rate test periods (Section 8.4.1.1).

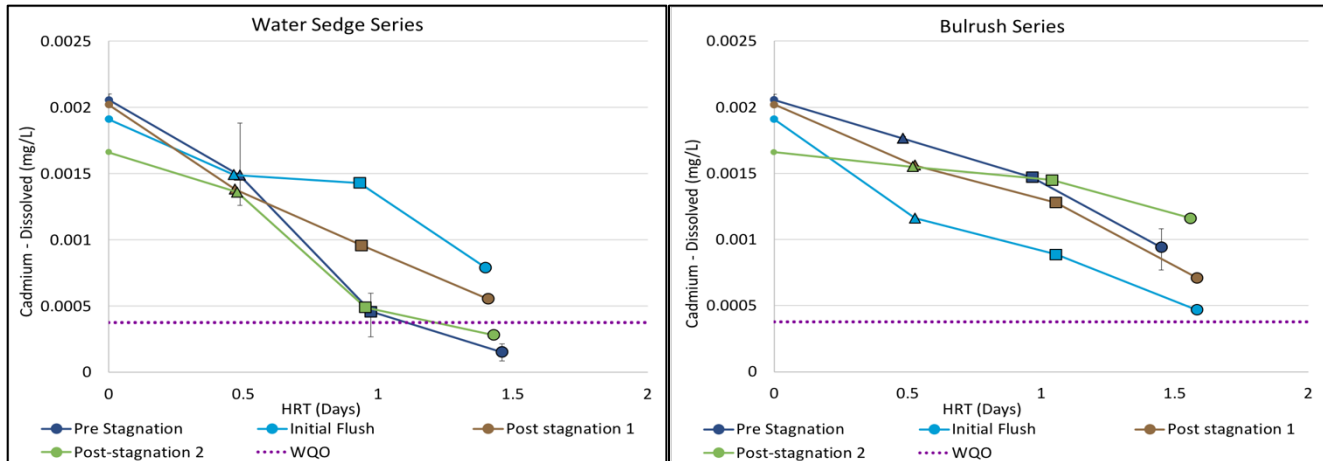


Figure 8-23: Dissolved Cadmium Treatment Post Stagnation Testing in Both Constructed Wetland Treatment System Designs

Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). Pre stagnation data are an average of all operational stage 2 high flow sampling events, with error bars indicating the lowest and highest concentrations in each cell. The detection limit for dissolved cadmium was 0.0000050 mg/L. The lower limit of the receiving environment WQO is indicated with a dotted line (0.000377 – 0.000456 mg/L).

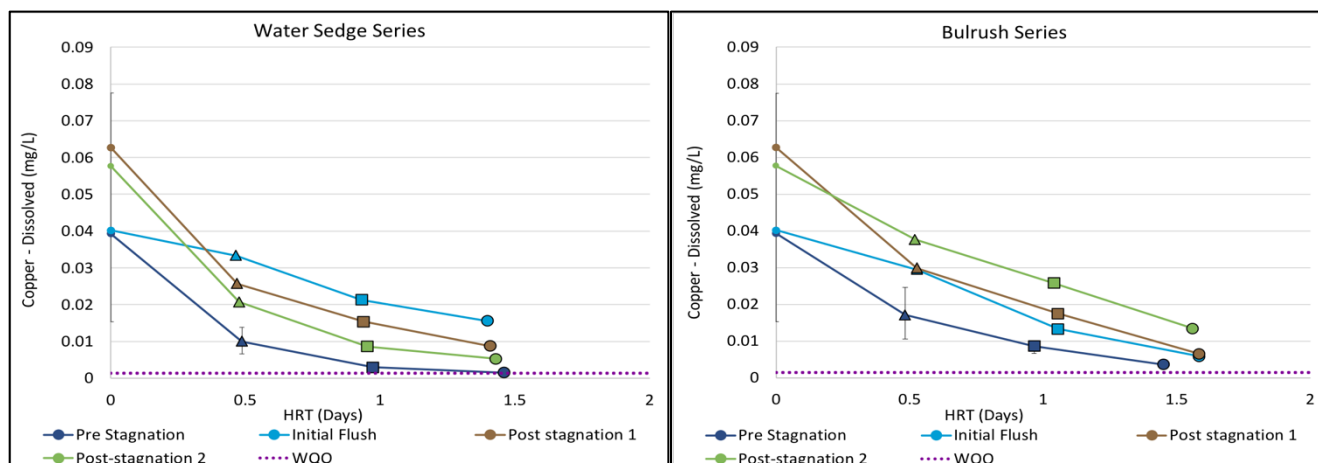


Figure 8-24: Dissolved Copper Treatment Post Stagnation Testing in Both Constructed Wetland Treatment System Designs

Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). Pre stagnation data are an average of all operational stage 2 high flow sampling events, with error bars indicating the lowest and highest concentrations in each cell. The detection limit for dissolved copper was 0.000050 mg/L. The receiving environment WQO is indicated with a dotted line (0.00144 mg/L).

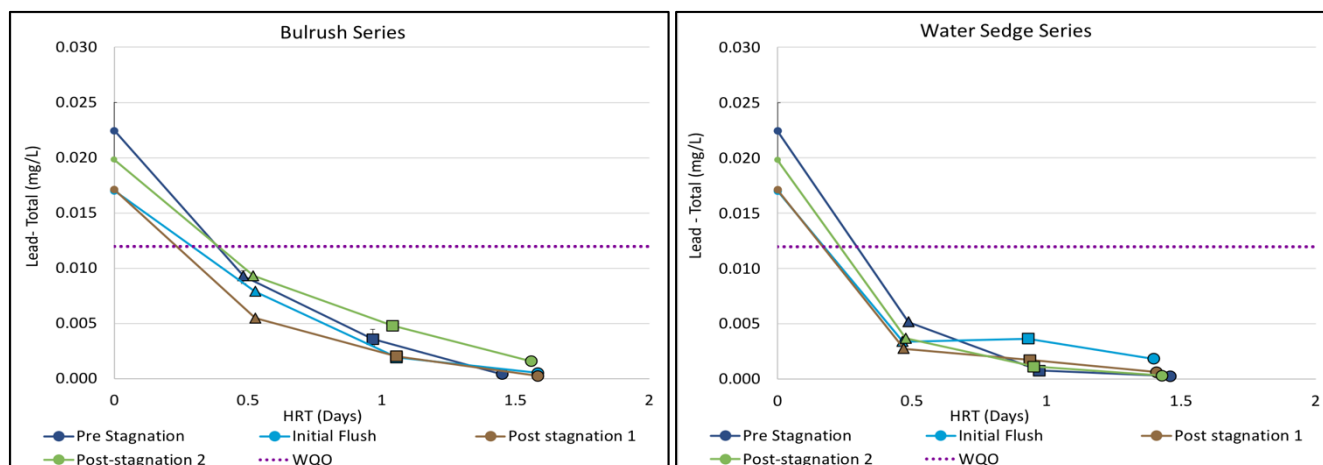


Figure 8-25: Total Lead Treatment Post Stagnation Testing in Both Constructed Wetland Treatment System Designs

Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). Pre stagnation data are an average of all operational stage 2 high flow sampling events, with error bars indicating the lowest and highest concentrations in each cell. The detection limit for total lead was 0.000020 mg/L. The lower limit of the receiving environment WQO is indicated with a dotted line (0.012 – 0.017 mg/L).

8.4.2 ARSENIC, ANTIMONY, AND ZINC

8.4.2.1 Treatment Evaluation

The average concentration of total arsenic, total antimony, and dissolved zinc entering the CWTS remained stable throughout pilot-scale testing (average of 0.06 mg/L, 0.02 mg/L, and 0.16 mg/L, respectively; Table 4-2; Appendix A, Table A4-1) and were consistent with the “worst case” concentrations based on the 2018 water quality model.

The water sedge CWTS exhibited higher percent removal (47% to 89%) of total arsenic in all flow periods compared to the bulrush CWTS (12% to 62%; Table 8-8). A similar trend was observed for dissolved zinc, where the water sedge

CWTS had a higher percent removal (65% to 98%) compared to the bulrush (7% to 81%; Table 8-9). The variability in percent removal is attributed to the flow periods that were tested, with lower percent removal (albeit higher load removed per day) at the high flow period with a 1.5 day HRT. Total arsenic was treated to concentrations below the receiving environment WQO in all flow periods with the exception of medium and high flow testing periods in the bulrush design (5- and 1.5-day HRT; Table 8-8 and Figure 8-26).

Table 8-8: Total Arsenic Treatment Summary Through Pilot-scale Constructed Wetland Treatment System Testing Periods

Summary (Average)	Bulrush				Water Sedge			
	Very Low	Low	Medium	High	Very Low	Low	Medium	High
Influent (mg/L) ¹	0.0601	0.0614	0.0611	0.0623	0.0601	0.0614	0.0611	0.0623
Outflow (mg/L) ¹	0.0289	0.0218	0.0374	0.0542	0.0065	0.0070	0.0114	0.0319
% Removal ²	52%	62%	37%	12%	89%	87%	79%	47%
Load Removed (mg/day) ³	0.55	1.14	2.33	2.55	0.62	1.02	2.69	5.42

Period identified by flow where: Very low flow: 25-day HRT; low flow: 16-day HRT; medium flow: 5-day HRT; high flow: 1.5-day HRT.

Green shading indicates concentrations were at or below the receiving environment WQO (0.037 mg/L). The detection limit was 0.000020 mg/L.

¹ Averages calculated using results from all sampling events at a given flow period (e.g. 5-day HRT for medium flow testing is average of 6 sampling events). Raw data can be found in Appendix A, Table A4-1.

² % removal calculated for each sampling event based on influent and outflow concentrations and then averaged for each flow testing period. % removal has not been corrected for water loss through evapotranspiration.

³ Load removed calculated for each sampling event based on influent and outflow concentrations and volume of water through the system and then averaged for each flow testing period.

Table 8-9: Dissolved Zinc Treatment Summary Through Pilot-scale Constructed Wetland Treatment System Testing Periods

Summary (Average)	Bulrush				Water Sedge			
	Very Low	Low	Medium	High	Very Low	Low	Medium	High
Influent (mg/L) ¹	0.160	0.160	0.164	0.163	0.160	0.160	0.164	0.163
Outflow (mg/L) ¹	0.0530	0.0260	0.0642	0.1511	0.0033	0.0033	0.0087	0.0568
% Removal ²	67%	81%	61%	7%	98%	97%	94%	65%
Load Removed (mg/day) ³	2.03	4.09	9.56	3.30	1.88	3.08	8.48	18.83

Period identified by flow where: Very low flow: 25-day HRT; low flow: 16-day HRT; medium flow: 5-day HRT; high flow: 1.5-day HRT.

Green shading indicates concentrations were at or below the lower limit of the receiving environment WQO (0.039-0.073 mg/L). The detection limit was 0.00010 mg/L.

¹ Averages calculated using results from all sampling events at a given flow period (e.g. 5-day HRT for medium flow testing is average of 6 sampling events). Raw data can be found in Appendix A, Table A4-1.

² % removal calculated for each sampling event based on influent and outflow concentrations and then averaged for each flow testing period. % removal has not been corrected for water loss through evapotranspiration.

³ Load removed calculated for each sampling event based on influent and outflow concentrations and volume of water through the system and then averaged for each flow testing period.

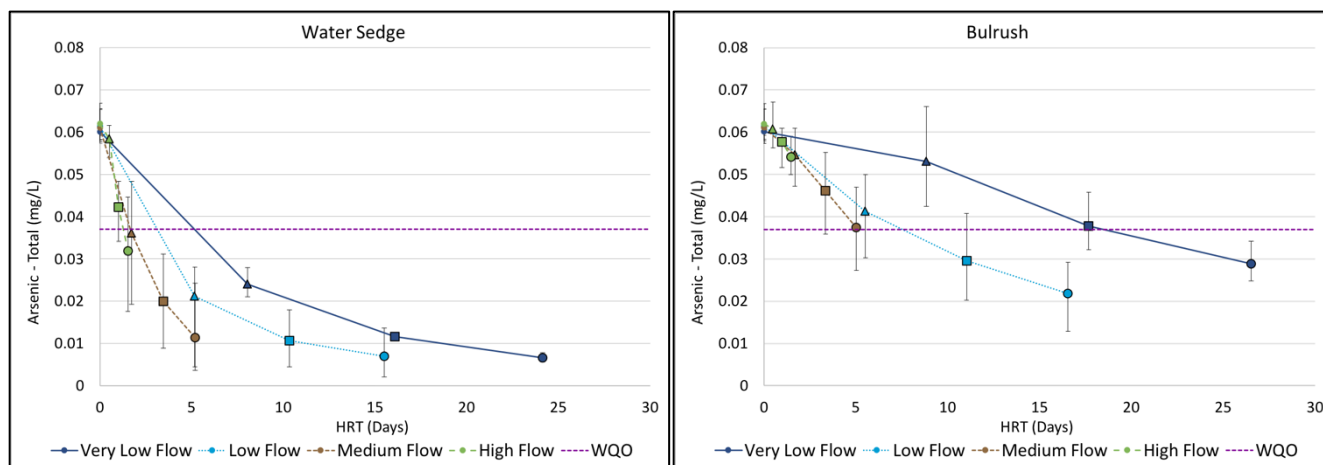


Figure 8-26: Average Total Arsenic Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for total arsenic was 0.000020 mg/L. The receiving environment WQO is indicated with a dotted line (0.037 mg/L).

Dissolved zinc was treated to concentrations below the lower receiving environment WQO of 0.039 mg/L in all flow periods in the water sedge design except the high flow period, where concentrations were below the upper WQO of 0.073 mg/L (Table 8-9 and Figure 8-27). Only the low flow period for the bulrush design met the lower receiving environment WQO in 15 of the 18 sampling events, while the medium flow and very low flow periods were below the upper WQO (Table 8-9 and Figure 8-27).

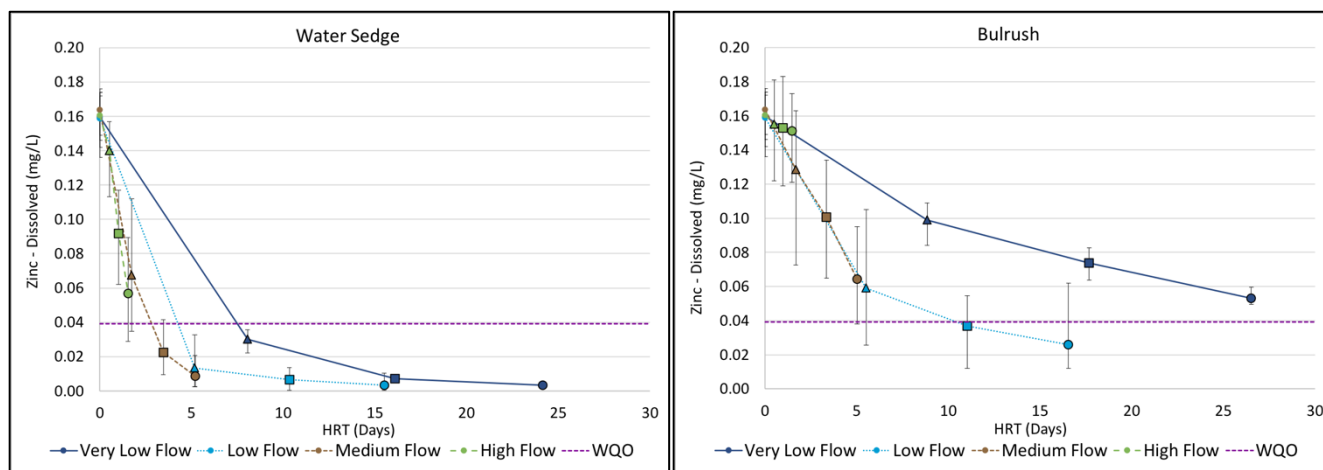


Figure 8-27: Average Dissolved Zinc Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for total zinc was 0.00010 mg/L. The lower receiving environment WQO for the CWTS is indicated with a dotted line (0.039 - 0.073 mg/L).

Total antimony also exhibited a higher percent removal in the water sedge CWTS (12% to 86%) compared to the bulrush CWTS (2% to 48%) (Table 8-10). The water sedge design achieved outflow total antimony concentrations equal to or below the receiving environment WQO (0.009 mg/L) during the medium flow (5-day HRT), low flow (16-day HRT)

and very low flow periods (25-day HRT; Table 8-10 and Figure 8-28). The bulrush CWTS design did not achieve total antimony concentrations below the WQO during any flow period (Table 8-10 and Figure 8-28).

Similar to other COPI, the water sedge design demonstrated faster treatment of arsenic, zinc, and antimony compared to the bulrush design (Table 8-2). The RRCs for arsenic and zinc in the water sedge CWTS were improved compared to the proxy RRCs that were developed based on other Projects with similar chemistry and conditions to the Project site that have been used (Section 3.2 and 8.3), whereas the bulrush exhibited lower RRC for zinc and similar RRC for arsenic compared to the proxy RRCs.

Table 8-10: Total Antimony Treatment Summary Through Pilot-scale Constructed Wetland Treatment System Testing Periods

Summary (Average)	Bulrush				Water Sedge			
	Very Low	Low	Medium	High	Very Low	Low	Medium	High
Influent (mg/L) ¹	0.0201	0.0220	0.0210	0.0202	0.0201	0.0220	0.0210	0.0202
Outflow (mg/L) ¹	0.0130	0.0119	0.0187	0.0198	0.0029	0.0025	0.0090	0.0176
% Removal ²	35%	48%	10%	2%	86%	86%	54%	12%
Load Removed (mg/day) ³	0.13	0.30	0.26	0.14	0.20	0.37	0.66	0.47

Period identified by flow where: Very low flow: 25-day HRT; low flow: 16-day HRT; medium flow: 5-day HRT; high flow: 1.5-day HRT.

Green shading indicates concentrations were at or below the receiving environment WQO (0.009 mg/L). The detection limit was 0.000020 mg/L.

¹ Averages calculated using results from all sampling events at a given flow period (e.g. 5-day HRT for medium flow testing is average of 6 sampling events). Raw data can be found in Appendix A, Table A4-1.

² % removal calculated for each sampling event based on influent and outflow concentrations and then averaged for each flow testing period. % removal has not been corrected for water loss through evapotranspiration.

³ Load removed calculated for each sampling event based on influent and outflow concentrations and volume of water through the system and then averaged for each flow testing period.

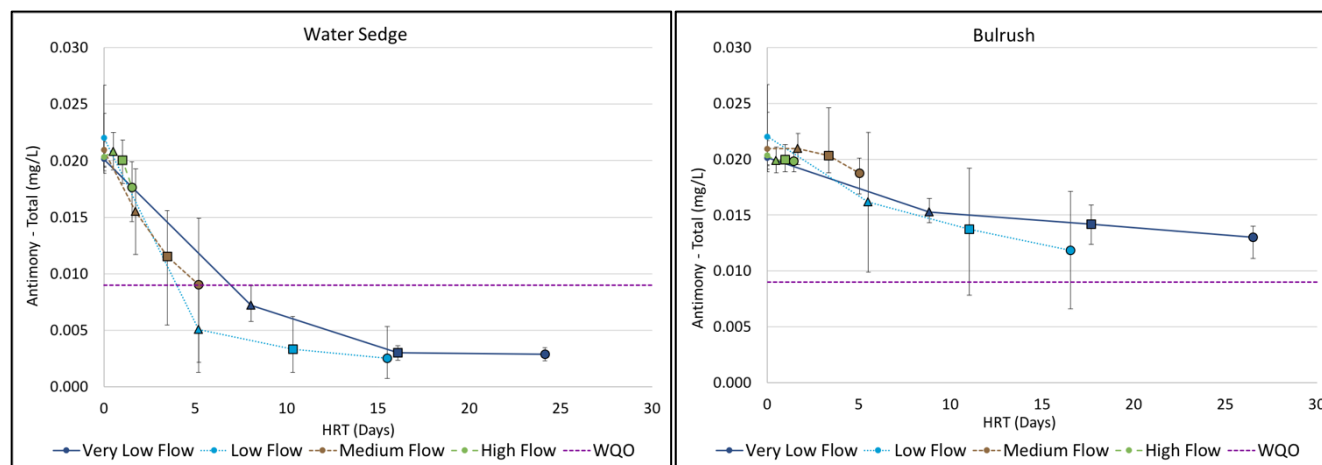


Figure 8-28: Average Total Antimony Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for total antimony was 0.000020 mg/L. The receiving environment WQO is indicated with a dotted line (0.009 mg/L).

8.4.2.2 Fate, Distribution, and Stability

The fate and distribution of arsenic, antimony, and zinc removed from the water during the pilot-scale testing (including commissioning) were evaluated for each CWTS design. The concentration of each COPI was measured at the end of the pilot-scale trials in the top ~5 cm of substrate, the above water plant tissues, and the organic material in the water column of the cell (e.g. moss, straw, and duckweed) as described in Section 7.3 and 8.4.1.2. The distribution of the COPI in the pilot CWTS was then evaluated, with load retained in 'other' locations within the CWTS cells which were not measured including substrate deeper than 5 cm, plant roots, biofilms on the walls of the CWTS cells, and forebay straw (where applicable).

Of the load of arsenic that entered the series through the pilot-scale test work, 0.338 to 0.484 g of arsenic was retained (Table 8-11), which corresponds to 36% to 50% and 72% to 84% of the load that entered the CWTS retained in the bulrush and water sedge CWTS, respectively. For antimony, 0.065 to 0.124 g was retained (Table 8-11), which corresponds to 20% to 28% and 57% to 81% of the load that entered the CWTS retained in each of the bulrush and water sedge CWTS, respectively. For zinc, 1.13 to 1.47 g was retained (Table 8-11), which corresponds 49% to 62% and 82% to 94% of the load that entered the CWTS retained in each of the bulrush and water sedge CWTS, respectively.

Of the load that entered each series, the distribution of that load into the top ~5 cm of substrate, the above water plant tissues, and the organic material in the water column of the cell was evaluated. Arsenic and zinc concentrations in the top 5 cm of substrate at the end of the pilot-scale trials were within method accuracy of the respective starting concentrations (Appendix A, Table A6-1). The change in antimony concentration in the top 5 cm of substrate represented 6.9% to 22% of the retained antimony load in the bulrush CWTS, and 5.9% to 8.1% in the water sedge CWTS.

There was minimal uptake of arsenic and antimony by bulrush (less than 1% of load retained; Table 8-11) and zinc into bulrush (less than 1%). Uptake of arsenic and antimony by water sedge was also minimal (less than 1% of load retained; Table 8-11) while uptake of zinc was slightly higher (less than 3.1%). The concentrations of zinc in the pilot-scale CWTS water sedge were within or slightly above ranges observed previously on site (18.4 to 93.4 mg/kg in the pilots

[Appendix A, Table A5-3] compared to 9.82 to 78.2 mg/kg measured in plants collected during the 2015 site assessment (Contango, 2016).

In the water sedge CWTS design, organics in the water column accounted for 1.5% to 18% of the retained arsenic, antimony, and zinc (Table 8-11). In the bulrush CWTS design, organics in the water column accounted for 15% to 60% of the retained arsenic and zinc, and 5.6% to 18% of the retained antimony. There was more arsenic and zinc retention in the organics in the bulrush systems compared to the water sedge systems, while relatively similar antimony retention was observed in the organics in both designs. The rest of the retained arsenic, antimony, and zinc was held in the 'other' category of the CWTS described above for both designs (40% to 92% and 80% to 95% for bulrush and water sedge, respectively; Table 8-11).

Table 8-11: Load of Arsenic, Antimony, and Zinc Retained and Percent Distribution Within the CWTS

Series	Load Retained (g)	Load Retained (%) ¹	Percent of Load Retained (%) ²			
			Top 5 cm substrate ³	Above Water Plant Tissue ⁴	Organics in Water Column ⁵	Deep Substrate/Root Zone & Other ⁶
Arsenic						
Bulrush 1	0.372	36	NM	0.0	58	42
Bulrush 2	0.338	50	NM	0.0	16	84
Bulrush 3	0.370	40	NM	0.1	15	85
Water Sedge 4	0.484	74	NM	0.7	4.4	95
Water Sedge 5	0.367	84	NM	0.5	8.8	91
Water Sedge 6	0.436	72	NM	0.8	18	81
Antimony						
Bulrush 1	0.071	20	6.9	0.0	18	75
Bulrush 2	0.065	28	22	0.0	5.6	73
Bulrush 3	0.082	26	NM	0.0	7.6	92
Water Sedge 4	0.124	57	5.9	0.5	1.5	92
Water Sedge 5	0.117	81	8.1	0.2	5.4	86
Water Sedge 6	0.116	58	6.5	0.4	13	81
Zinc						
Bulrush 1	1.37	49	NM	0.2	60	40
Bulrush 2	1.13	62	NM	0.5	23	76
Bulrush 3	1.42	57	NM	0.4	16	84
Water Sedge 4	1.47	82	NM	3.1	3.5	93
Water Sedge 5	1.13	94	NM	2.1	9.8	88
Water Sedge 6	1.47	90	NM	1.7	18	80

NM: Not measurable (final concentrations of COPs were within method error of initial concentrations. Method error was 20% for initial and 30% for final samples).

¹ Calculated by dividing the load retained (g) by the load in (g) over the entire pilot trial. Load in varies based on the retention time of each series.

² Calculated by dividing the load retained in respective area of the CWTS by the overall load retained for each series.

³ Top 5 cm of substrate collected from each CWTS cell.

⁴ All above water plant tissue collected from each CWTS cell.

⁵ Organic material including moss, straw, and duckweed collected from each CWTS cell.

⁶ Percent retained in the 'other' category is the remaining load retained that was not accounted for by the top 5 cm substrate, above water plant tissue, and organic material in water column. This includes deeper substrate, plant roots, biofilms on the walls of the CWTS cells, and forebay straw (where applicable).

Tessier extraction indicated that approximately 75% to 95% of the substrate arsenic burden was found in the residual Fraction 5 pool (Figure 8-29; Appendix A, Table A6-2). Fractions 3 and 4, representing the iron/manganese oxide-bound and sulphide/organics bound pools, respectively, comprised the next most abundant arsenic pools. That the majority was present in the residual mineral fraction indicates that most arsenic in the substrate is not mobile given the strong acids required to liberate Fraction 5. Compared with the initial substrate sample, some redistribution of arsenic was observed from Fraction 3 (iron/manganese oxides) towards Fraction 4 (sulphide- and/or organic-bound) by the end of pilot-scale testing (Figure 8-29). This is suggestive of re-precipitation of arsenic as a sulphide or co-precipitation with iron sulphide, which is expected to provide long term stability under the reducing conditions of the CWTS. There was

no notable difference in arsenic forms in the substrate between the bulrush and water sedge systems, except for cell 4A (water sedge) that exhibited a higher proportion of arsenic in Fraction 4.

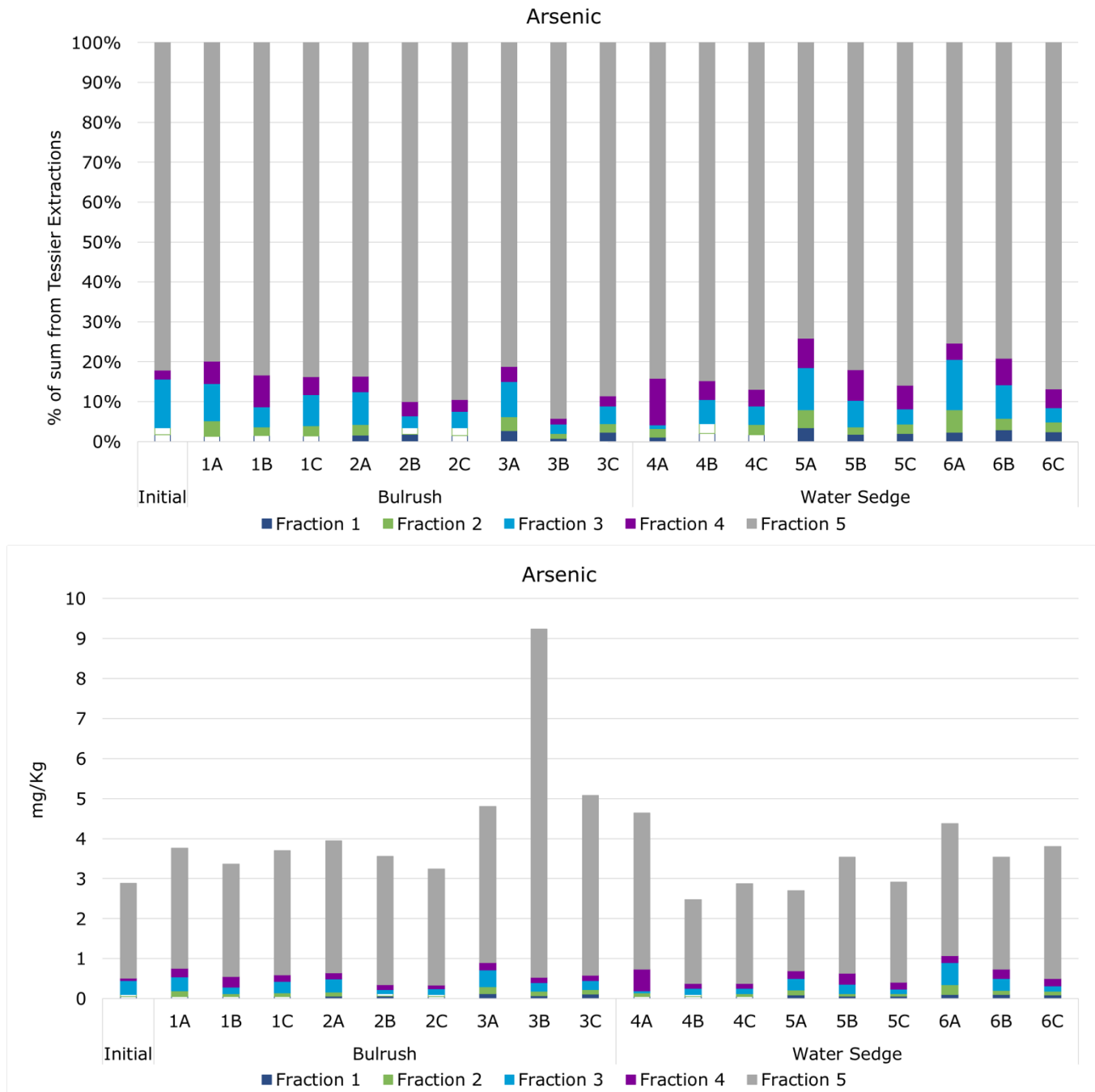


Figure 8-29: Fraction Distribution of Arsenic in the CWTS Pilot Design Expressed as a % of the sum From Tessier Extractions (Top) and as mg/kg (Bottom)

Results of Tessier sequential extraction determining mineral forms of arsenic in the top 5 cm of substrate. Whited out areas are values at or below detection limits.

For antimony the initial substrate was predominantly below detection limits in the sequential Tessier extraction (Figure 8-30). However, lower detection limits were achieved for the testing performed at the end of the pilot-scale trials), which indicated the bulk of the antimony was associated with Fraction 5, which is recalcitrant to mobilization under field environmental conditions.

Zinc was primarily hosted in Fraction 5 for most CWTS cells including the initial substrate sample (Figure 8-31). Fraction 1, which represents the exchangeable fraction (i.e., labile), comprised the bulk of zinc in the bulrush cell 3A and a significant proportion of substrate zinc in water sedge cells 5C and 6A. Although zinc was loaded into the CWTS in concentrations that were too low to evaluate any notable changes in substrate composition from initial sampling, cell 4A (water sedge) exhibited a marked increase in the proportion of zinc in Fraction 4, consistent with the enhanced zinc removal observed for the water sedge systems. Zinc is not expected to be mobile given the majority is hosted in the recalcitrant residual Fraction 5. The elevated proportion of zinc associated with the exchangeable Fraction 1 in cells 3A, 5C, and 6A is more prone to mobilization, but the high ionic strength of the extraction used for Fraction 1 (1 M magnesium chloride) likely overestimates the fraction of zinc that may be labile. Furthermore, zinc released via desorption under reducing conditions will likely be re-sequestered as a sulphide phase under the sulphate-reducing conditions present within the CWTS.

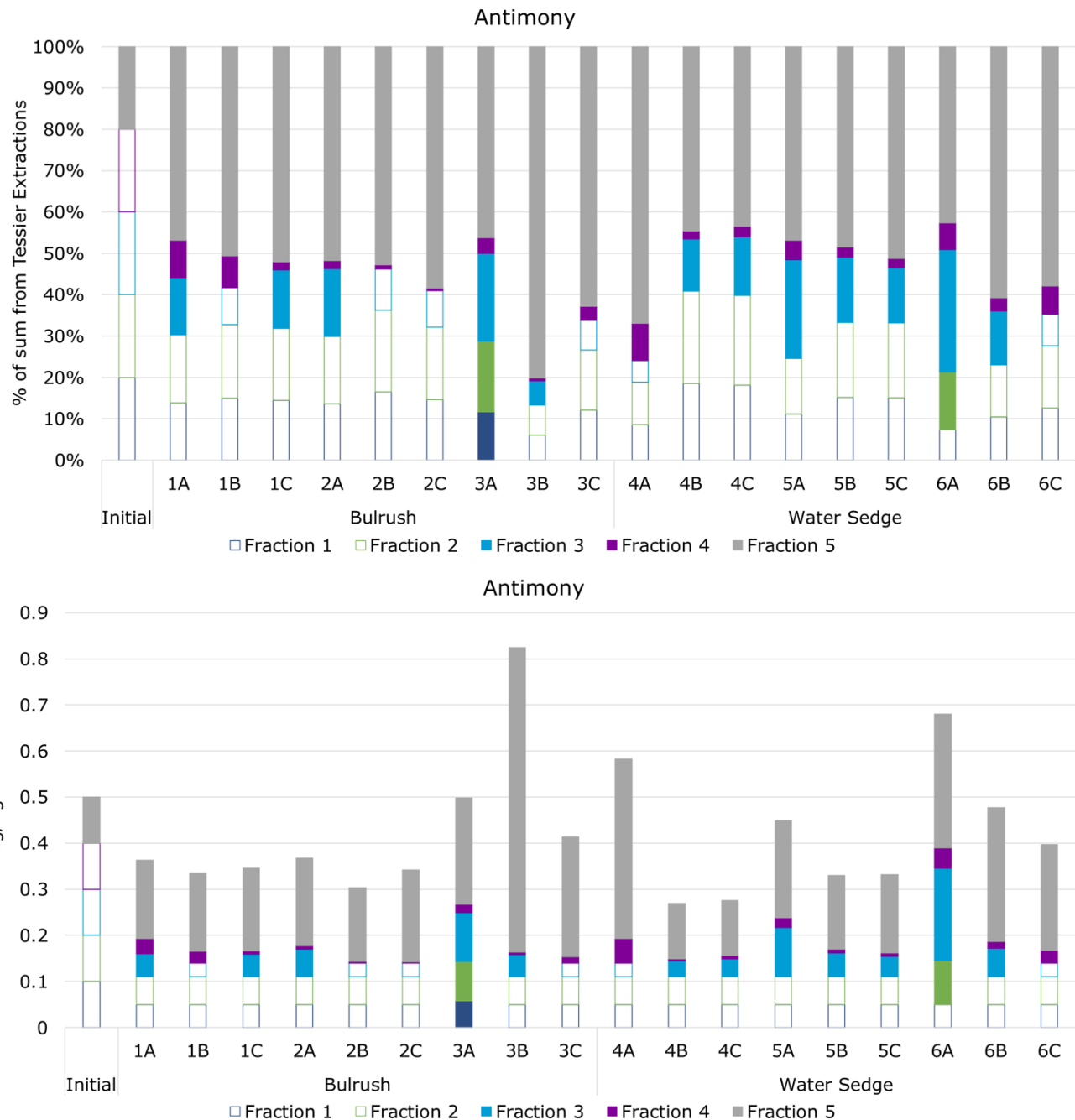


Figure 8-30: Fraction Distribution of Antimony in the CWTS Pilot Design Expressed as a % of the sum From Tessier Extractions (Top) and as mg/kg (Bottom)

Results of Tessier sequential extraction determining mineral forms of antimony in the top 5 cm of substrate. Whited out areas are values at or below detection limits.

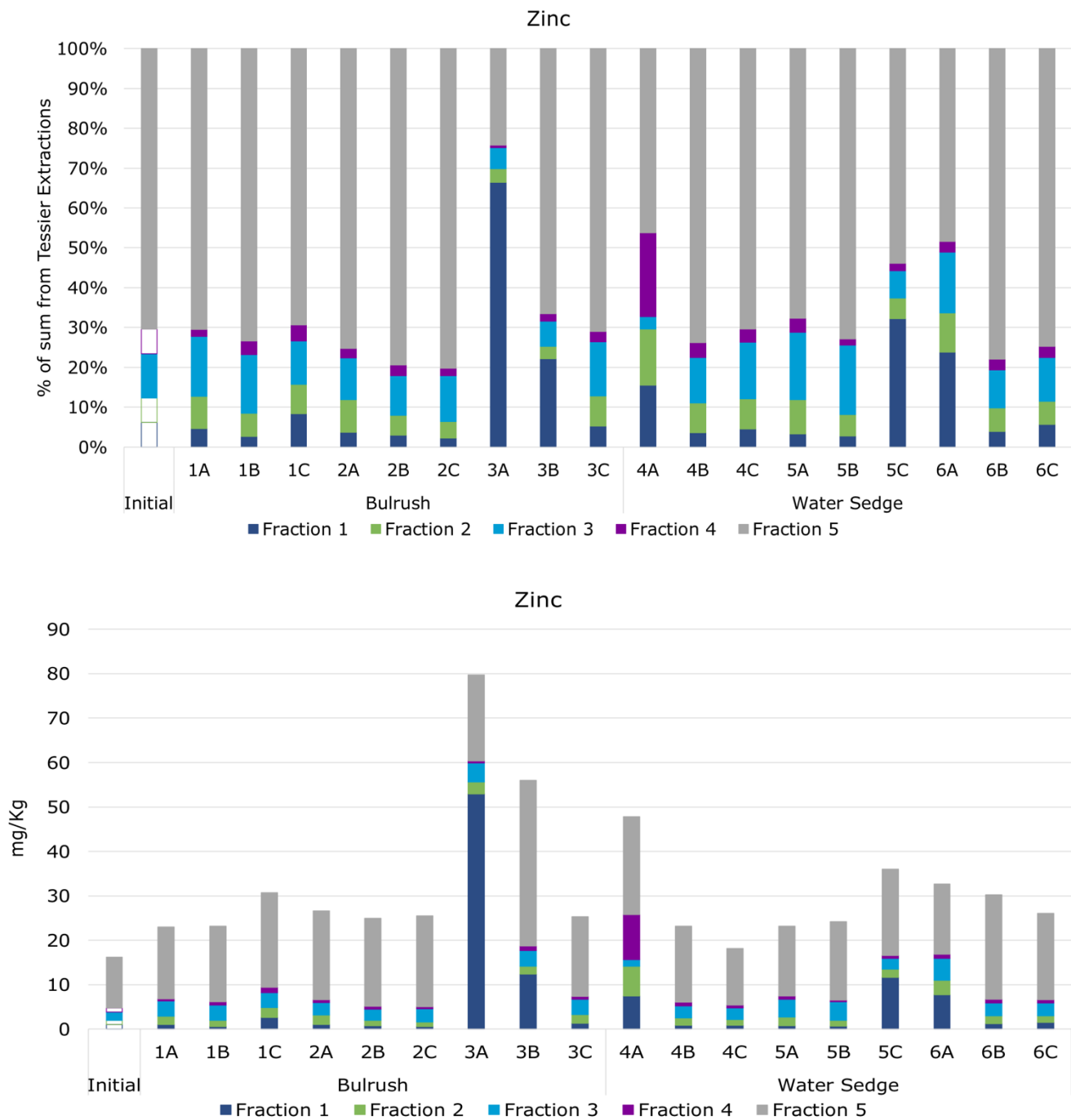


Figure 8-31: Fraction Distribution of Zinc in the CWTS Pilot Design Expressed as a % of the sum From Tessier Extractions (Top) and as mg/kg (Bottom)

Results of Tessier sequential extraction determining mineral forms of zinc in the top 5 cm of substrate. Whited out areas are values at or below detection limits.

8.4.2.3 Freeze-thaw Testing

The arsenic that was retained in the CWTS remained predominantly stable through a freeze-thaw process. An estimate of 95% and 94% of the load of arsenic held within the CWTS through the pilot-scale trials was retained through the freezing and thawing of the bulrush and water sedge CWTS designs, respectively (Table 8-12). Zinc also exhibited stability with approximately 93% and 97% of zinc retained through the freeze-thaw trials in the water sedge and bulrush, respectively (Table 8-12). No release of stored antimony was exhibited through the freeze-thaw trials (Table 8-12). As noted in Section 6.9 and discussed in Section 8.4.1.3, the freeze-thaw testing is intended to evaluate stability and potential for COPI release through a freeze-thaw cycle and does not demonstrate subsequent water treatment as it flows through the CWTS.

Table 8-12: Load of Arsenic, Antimony, and Lead Released and Percent Retained Through Freeze-Thaw Testing.

COPI	Pilot-scale CWTS	Load retained (g)	Load released through freeze-thaw (g)	Percent retained
Arsenic	Bulrush (series 3)	0.370	0.020	95%
	Water sedge (series 6)	0.436	0.027	94%
Antimony	Bulrush (series 3)	0.082	0	> 99%
	Water sedge (series 6)	0.116	0	> 99%
Zinc	Bulrush (series 3)	1.423	0.099	93%
	Water sedge (series 6)	1.468	0.043	97%

8.4.2.4 Stagnation Testing

The bulrush CWTS designs showed decreased concentrations of arsenic and antimony through the stagnation and initial flush of water through the system, with subsequent treatment observed to be similar to the pre-stagnation test events at the high flow 1.5-day HRT (Figure 8-32 and Figure 8-33). In contrast, the water sedge CWTS showed an increase in concentrations of arsenic and antimony through the stagnation and initial flush in the A cell of the series, which was then treated as it flowed through the system (Figure 8-32, Figure 8-33). Treatment of arsenic and antimony in the water sedge CWTS recovered rapidly and was similar to the pre-stagnation test events at the high flow 1.5-day HRT.

Both CWTS designs showed continued treatment of zinc through the stagnation period, with no leaching or increased concentrations of the COPI compared to the influent concentration (Figure 8-34). The bulrush CWTS demonstrated temporarily improved treatment through the stagnation and subsequent initial flush (Figure 8-34).

As discussed in Section 8.4.1.4, the stagnation trials are intended to provide information on a worst-case scenario where a stagnation period that promotes anoxic/reducing conditions to establish in the CWTS is followed by a high flow event which rapidly provides oxygenated water to the system. While there were instances where the outflow concentration was greater than the receiving environment WQO for COPIs, water sedge treatment results were consistent with treatment observed pre-stagnation (Section 8.4.2.1) indicating rapid recovery of the CWTS.

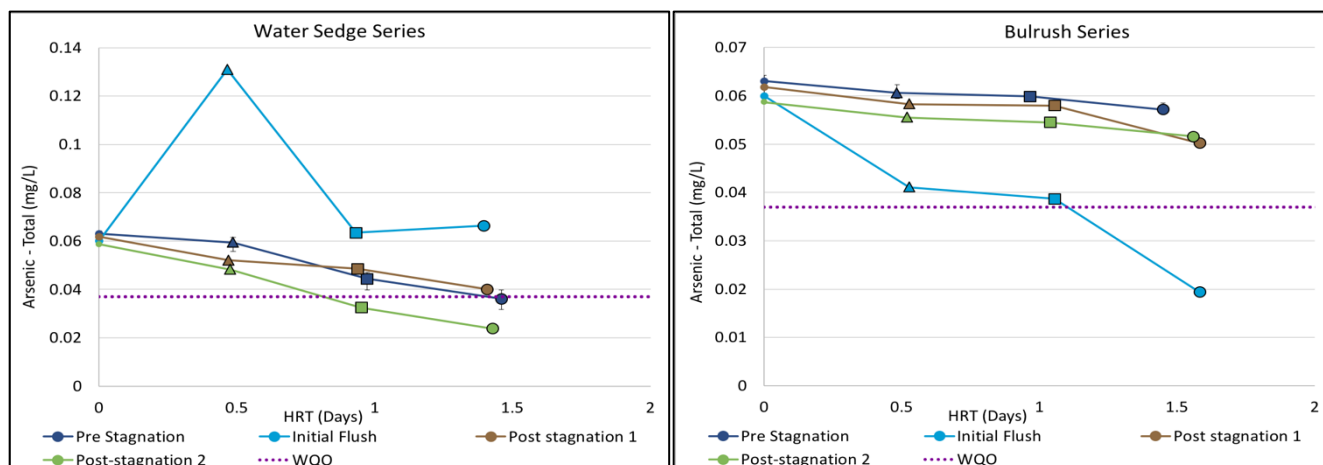


Figure 8-32: Total Arsenic Treatment Post Stagnation Testing in Both Constructed Wetland Treatment System Designs

Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). Pre stagnation data are an average of all operational stage 2 high flow sampling events, with error bars indicating the lowest and highest concentrations in each cell. The detection limit for total arsenic was 0.000020 mg/L. The receiving environment WQO is indicated with a dotted line (0.037 mg/L).

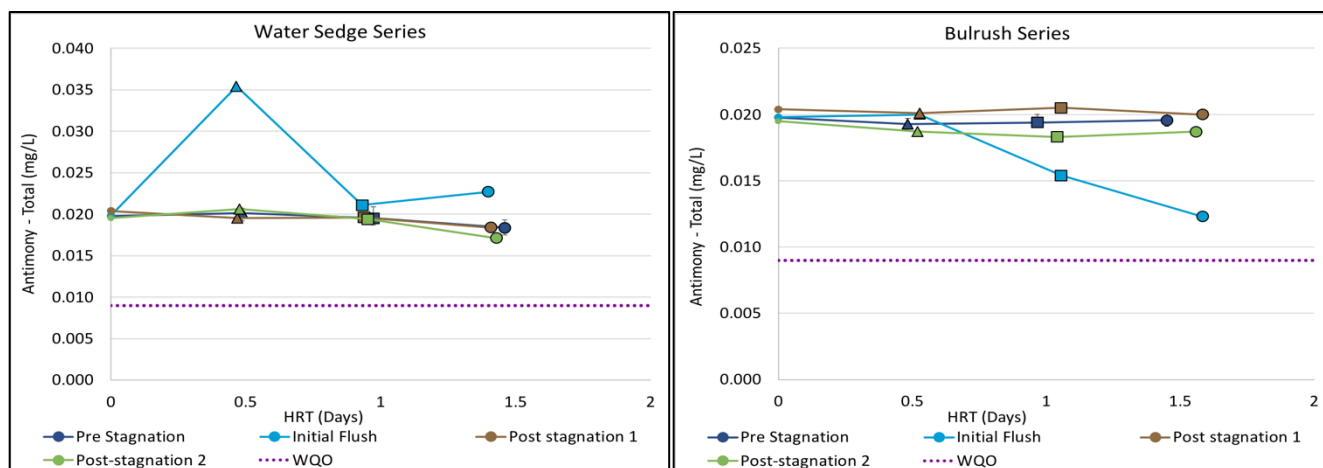


Figure 8-33: Total Antimony Treatment Post Stagnation Testing in Both Constructed Wetland Treatment System Designs

Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). Pre stagnation data are an average of all operational stage 2 high flow sampling events, with error bars indicating the lowest and highest concentrations in each cell. The detection limit for total antimony was 0.000020 mg/L. The receiving environment WQO is indicated with a dotted line (0.009 mg/L).

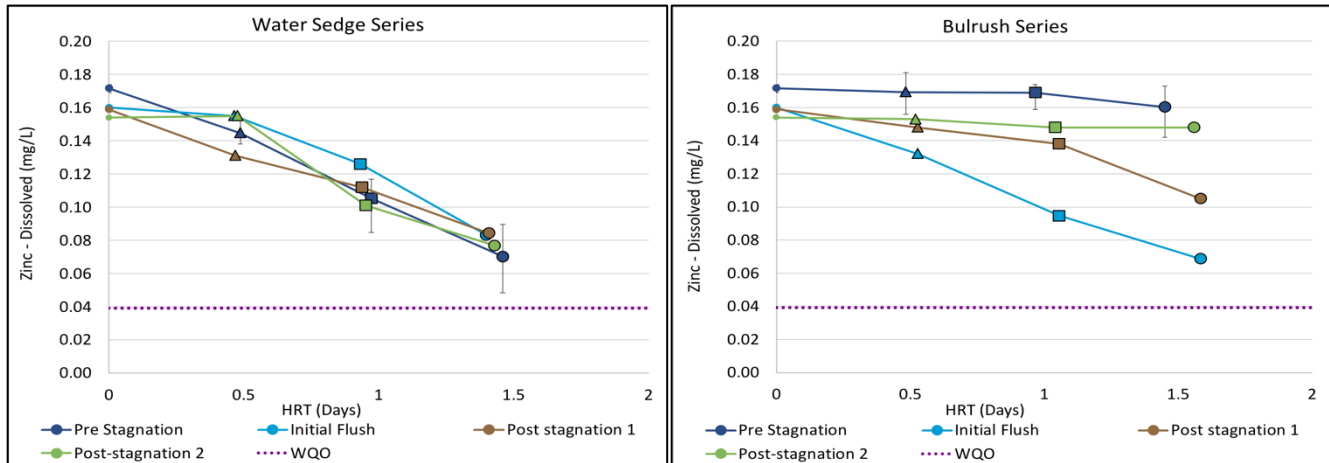


Figure 8-34: Dissolved Zinc Treatment Post Stagnation Testing in Both Constructed Wetland Treatment System Designs

Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). Pre stagnation data are an average of all operational stage 2 high flow sampling events, with error bars indicating the lowest and highest concentrations in each cell. The detection limit for total zinc was 0.00010 mg/L. The lower receiving environment WQO is indicated with a dotted line (0.039 - 0.073 mg/L).

8.4.3 SELENIUM AND URANIUM

8.4.3.1 Treatment Evaluation

Selenium and uranium are COPIs which can be directly reduced by microbes into insoluble forms under reducing conditions (Section 3.6.2 and 3.6.3). They are therefore discussed together in this section.

The average total concentrations of selenium and uranium entering the CWTS remained stable throughout the pilot-scale testing (0.008 mg/L and 0.029 mg/L, respectively; Table 4-2; Appendix A, Table A4-1). Dissolved and total concentrations for both COPIs were similar throughout CWTS testing. The targeted COPI concentrations were consistent with the 2018 "worst case" WQM predicted concentrations (Table 4-2). The water sedge design had faster treatment with higher RRC for selenium and uranium compared to the bulrush design (Table 8-2).

The water sedge CWTS exhibited higher percent removal (34% to 95%) of total selenium in all flow periods compared to the bulrush (4% to 63%) (Table 8-13). In the water sedge CWTS, selenium was treated below the lower receiving environment WQO (0.00243 to 0.00316 mg/L) in all flow periods except high flow (1.5-day HRT), which was close to the upper WQO, and two medium flow sampling events (Table 8-13, Figure 8-35). In the bulrush CWTS, selenium was treated below the upper WQO (0.00316 mg/L) only in the very low flow and low flow periods (25-day to 15-day HRT) (Table 8-13; Figure 8-35).

Table 8-13: Total Selenium Treatment Summary Through Pilot-scale Constructed Wetland Treatment System Testing Periods

Summary (Average)	Bulrush				Water Sedge			
	Very Low	Low	Medium	High	Very Low	Low	Medium	High
Influent (mg/L) ¹	0.00750	0.00745	0.00767	0.00764	0.00750	0.00745	0.00767	0.00764
Outflow (mg/L) ₁	0.00315	0.00288	0.00618	0.00732	0.00042	0.00037	0.00160	0.00491
% Removal ²	58%	63%	19%	4%	94%	95%	77%	34%
Load Removed (mg/day) ³	0.08	0.13	0.14	0.09	0.08	0.13	0.33	0.48

Period identified by flow where: Very low flow: 25-day HRT; low flow: 16-day HRT; medium flow: 5-day HRT; high flow: 1.5-day HRT.

Green shading indicates concentrations were below the lower limit of the receiving environment WQO (0.00243 – 0.00316 mg/L). The detection limit was 0.000040 mg/L.

¹ Averages calculated using results from all sampling events at a given flow period (e.g. 5-day HRT for medium flow testing is average of 6 sampling events). Raw data can be found in Appendix A, Table A4-1.

² % removal calculated for each sampling event based on influent and outflow concentrations and then averaged for each flow testing period. % removal has not been corrected for water loss through evapotranspiration.

³ Load removed calculated for each sampling event based on influent and outflow concentrations and volume of water through the system and then averaged for each flow testing period.

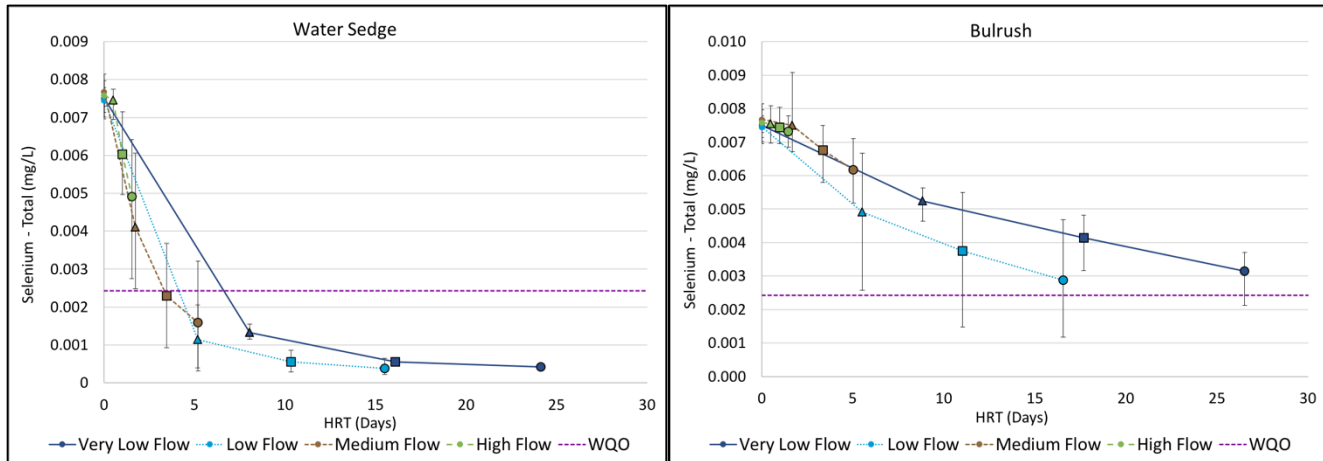


Figure 8-35: Average Total Selenium Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for total selenium was 0.000040 mg/L. The lower receiving environment WQO is indicated with a dotted line (0.00243 – 0.00316 mg/L).

The percent removal of total uranium was also higher in the water sedge CWTS compared to the bulrush CWTS, with percent removals ranging from 45% to 84% and 9% to 40%, respectively (Table 8-14). While total uranium was treated to concentrations below the receiving environment WQO (0.015 mg/L) during all flow periods in the water sedge CWTS design, the WQO were not met in the bulrush CWTS design in any flow period (Table 8-14; Figure 8-36).

Table 8-14: Total Uranium Treatment Summary Through Pilot-scale Constructed Wetland Treatment System Testing Periods

Summary (Average)	Bulrush				Water Sedge			
	Very Low	Low	Medium	High	Very Low	Low	Medium	High
Influent (mg/L) ¹	0.0284	0.0297	0.0292	0.0290	0.0284	0.0297	0.0292	0.0290
Outflow (mg/L) ¹	0.0258	0.0157	0.0184	0.0217	0.0065	0.0034	0.0052	0.0147
% Removal ²	9%	40%	34%	23%	77%	84%	80%	45%
Load Removed (mg/day) ³	0.05	0.41	1.01	2.33	0.25	0.49	1.29	2.53

Period identified by flow where: Very low flow: 25-day HRT; low flow: 16-day HRT; medium flow: 5-day HRT; high flow: 1.5-day HRT.

Green shading indicates concentrations were below the receiving environment WQO (0.015 mg/L). The detection limit was 0.000050 mg/L.

¹ Averages calculated using results from all sampling events at a given flow period (e.g. 5-day HRT for medium flow testing is average of 6 sampling events). Raw data can be found in Appendix A, Table A4-1.

² % removal calculated for each sampling event based on influent and outflow concentrations and then averaged for each flow testing period. % removal has not been corrected for water loss through evapotranspiration.

³ Load removed calculated for each sampling event based on influent and outflow concentrations and volume of water through the system and then averaged for each flow testing period.

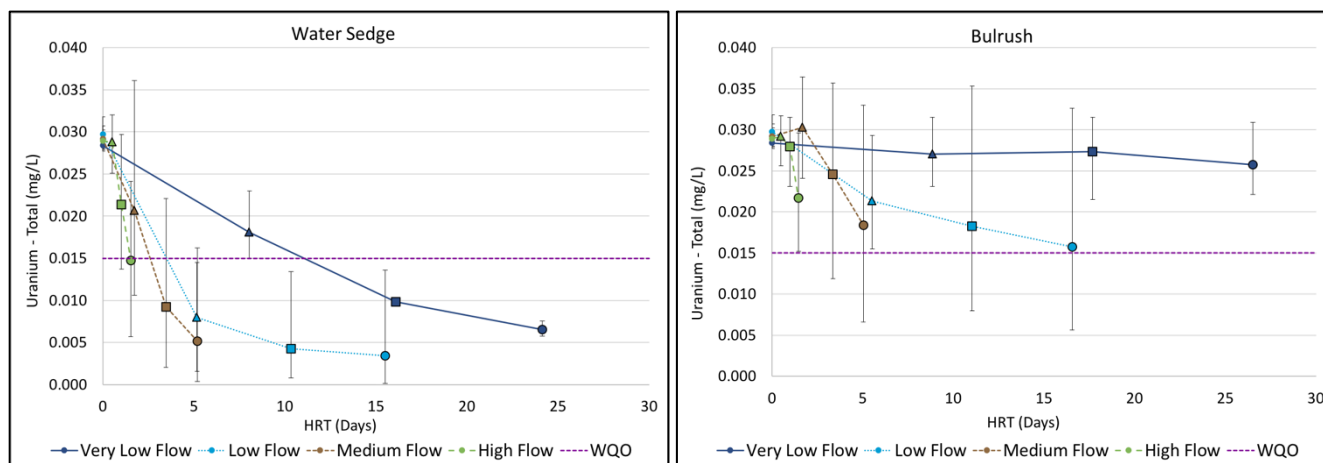


Figure 8-36: Average Total Uranium Concentrations for Both Constructed Wetland Treatment System Designs During Each Flow Period

Replicate CWTS designs are grouped and averaged. Treatment period identified by targeted flow and HRT. Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). The error bars indicate the lowest and highest concentrations in each cell for each flow period. The detection limit for total uranium was 0.000040 mg/L. The receiving environment WQO for the CWTS is indicated with a dotted line (0.015 mg/L).

8.4.3.2 Fate, Distribution, and Stability

The fate and distribution of selenium and uranium removed from the water during the pilot-scale testing were evaluated for each CWTS design. Distribution between the top 5 cm of substrate, the above water plant tissues, and the organic material in the water column of the cell (e.g. moss, straw, and duckweed) was evaluated as described in Section 7.3 and 8.4.1.2. The distribution of the COPI in the pilot CWTS was then evaluated, with load retained in 'other' locations within the CWTS cells which were not measured including substrate deeper than 5 cm, plant roots, biofilms on the walls of the CWTS cells, and forebay straw (where applicable).

The bulrush series retained 0.030 to 0.038 g of selenium, and the water sedge series retained 0.059 to 0.056 g (Table 8-15). Overall, 23% to 37% of total selenium entering the bulrush CWTS and 68% to 89% entering the water sedge design was retained in the system. There was minimal uptake into both above water plant types as targeted, with less than 1% retained by bulrush tissue and less than 1.1% retained by water sedge tissue (Table 8-15; Appendix A, Table A5-3). The concentrations of selenium in the top 5 cm of substrate at the end of the pilot-scale trials were all below the detection limit (Appendix A, Table A6-1). The organics in the water column accounted for 12% to 37% and 1.6% to 13% of retained selenium in the bulrush and water sedge series, respectively. A comparison across CWTS designs reveals more selenium retention in the organics in the bulrush design compared to water sedge design, likely due to more moss in the bulrush CWTS. The rest of the retained selenium was held in the deep substrate/root zone and 'other' locations of the CWTS as described above (bulrush: 63% to 88%; water sedge: 86% to 97%).

The bulrush series retained 0.127 to 0.183 g of uranium, and the water sedge series retained 0.179 to 0.204 g through the pilot-scale test work (Table 8-15). Of the load of uranium entering the CWTS, 26% to 44% and 67% to 91% was retained in the bulrush and water sedge systems, respectively. There was minimal uptake by both above water plant types as targeted, with less than 1% retained by bulrush tissue and less than 1% retained by water sedge tissue (Table 8-15; Appendix A, Table A5-3). Uranium concentrations in the top 5 cm of substrate at the end of the pilot-scale trials were within method accuracy (30%) of the respective starting concentrations (Appendix A, Table A6-1). The organics in the water column accounted for 22% to 53% and 1.2% to 13% of retained uranium in the bulrush and water sedge

series, respectively. The rest of the retained uranium was held in the 'other' category of the CWTS as described above (bulrush: 47% to 78%; water sedge: 86% to 98%).

Table 8-15: Load of Selenium and Uranium Retained and Percent Distribution Within the CWTS

Series	Load Retained (g)	Load Retained (%) ¹	Percent of Load Retained (%) ²			
			Top 5 cm substrate ³	Above Water Plant Tissue ⁴	Organics in Water Column ⁵	Deep Substrate/Root Zone & Other ⁶
Selenium						
Bulrush 1	0.030	23	NM	0.2	37	63
Bulrush 2	0.031	37	NM	0.2	18	82
Bulrush 3	0.038	33	NM	0.4	12	88
Water Sedge 4	0.056	68	NM	1.1	1.6	97
Water Sedge 5	0.049	89	NM	0.9	5.9	93
Water Sedge 6	0.054	72	NM	0.9	13	86
Uranium						
Bulrush 1	0.127	26	NM	0.0	53	47
Bulrush 2	0.137	44	NM	0.0	29	71
Bulrush 3	0.183	43	NM	0.1	22	78
Water Sedge 4	0.204	67	NM	0.5	1.2	98
Water Sedge 5	0.179	91	NM	0.2	5.1	95
Water Sedge 6	0.203	73	NM	0.4	13.1	86

NM: Not measurable (final concentrations of COPs were within method error of initial concentrations. Method error was 20% for initial and 30% for final samples).

¹ Calculated by dividing the load retained (g) by the load in (g) over the entire pilot trial. Load in is varied based on the retention time of each series.

² Calculated by dividing the load retained in respective area (of the CWTS by the overall load retained for each series).

³ Top 5 cm of substrate collected from each CWTS cell.

⁴ All above water plant tissue collected from each CWTS cell.

⁵ Organic material including moss, straw, and duckweed collected from each CWTS cell.

⁶ Percent retained in the 'other' category is the remaining load retained that was not accounted for in the top 5 cm substrate, above water plant tissue, and organic material in water column. This includes deeper substrate, plant roots, biofilms on the walls of the CWTS cells, and forebay straw (where applicable).

Selenium was present in the CWTS in concentrations that were too low to evaluate any notable changes in the substrate (Figure 8-37). The starting substrate was predominantly below detection limits for the sequential Tessier extraction analysis. Improved detection limits available for the testing performed at the end of the pilot-scale trials identified selenium concentrations above detection in Fraction 4 only (Appendix A, Table A6-2). Selenium is expected to be removed as elemental selenium under the reducing conditions within the CWTS. This is consistent with the detection of selenium in Fraction 4, since this step uses an oxidizing extraction solution (hydrogen peroxide) which would oxidize elemental selenium to soluble selenite and/or selenate. The detection limited results for the other Tessier fractions precludes further in-depth discussion; however, selenium is expected to be stable when sequestered as elemental selenium under the reducing conditions of the CWTS.

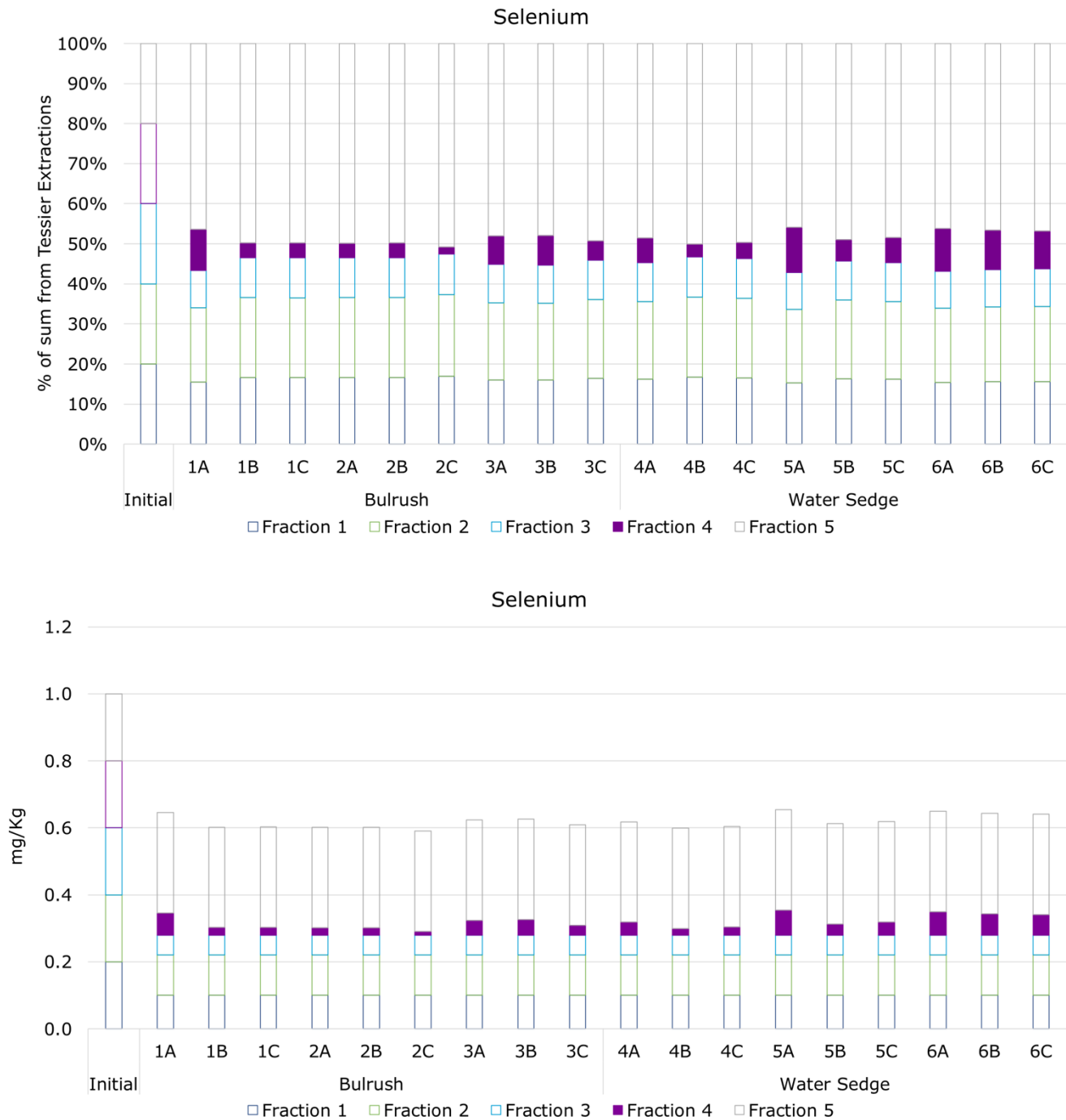


Figure 8-37: Fraction Distribution of Selenium in the CWTS Pilot Design Expressed as a % of the sum From Tessier Extractions (Top) and as mg/kg (Bottom)

Results of Tessier sequential extraction determining mineral forms of selenium in the top 5 cm of substrate. Whited out areas are values at or below detection limits.

Uranium was predominantly present in the substrate at the end of the pilot-scale trials bound to carbonates (Fraction 2) and the residual minerals form (Fraction 5) (Figure 8-38; Appendix A, Table A6-2). There was an increase in uranium in Fraction 2 in both systems compared to the initial sample, and slightly larger increases in Fraction 2 in the water sedge systems. Alkalinity is generated by the mineralization of organic carbon under reducing conditions, providing conditions for the formation of carbonate minerals in these anaerobic circumneutral pH experiments. Recent research suggests that the biogenic reduced uranium expected to have formed in the CWTS is associated with both organic carbon and carbonates (Bhattacharyya et al., 2017). That a greater fraction of uranium in the CWTS substrate was associated with Fraction 2 is consistent with the work of Bhattacharyya et al. (2017) and points toward the formation of reduced U(IV) phases in the CWTS substrate. Given that uranium is largely associated with the residual Fraction 5, the bulk of substrate uranium is not mobile. Furthermore, the lack of acidic influent expected for the CWTS suggests that uranium sequestered with carbonate minerals is also unlikely to be mobilized within the CWTS.

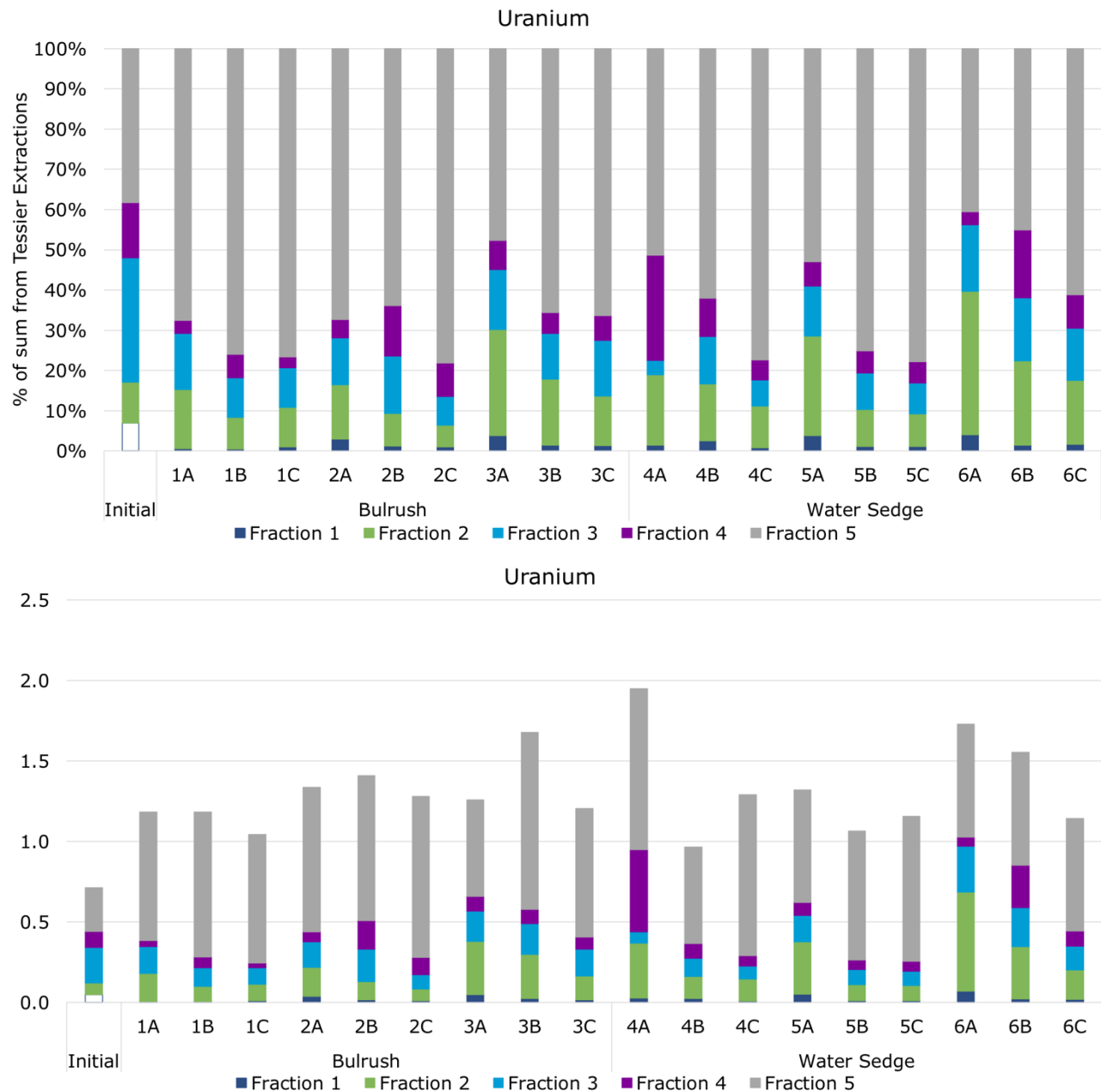


Figure 8-38: Fraction Distribution of Uranium in the CWTS Pilot Design Expressed as a % of the sum From Tessier Extractions (Top) and as mg/kg (Bottom)

Results of Tessier sequential extraction determining mineral forms of uranium in the top 5 cm of substrate. Whited out areas are values at or below detection limits.

8.4.3.3 Freeze-thaw Testing

The selenium and uranium that was retained in the CWTS remained stable through a freeze-thaw process (Table 8-16). No release of selenium, and no or minimal release of uranium was observed upon thawing; (99% of uranium load retained of in the water sedge, and no release in the bulrush).

Table 8-16: Load of Selenium and Uranium Released and Percent Retained Through Freeze-Thaw Testing

COPI	Pilot-scale CWTS	Load retained (g)	Load released through freeze-thaw (g)	Percent retained
Selenium	Bulrush (series 3)	0.038	0	> 99%
	Water sedge (series 6)	0.054	0	> 99%
Uranium	Bulrush (series 3)	0.183	0	> 99%
	Water sedge (series 6)	0.203	0.002	99%

8.4.3.4 Stagnation Testing

The bulrush CWTS designs showed decreased concentrations of selenium through the stagnation and initial flush of water through the system, with subsequent treatment observed to be similar to the pre-stagnation test events at the high flow 1.5 day HRT (Figure 8-39). The water sedge CWTS showed a slight increase in selenium concentrations through the stagnation and initial flush of water through the system, which was predominantly due to concentration of the COPI from water loss through trial. Subsequent treatment was similar to the pre-stagnation test events within two HRT periods (Figure 8-39).

Both CWTS designs showed increased concentrations of uranium through the stagnation and initial flush of water through the system (Figure 8-40). The water sedge CWTS design had an increase in uranium concentration in the A cell and subsequent uranium removal as water flowed through the system, while the bulrush CWTS had minimal treatment through the first flush. Treatment recovered rapidly in both CWTS designs and was similar to pre-stagnation test events at the high flow 1.5 day HRT.

As discussed in Section 8.4.1.4, the stagnation trials are intended to provide information on a worst-case scenario where a stagnation period that promotes anoxic/reducing conditions to establish in the CWTS is followed by a high flow event which rapidly provides oxygenated water to the system. While the selenium outflow concentrations were greater than the receiving environment WQO, treatment results were consistent with treatment observed pre-stagnation (Section 8.4.1.4) indicating rapid recovery of the CWTS. Furthermore, a gradual increase of flows to the CWTS would be a more likely scenario following a stagnation event due to a drought. The water sedge system achieved selenium outflow concentrations below the receiving environment WQOs in the very low, low, and medium flow rate test periods (Section 8.4.1.4).

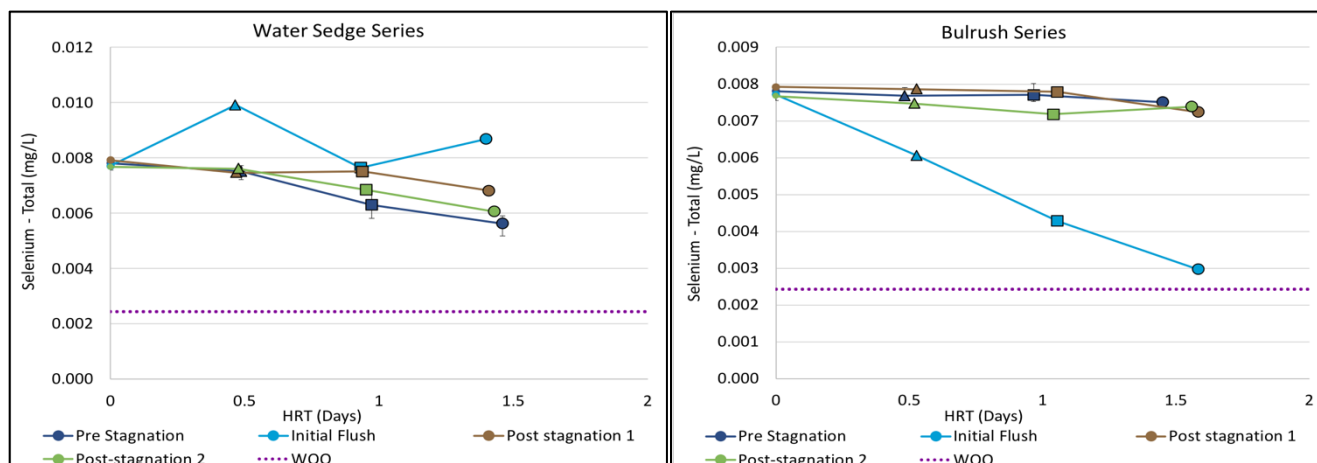


Figure 8-39: Total Selenium Treatment Post Stagnation Testing in Both Constructed Wetland Treatment System Designs

Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). Pre stagnation data are an average of all high flow forebay sampling events, with error bars indicating the lowest and highest concentrations in each cell. The detection limit for total selenium was 0.000040 mg/L. The lower receiving environment WQO is indicated with a dotted line (0.00243 – 0.00316 mg/L).

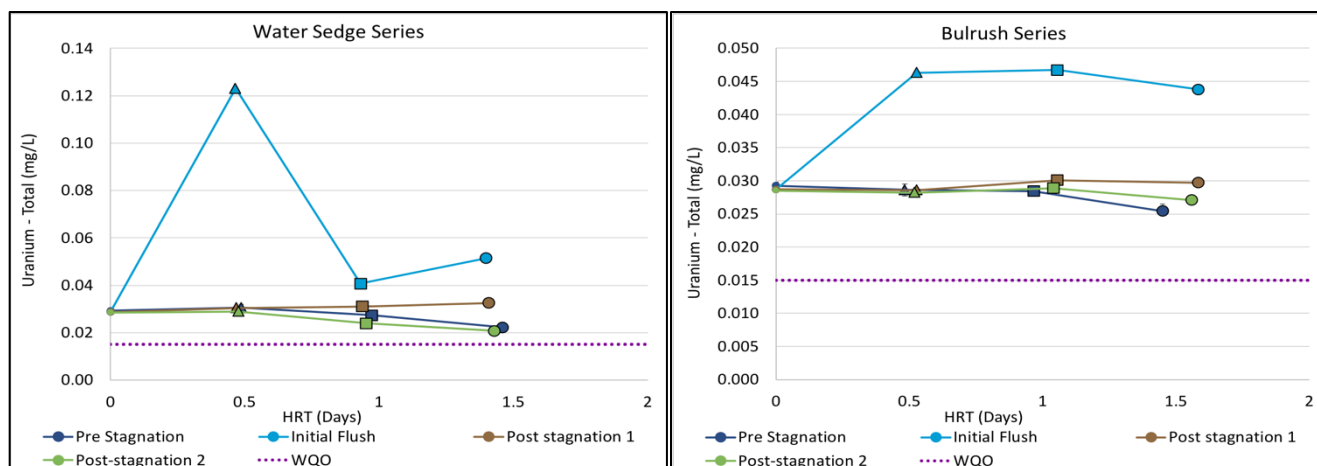


Figure 8-40: Total Uranium Treatment Post Stagnation Testing in Both Constructed Wetland Treatment System Designs

Treatment cell in CWTS identified by shape: A Cell (triangle), B Cell (square), C Cell (circle). Pre stagnation data are an average of all high flow forebay sampling events, with error bars indicating the lowest and highest concentrations in each cell. The detection limit for total uranium was 0.000040 mg/L. The receiving environment WQO is indicated with a dotted line (0.015 mg/L).

8.5 ACID VOLATILE SULPHIDES

The mechanism of producing sulphide in a CWTS is biological and therefore, production rates of sulphide could be affected by temperature. Likewise, purely biological reactions may have difficulty in directly accommodating large spikes of COPI concentrations. Fortunately, when excess sulphides are generated by SPB and there is also excess iron present, sulphides can be stored in the substrate as AVS for future use in COPI treatment in an on-demand manner. AVS

are biogenically formed amorphous iron sulphides. The amorphous structure and solubility constant of the AVS results in the sulphide preferentially exchanging iron for COPI with a greater affinity for the sulphide (e.g., antimony, cadmium, copper, lead, nickel, thallium, and zinc) which are then stably bound.

This beneficial treatment capacity through reserve of AVS can be tested for by a method that assays both the AVS and simultaneously extracted metals (SEM); cadmium, copper, lead, mercury, nickel, and zinc. If a substrate has a molar ratio of $\Sigma\text{SEM}:\text{AVS}$ less than one, then it is considered to be theoretically capable of exchanging iron for a SEM type COPI, enabling the CWTS to overcome influences of temperature and biological reaction rates on treatment of the COPI being removed as sulphide minerals. Moreover, when $\Sigma\text{SEM}:\text{AVS}$ is less than one the AVS can serve as a buffer to oxidation should the substrate of a reducing (sulphide-producing) CWTS be exposed to oxygen (e.g., briefly drying out), thereby making sequestered metals less likely to re-solubilize.

The water sedge systems had much greater AVS formation (0.62 to 9.16 $\mu\text{mol/g}$) than the bulrush systems (0.2 to 5.06 $\mu\text{mol/g}$) throughout pilot-scale testing (Figure 8-41, Appendix A, Table A6-3). Increases in AVS concentrations from the initial substrate were more notable in the C cells than the A cells (B cells were not analyzed) in both designs, which decreased following freeze-thaw, possibly due to AVS being utilized by the release of SEM type COPI during freeze-thaw testing. This is consistent with the COPI concentrations post-freeze testing, where minimal or no release of COPI from the substrate in the C cells of each series was observed. Water sedge had a molar ratio of $\Sigma\text{SEM}:\text{AVS}$ less than one in the substrate during pre- and post-freeze testing, indicating an excess of AVS in the substrate (Figure 8-42). Similarly, bulrush had a molar ratio of $\Sigma\text{SEM}:\text{AVS}$ less than one during all testing scenarios, with the exception of the A cells during pre-freeze and post-freeze testing. Overall, this suggests that the water sedge designs may have higher stabilisation and buffering capacity for metals treatment than the bulrush.

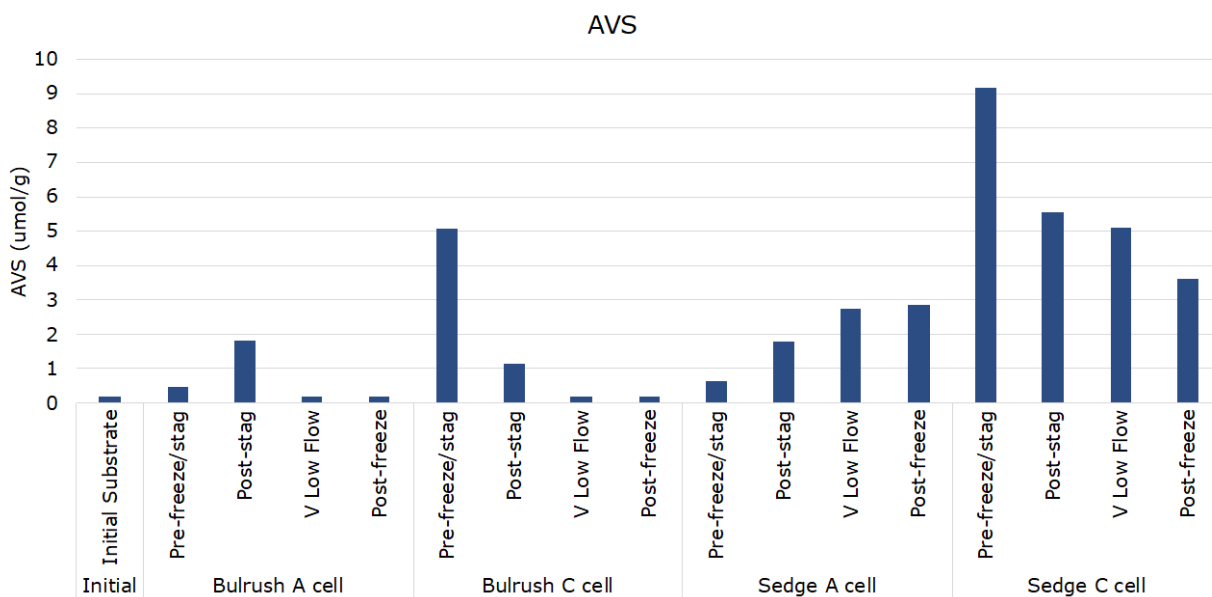


Figure 8-41: AVS Concentrations in the Bulrush and Water Sedge CWTS at Various Testing Stages

Pre-freeze/stag: samples collected immediately prior to the freeze-thaw and stagnation testing (series 1/3 and 4/6); Post-stag: samples collected after three high flow HRTs (series 1 and 4); V Low Flow: samples collected following very low flow testing (series 2 and 5); Post-freeze: samples collected after cell thawing (series 3 and 6).

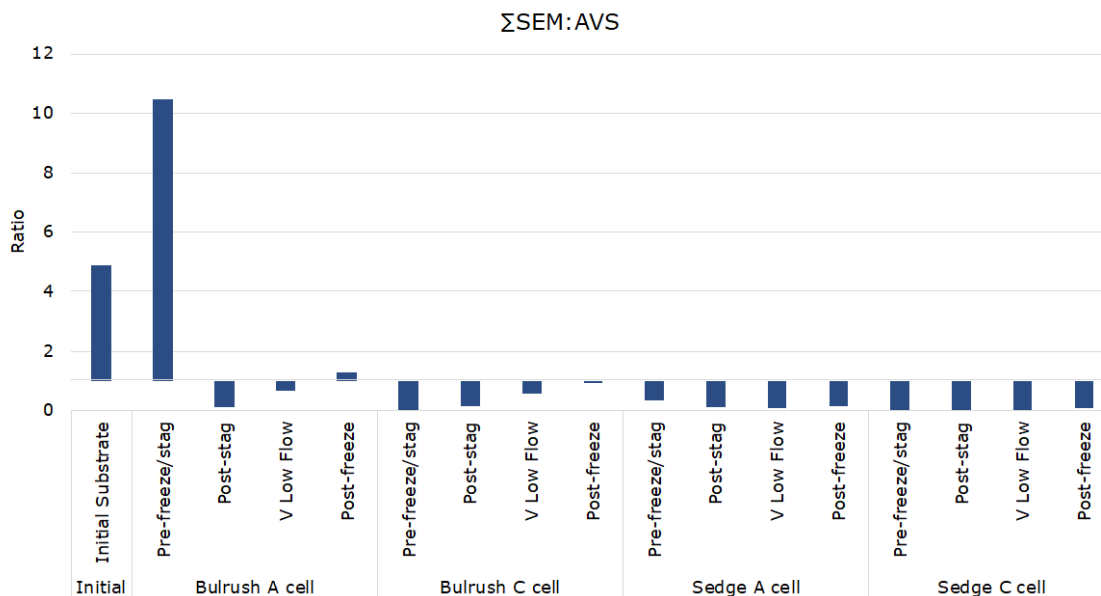


Figure 8-42: Ratio of the Sum of SEM to AVS in A and C Cells of the Bulrush and Water Sedge CWTS at Various Testing Stages

Ratio of the sum of simultaneously extracted metals (SEM) and acid volatile sulphides (AVS). A SEM:AVS ratio <1 is targeted.

Pre-freeze/stag: samples collected immediately prior to the freeze-thaw and stagnation testing (series 1/3 and 4/6); Post-stag: samples collected after three high flow HRTs (series 1 and 4); V Low Flow: samples collected following very low flow testing (series 2 and 5); Post-freeze: samples collected after cell thawing (series 3 and 6).

8.6 MICROBIOLOGY

Specific types of bacteria have been evaluated in the substrate, moss, and roots in the CWTS to inform treatment mechanisms that are occurring. Background information on the targeted treatment mechanisms and bacteria involved in these biogeochemical reactions is provided in Section 3.6. DNA testing can be used to quantify and identify all bacteria in a sample, along with their relative abundance as a percentage of the community (Section 6.8). This reveals whether the desired types of bacteria are present in the community, and if there is biodiversity for the community to adapt to environmental change while maintaining the desired treatment pathways. In other words, diversity in beneficial microbes is favourable and can be regarded as a measure of robustness to conduct a given biogeochemical function, as multiple different bacteria will be able to carry out the beneficial reaction under a wider range of conditions than a small diversity of bacteria could. Key findings of microbial analyses for the CWTS are provided in the following sections.

8.6.1 SULPHIDE-PRODUCING BACTERIA

The substrate and roots in the pilot-scale CWTS had microbial communities that were more specialized for sulphide production than the moss, as evidenced by the higher percentage and diversity of sulphide-producing bacteria (SPBs) in the former two sample types (Figure 8-43 and Table 8-17). This was particularly evident in the bulrush CWTS. Percentages of SPBs in substrate samples were similar between the bulrush and water sedge CWTS, while the water sedge had higher percentages associated with the moss and root samples than the bulrush CWTS. The higher percentages associated with the water sedge CWTS reflects the more reducing conditions and consistently better treatment of COPI that can form insoluble sulphide minerals achieved in this design (Section 8.3). Higher quantities of SPBs were measured in the water sedge series at the midpoint of pilot-scale testing (August 14, 2019), which immediately followed the period with the most reducing conditions during the pilot tests (July to August 2019; Figure 8-2 and Figure 8-4). Quantities were generally lower at the end of the pilot trials, when conditions in the CWTS had

become gradually less reducing likely due to plant health as discussed further in Section 8.7. There was an increase in abundance and percentage of SPBs in the substrate after the stagnation period, as evidenced by the sample analyzed for cell 4A (Figure 8-43).

The plant roots were the source of most of the SPBs that developed in the CWTS. This indicates adaptation and growth of SPBs as intended with the reducing CWTS design, and confirms that the local water sedge plant from site would be a good candidate for full-scale CWTS design.

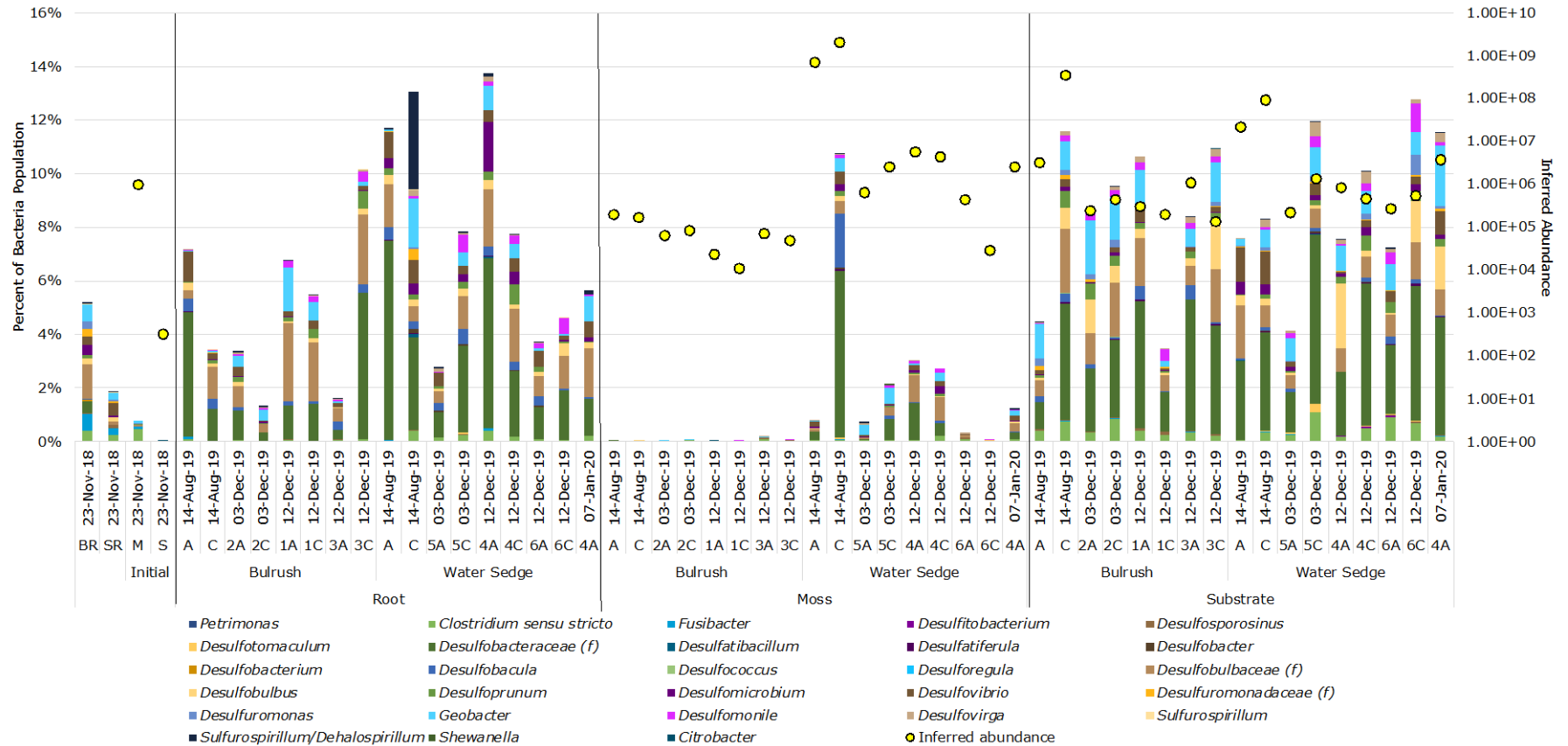


Figure 8-43: Sulphide-producing Bacteria Associated With Soil, Moss, and Root Samples From the Constructed Wetland Treatment System

The primary y-axis provides the percentage of the bacterial population (relative abundance) that corresponds to sulphide-producing bacteria through the reduction of sulphate, sulphite, thiosulphate, and sulphur. Organisms are classified to the genus or family level (f). The secondary y-axis provides the inferred abundance of SPBs in the substrate and moss samples (not applicable for root). Vertical lines are used to separate sample types. Samples are labelled according to the cell that the sample was collected, with midpoint samples (August 14) representing a composite of replicate series. End point samples (December) and post-stagnation samples (January 7 for cell 4A) are shown, along with Initial samples: M (moss), BR (bulrush root), SR (water sedge root), and S (substrate).

8.6.2 SELENIUM-REDUCING AND URANIUM-REDUCING BACTERIA

Selenium-reducing bacteria (SeRBs) were present in all sample types (i.e., moss, roots, substrate) tested in the pilot-scale CWTS. The water sedge CWTS generally had higher percentages of SeRBs than the bulrush CWTS (Appendix B), which is consistent with improved treatment observed in the water sedge CWTS compared to the bulrush CWTS (Section 8.4.3.1). There were differences in the types of SeRB associated with different sample types in the CWTS, which provided diversity in the SeRB population in the CWTS. Diversity was slightly lower in the moss samples than the root and substrate samples for both CWTS, and slightly higher in the water sedge CWTS overall (Table 8-17).

Table 8-17: Average Number of Different Types of Sulphide-producing Bacteria and Selenium-reducing Bacteria in the Constructed Wetland Treatment System Designs

Sample Type	Selenium-reducing Bacteria		Sulphide-producing Bacteria	
	Bulrush	Water	Bulrush	Water
Moss	12	18	7	16
Roots	17	21	19	22
Substrate	18	21	21	22

Average number of different types is based on the number of different bacteria that are identified as known selenium-reducing or sulphide-producing bacteria in each sample type.

Uranium-reducing bacteria (URB) were found in both CWTS designs, primarily associated with the substrate and root samples. The URB was associated with the initial plant roots from site, and are the likely source of these beneficial bacteria in the pilot-scale CWTS. There were similar percentages of URB in the substrate of both CWTS designs, while the water sedge design typically had higher percentages associated with root and moss than the bulrush design. This is consistent with the improved treatment of uranium observed in the water sedge CWTS design (Section 8.4.3.1). The microbiology results support the observation of microbially catalyzed uranium reduction in the pilot-scale CWTS (Section 8.4.3.2).

8.7 VEGETATION GROWTH AND HEALTH

Both water sedge and bulrush plant species established as intended through commissioning and into operations. In an on site CWTS a growing season for these plant species would be approximately 4-5 months (May-September), with natural die off occurring at the end of a growing season. The pilot-scale testing occurred over approximately 14 months (including initial plant growth and commissioning). Plant health in both of the plant species appeared to deteriorate towards the end of the pilot-scale trials (Photograph 8-4). This has not been observed previously in other off site pilot-scale trials, and may be due to the low levels of nutrients in the influent (and lack of replenishment of nutrients by annual plant die off). Likely due to plant health, conditions in the CWTS started to become less reducing towards the end of the pilot-scale trials. While this is not expected to occur on site as plants will follow their natural seasonal die off, it is recommended that this be evaluated during the on site demonstration-scale CWTS.

Straw was added to forebays in select series to evaluate the effect of additional organic carbon on system performance. Minimal impact of the straw addition was observed on performance in both CWTS designs. This suggests the systems were not carbon-limited and forebays did not have an impact on COPI treatment.

8.8 HYDROSOIL

The substrate used in the pilot CWTS was a mixture of 90% medium to coarse sand and 10% wood chips, with a porosity of 23%. The sand allowed water to interact with the root zones and promoted reducing conditions in the substrate, as was seen by the consistently reducing conditions measured in the substrate of both CWTS designs. The medium to coarse sand used in the pilot CWTS consisted of grains with a diameter between 0.2 to 1 mm and a critical resuspension linear flow velocity of 2 to 10 cm/s. This critical resuspension velocity is less than the flow rate targeted in a CWTS, preventing resuspension of sand and mineralized contaminants. A medium to coarse sand substrate is also recommended for the on site CWTS, but any selected substrate will require pre-screening for metal content.

The addition of wood chips to the substrate provided a source of carbon for the microbial communities to develop as the CWTS matures, as the vegetation would be unable to provide the required level of carbon until sufficiently established. As discussed in Section 8.6, the substrate of both CWTS contained the highest percentages of desired microbes including SPBs, SeRBs, and URBs when compared to the moss and root samples. This indicates the substrate is an important area of COPI treatment and that the microbial communities were able to establish well, likely aided by the wood chip addition. Carbon amendments (10% by volume) are therefore recommended in the substrate of the on site CWTS, again with proper pre-screening of considered materials to prevent leaching of metals from the substrate into the CWTS.

8.9 DETRITUS AND ACCRETION

The detritus study was conducted to assess the decomposition rates of bulrush and water sedge in the CWTS designs over time (Section 6.11; Chimney and Pietro, 2006; Hammerly et al., 1989). Carbon cycles through a wetland by accumulation into the plants during photosynthesis, and release through plant decomposition (USEPA, 2008). The rate of decomposition and nutrient release is dependent on many factors, such as plant type, HRT, and environmental conditions (USEPA, 2008), and is therefore assessed through site-specific testing. The rate of decomposition is important in a CWTS to determine the amount of organic matter that will be broken down and become available as organic carbon, and the amount that will contribute to accretion. Accretion is the gradual accumulation of additional layers of organic matter, which aids in building new substrate in the CWTS from undecomposed plant tissues (Section 5.1.2). It is an important process in the CWTS as it buries treated minerals making them more stable and maintains low overall concentrations of metals.

The results show that 83% and 71% decomposition occurs for bulrush and water, respectively, over a period roughly equivalent to one operational season (i.e., from spring start up to fall shut down, comparable to the 112-day sampling event; Figure 8-44; Appendix A, Table A7-1). This suggests that the plant material is successfully being broken down in the CWTS to promote reducing conditions and provide the organic carbon and nutrients needed by beneficial microbes for treatment. Decomposition rates slowed substantially over time, with minimal changes from day 112 to day 199 with the water which had 72% decomposition by day 199 (Figure 8-44). Similarly, decomposition rates slowed for the bulrush which had greater overall decomposition at 93% by day 199 (Figure 8-44). There was no significant carbon contribution from periphyton growth on the polyester filter fibre material bags in the detritus study.

Through the duration of the pilot-scale CWTS trial, bulrush and water sedge produced an average of 0.15 and 0.91 kg of dry weight per meter squared, respectively. The plant material did not completely decompose after a time period equivalent to an operating season, suggesting accretion in the wetland would occur as more organics are produced in a year than decompose (Figure 8-44). The accretion and decomposition rates reported here are intended to be refined through the on site demonstration-scale CWTS.

Direct measurement of the vertical accretion at the end of testing indicated that more accretion occurred in the water sedge CWTS (approximately 4 cm) than the bulrush CWTS (approximately 2 cm), with root growth and development being the primary contributor over decomposition of organic material (Photograph 8-6). Generally, high amounts of accretion from root growth is expected early on but would decrease as the CWTS matures. The vertical accretion seen in the isolated treatment cells of the CWTS may not be fully representative of the accretion which would occur in an open, full-scale system, with vertical accretion intended to be further evaluated through the on site demonstration-scale CWTS.

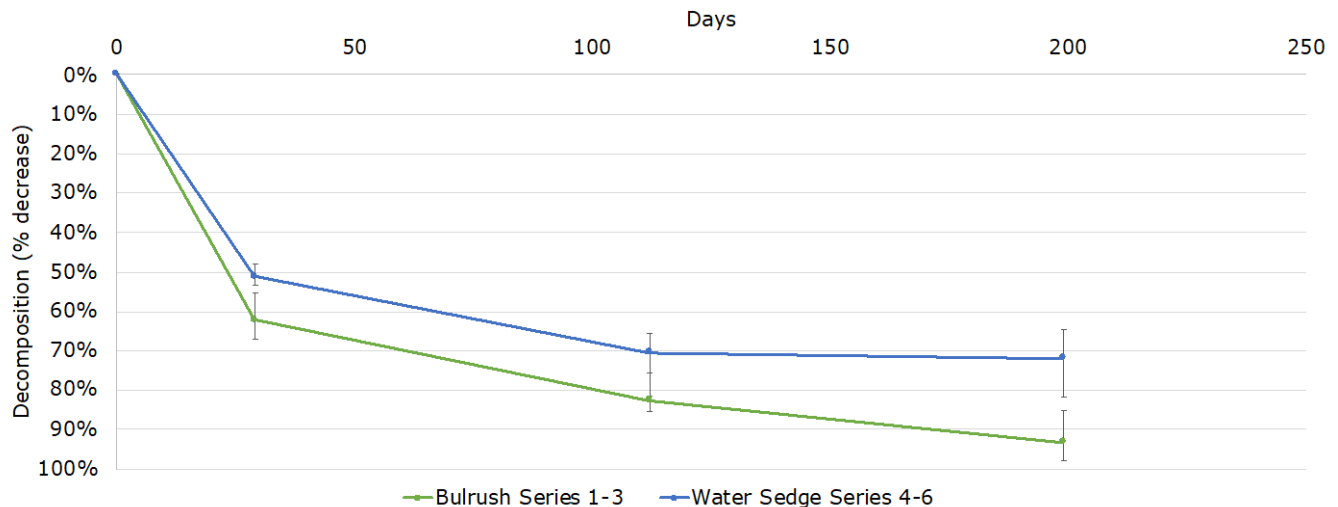


Figure 8-44: Percent Decomposition of Plant Material in Constructed Wetland Treatment System Over Time

Decomposition was measured by the decrease in dry mass of the bulrush and water sedge material over time.



Photograph 8-6: Water Sedge (Left) and Bulrush (Right) Cut Open at the end of Operations Phase to Show Accretion and Root Mats

9 SUMMARY OF KEY FINDINGS

The pilot-scale CWTS testing addressed several important design considerations regarding implementation of a CWTS for treatment of COPIs at the Project. COPIs (arsenic, antimony, cadmium, copper, lead, selenium, uranium, and zinc) were assessed for extent of treatment as well as the fate, stability, and distribution of treated COPIs in the CWTS.

The pilot-scale testing has provided additional proof-of-concept for CWTS for the Project, demonstrating notable treatment of all COPIs. The pilot-scale testing successfully evaluated two CWTS designs with different plant types, using a “worst case” scenario from the ABM Lake WQM, which assumes a reduced treatment efficiency in the lake.

The strengths and considerations of each CWTS design are summarized in Table 9-1, and the key findings are summarized as:

- The water sedge design achieved and maintained reducing conditions throughout pilot-scale testing, whereas the bulrush design was not able to consistently achieve targeted reducing conditions.
- The targeted explanatory parameters for the CWTS were optimized through monitoring during pilot-scale CWTS commissioning and operations. ORP targets will be revised for future on site CWTS.
- Treatment of COPIs was more effective in the water sedge CWTS compared to the bulrush CWTS, with higher removal rate coefficients (RRC) and lower outflow concentrations in the water sedge CWTS for all COPIs.
- Cadmium, lead, arsenic, zinc and selenium were treated below the receiving environment WQO in both designs.
- Copper, antimony, and uranium were treated below receiving environment WQO in the water sedge CWTS only.
- COPIs were generally stable through freeze-thaw testing.
- Stagnation testing revealed increases in antimony, arsenic, and uranium in the A cell of the water sedge CWTS during the stagnation period and initial flush of water through the system, with subsequent treatment observed as water flowed through the system. Treatment of these COPIs subsequently recovered rapidly to levels observed before the stagnation trial. Most of these COPIs decreased or were not affected in the bulrush CWTS, while uranium increased and was minimally treated through the bulrush system. Stagnation had minimal impact on cadmium, copper, lead, and zinc.
- Minimal plant uptake of COPIs was observed as targeted, which is a critical component in the CWTSs.
- Beneficial sulphide-producing, selenium-reducing, and uranium-reducing bacteria were found in all CWTS designs, supporting the presence of targeted treatment mechanisms. These beneficial bacteria were promoted from the plants collected from the site and regional area in 2018 for use in the pilot-scale CWTS.
- The coarse sand and wood chip substrate used in the pilot-scale CWTS promoted desired reducing conditions in the substrate of both CWTS and supported beneficial microbial growth.
- Vegetation established well in both CWTS, with more dense growth in the water sedge design than the bulrush design. Based on the decomposition rates of bulrush and water sedge, accretion is expected to occur in the CWTS.

Table 9-1: Summary of Strengths, Considerations, and Recommendations for Constructed Wetland Treatment System Designs

CWTS Design	Strengths	Considerations	Recommendation
Bulrush	- More tolerant to deep water resulting in smaller footprint. - Minimal release of most COPIs through stagnation. - Excess AVS produced for stabilizing COPI treatment during temperature and biological fluctuations. - More COPIs retained in organics compared to water sedge CWTS, likely due to better moss establishment. - Desired microbial populations (SPBs, SeRBs, URBs) established in the root zones and substrate.	- Variable treatment of COPIs, with minimal treatment during high flow events. - Slower removal rates than water sedge design - Did not maintain targeted reducing conditions throughout operations. - Limited SPBs and URBs associated with the moss.	Not recommended
Water sedge	- Best treatment of all COPIs during all flow regimes, with COPIs treated to below receiving environment WQOs at most flow regimes. - Faster establishment of reducing conditions and maintained targeted conditions throughout operations. - More AVS created compared to bulrush. - Excess AVS produced for stabilizing COPI treatment during temperature and biological fluctuations. - Produced more biomass per year for carbon addition to the CWTS. - Desired microbial populations (SPBs, SeRBs, URBs) established in the moss, root zones, and substrate.	- More release of COPIs during stagnation, with subsequent treatment observed as water flowed through the system and rapid recovery of treatment. - Requires shallower water depth than bulrush, however, had faster COPI removal rates which helps minimize CWTS footprint required for treatment. - Larger impact of evapotranspiration during low flow regimes, which will be evaluated through full-scale CWTS sizing.	Recommended system for on site

10 RECOMENDATIONS AND NEXT STEPS

Pilot-scale testing has provided additional proof-of-concept for CWTS for the Project, demonstrating notable treatment of COPIs. The work addressed several important design and commissioning considerations for implementation for a full-scale CWTS. These include selection of suitable vegetation, soils, and requirements for effective commissioning.

Both water sedge and bulrush designs demonstrated treatment of COPIs, although treatment in the water sedge CWTS was consistently more efficient. The pilot-scale CWTS has demonstrated the water sedge CWTS design is capable of treating COPIs in the 2018 “worst-case” WQM scenario from ABM Lake to below the receiving environment WQOs. As a result, the water sedge CWTS design appears to be appropriate to use as the primary contingency measure for the maintenance of water quality for the Project in Post-closure.

It is recommended that the information presented in this report be used to support the CWTS design as a contingency measure in the RCP. This includes refining CWTS sizing based on the COPI RRCs developed for the Project through the

pilot-scale test work and updated water quality models for the Project. Future work should include the next phases of CWTS design and implementation, including on site demonstration-scale optimization to further refine design and testing under site specific influences.

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APPENDIX A.

Raw and Calculated Data

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A1. RAW YSI DATA

Table A1-1: YSI Data Collected Through Pilot-scale Testing

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 1A	18-Jan-19	58.5	5.21	653	707	201.3	7.50	20.9	NA
	7-Feb-19	48.3	4.09	599	627	213.1	7.66	22.6	NA
	14-Feb-19	44.6	3.80	661	692	190.3	7.46	22.7	NA
	20-Feb-19	39.3	3.54	630	692	181.8	7.43	20.3	-47.5
	28-Feb-19	58.4	5.11	633	655	189.1	7.53	23.3	-57.5
	7-Mar-19	65.6	5.70	666	708	205.2	7.13	21.9	-49.5
	14-Mar-19	62.5	5.07	838	828	96.8	6.81	25.7	-56.5
	21-Mar-19	59.7	5.11	867	902	117.5	6.75	22.9	-53.0
	22-Mar-19	NA	6.23	914	905	121.0	6.80	25.5	-58.0
	28-Mar-19	85.1	7.76	805	896	148.1	6.45	19.7	-48.0
	3-Apr-19	77.7	7.19	699	791	245.1	6.93	18.9	-40.0
	11-Apr-19	56.4	5.22	710	800	132.7	7.05	19.1	-10.0
	15-Apr-19	76.3	6.57	765	811	147.1	7.12	22.0	-47.0
	25-Apr-19	36.9	3.22	743	831	126.8	6.98	19.4	-44.0
	1-May-19	48.5	4.42	717	806	164.9	6.92	19.8	-35.0
	6-May-19	63.9	5.81	719	802	121.0	6.98	19.6	-44.0
	9-May-19	43.6	3.79	797	862	84.1	6.78	21.1	-51.5
	14-May-19	64.6	6.11	726	852	110.2	6.94	17.3	-46.0
	6-Jun-19	42.3	3.91	769	869	284.8	6.87	19.0	-52.0
	5-Jul-19	56.9	5.34	743	850	126.4	7.04	18.4	-43.5
	24-Jul-19	57.5	5.01	680	724	140.2	6.94	21.8	-96.5
	9-Aug-19	49.2	4.54	733	826	68.2	6.87	19.1	-96.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 1A	14-Aug-19	56.3	5.20	724	818	84.4	6.77	19.0	-96.5
	19-Aug-19	55.7	5.18	717	809	109.7	6.90	19.1	-96.0
	27-Aug-19	66.4	5.96	722	797	146.2	6.99	20.0	-90.5
	9-Sep-19	60.9	5.58	692	775	112.9	6.80	19.4	-95.5
	11-Sep-19	53.6	5.02	667	774	128.6	6.73	18.4	-96.0
	13-Sep-19	54.5	5.23	701	779	168.2	6.63	19.7	-98.5
	4-Oct-19	38.6	3.54	704	788	160.5	6.86	19.4	-90.0
	21-Oct-19	39.2	3.82	690	825	142.3	6.91	16.5	-90.0
	6-Nov-19	60.3	5.80	679	801	168.5	6.97	17.0	-93.5
	13-Nov-19	44.6	4.34	699	833	150.6	6.93	16.6	-84.0
	18-Nov-19	34.3	3.36	695	832	119.8	7.05	16.3	-95.5
	25-Nov-19	36.2	3.47	666	801	141.6	7.06	16.2	-97.5
	2-Dec-19	57.2	5.37	672	793	146.7	6.95	17.0	-88.0
	4-Dec-19	56.0	5.49	696	832	168.3	6.97	16.5	-100.0
	6-Dec-19	48.6	4.51	665	794	177.5	7.07	16.4	-150.0
	12-Dec-19	76.8	7.33	732	859	110.6	7.05	17.3	-101.0
	20-Dec-19	42.0	3.98	748	869	85.2	6.93	17.8	-102.0
	27-Dec-19	55.8	5.34	761	894	207.8	7.02	17.2	-99.0
	2-Jan-20	43.1	4.11	761	889	138.4	7.10	17.5	-99.5
	6-Jan-20	45.1	4.30	800	933	125.4	7.06	17.5	-105.5
	9-Jan-20	49.8	4.76	708	841	107.8	7.08	16.7	-103.5
	13-Jan-20	54.8	5.32	699	829	186.3	7.01	16.8	-101.0
Cell 1B	9-Jan-19	72.5	6.37	865	919	138.5	7.64	21.9	NA
	31-Jan-19	83.7	7.55	538	591	178.4	7.84	20.3	NA
	14-Mar-19	76.8	6.34	788	789	90.0	7.16	25.0	-15.5
	21-Mar-19	76.2	6.53	872	910	99.9	6.93	22.8	-16.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 1B	22-Mar-19	81.4	6.68	921	918	103.5	6.97	25.2	-19.0
	28-Mar-19	84.4	7.65	843	932	95.3	6.93	20.0	14.5
	3-Apr-19	86.5	7.83	747	842	251.6	6.91	19.2	24.5
	11-Apr-19	78.1	7.15	738	826	150.3	7.18	19.5	30.5
	15-Apr-19	96.7	8.31	796	840	118.2	7.24	22.2	22.0
	25-Apr-19	54.0	4.83	786	880	108.3	7.03	19.4	15.0
	1-May-19	46.2	4.21	752	843	161.2	6.90	19.9	20.0
	6-May-19	50.8	4.57	759	838	119.8	6.88	20.1	16.5
	9-May-19	44.8	3.97	848	911	99.6	6.70	21.4	17.0
	14-May-19	53.2	4.99	781	890	107.1	6.86	18.6	17.5
	6-Jun-19	64.3	5.85	807	896	289.7	6.89	19.8	7.5
	5-Jul-19	60.2	6.12	809	889	129.5	6.90	20.3	-5.0
	24-Jul-19	57.3	4.91	706	733	126.2	6.73	23.0	-35.0
	9-Aug-19	52.0	4.85	787	866	84.6	6.74	20.2	-39.0
	14-Aug-19	49.2	4.47	756	830	114.0	6.73	20.4	-45.0
	19-Aug-19	53.3	4.75	742	819	116.8	6.81	20.0	-45.0
	27-Aug-19	43.5	3.82	739	806	123.3	6.91	20.6	-45.0
	9-Sep-19	52.0	4.74	696	777	110.3	6.80	19.6	-50.0
	11-Sep-19	48.8	4.44	682	777	116.6	6.69	18.6	-47.0
	13-Sep-19	47.6	4.56	703	780	171.5	6.66	19.9	-45.0
	4-Oct-19	42.0	3.81	736	815	160.5	6.77	19.9	-122.0
	21-Oct-19	55.3	5.31	721	849	145.7	6.93	17.1	-129.0
	6-Nov-19	58.0	5.53	703	820	168.9	6.88	17.5	-140.0
	13-Nov-19	49.9	4.80	716	845	141.7	6.89	17.0	-141.0
	18-Nov-19	48.4	4.54	717	840	90.8	7.06	17.3	-145.0
	25-Nov-19	57.2	5.44	860	802	151.9	7.08	17.1	-150.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 1B	2-Dec-19	51.4	4.85	679	797	130.7	6.98	17.2	-155.0
	4-Dec-19	56.4	5.59	698	832	168.4	6.95	16.5	-155.0
	6-Dec-19	50.9	4.67	671	797	159.6	7.03	16.7	-156.0
	12-Dec-19	66.9	6.31	745	860	108.4	6.95	18.0	-158.0
	20-Dec-19	58.5	5.46	750	866	78.9	6.89	18.6	-147.0
	27-Dec-19	65.5	6.22	769	893	208.0	6.99	17.7	-150.0
	2-Jan-20	57.9	5.48	774	894	137.6	7.06	18.0	-151.0
	6-Jan-20	64.2	6.02	809	937	114.8	7.03	17.8	-153.0
	9-Jan-20	65.6	6.34	716	847	117.9	7.12	16.9	-157.0
	13-Jan-20	65.4	6.28	701	828	180.5	7.04	17.0	-158.0
Cell 1C	25-Jan-19	58.1	5.02	501	554	169.8	7.66	20.0	NA
	31-Jan-19	98.6	9.53	610	672	172.3	8.39	20.1	NA
	14-Feb-19	100.8	8.67	633	666	169.4	7.33	22.5	NA
	20-Feb-19	79.4	7.10	632	693	176.0	7.55	20.4	-154.0
	28-Feb-19	67.7	5.91	672	706	187.4	7.39	22.5	-139.5
	7-Mar-19	50.2	4.43	630	680	188.1	7.41	21.2	-117.0
	14-Mar-19	72.7	6.02	738	741	77.8	7.46	24.8	-121.0
	21-Mar-19	80.4	6.96	828	872	87.9	7.27	22.3	-112.5
	22-Mar-19	95.1	7.85	887	883	99.3	7.58	25.3	-113.0
	28-Mar-19	102.7	9.33	844	934	85.5	7.35	20.0	-98.0
	3-Apr-19	107.6	9.89	800	903	248.4	7.22	19.0	-81.0
	11-Apr-19	8.5	9.01	765	862	150.1	7.41	19.2	-107.5
	15-Apr-19	116.2	9.58	822	866	117.0	7.72	22.3	-96.5
	25-Apr-19	54.0	4.83	786	880	108.3	7.03	19.3	-53.5
	1-May-19	62.6	5.38	786	877	153.0	7.01	20.1	-70.5
	6-May-19	69.5	6.29	796	873	106.0	7.07	20.5	-68.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)	Soil Redox (mV)
Cell 1C	9-May-19	50.9	4.56	861	951	104.4	7.11	20.1	-76.0
	14-May-19	64.5	5.99	829	936	143.8	7.00	19.0	-36.0
	6-Jun-19	36.0	3.25	834	918	241.8	6.86	20.2	39.5
	5-Jul-19	58.8	5.25	843	922	113.9	7.03	20.5	-9.0
	24-Jul-19	32.7	2.71	730	759	62.8	6.81	22.9	-93.0
	9-Aug-19	47.0	4.26	815	900	58.7	6.83	20.0	-95.0
	14-Aug-19	43.6	3.97	777	852	96.0	6.74	20.4	-96.5
	19-Aug-19	53.7	4.84	757	831	106.7	6.81	20.4	-99.0
	27-Aug-19	60.0	5.27	749	811	113.2	6.99	21.0	-128.5
	9-Sep-19	50.7	4.67	698	779	113.5	6.81	19.5	-126.5
	11-Sep-19	50.8	4.64	682	779	124.0	6.71	18.5	-121.5
	13-Sep-19	69.4	6.27	706	777	182.5	6.76	20.1	-118.5
	4-Oct-19	46.9	4.27	752	835	158.0	6.88	19.7	-94.5
	21-Oct-19	49.3	4.75	741	873	130.1	6.95	17.0	-79.5
	6-Nov-19	52.6	4.98	728	847	166.2	6.93	17.7	-70.0
	13-Nov-19	46.6	4.47	729	856	122.4	6.89	17.0	-64.0
	18-Nov-19	40.8	3.85	718	849	91.0	7.07	16.9	-78.0
	25-Nov-19	42.6	4.04	681	808	112.6	7.06	16.8	-75.5
	2-Dec-19	47.0	4.43	685	804	95.2	7.03	17.3	-84.5
	4-Dec-19	52.6	5.23	700	833	177.2	7.00	16.7	-81.5
	6-Dec-19	47.1	4.48	673	80	228.9	7.04	16.7	-74.5
	12-Dec-19	54.4	5.12	749	862	95.0	7.00	18.1	-77.0
	20-Dec-19	38.2	3.62	762	887	44.7	6.86	17.6	-79.0
	27-Dec-19	52.7	5.52	781	914	207.9	6.99	17.4	-70.5
	2-Jan-20	39.9	3.78	783	911	136.7	7.02	17.6	-75.5
	6-Jan-20	50.7	4.82	818	955	97.9	6.98	17.5	-81.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 1C	9-Jan-20	50.6	4.86	721	856	105.1	7.10	16.8	-78.5
	13-Jan-20	54.6	5.19	695	823	165.1	7.04	16.9	-75.0
Cell 2A	18-Jan-19	50.4	4.51	883	965	199.6	7.46	20.5	NA
	7-Feb-19	60.8	5.24	600	631	215.1	7.44	22.4	NA
	14-Feb-19	49.6	4.28	676	719	180.1	7.40	21.9	NA
	20-Feb-19	41.7	3.68	637	717	193.3	7.34	19.2	-98.5
	28-Feb-19	63.3	5.37	647	670	193.3	7.61	23.3	-100.0
	7-Mar-19	56.1	4.86	667	705	201.7	7.35	22.0	29.5
	14-Mar-19	63.0	5.09	843	825	85.1	6.68	26.1	-92.0
	21-Mar-19	57.3	4.81	883	900	105.0	6.52	24.0	-90.0
	22-Mar-19	69.7	5.61	927	903	119.7	6.53	26.4	-114.5
	28-Mar-19	65.2	5.89	807	889	146.8	6.20	20.2	-78.5
	3-Apr-19	69.0	6.40	683	772	232.9	6.76	18.9	-66.5
	11-Apr-19	65.6	5.95	710	794	148.7	6.99	19.4	-94.0
	15-Apr-19	84.3	7.55	764	805	140.9	7.10	22.3	-106.0
	25-Apr-19	37.4	3.37	736	824	124.5	6.82	19.4	-150.5
	1-May-19	33.2	2.97	722	801	120.3	6.70	20.4	-116.5
	6-May-19	44.1	3.96	728	798	121.9	6.69	20.4	-135.0
	9-May-19	38.5	3.40	798	855	75.4	6.69	21.5	-139.5
	14-May-19	43.5	3.98	755	848	90.4	6.73	19.3	-98.5
	6-Jun-19	35.8	3.16	801	862	239.2	6.72	21.3	-114.5
	5-Jul-19	39.0	3.45	796	858	80.2	6.66	21.2	-125.5
	24-Jul-19	18.8	1.58	709	724	124.1	6.47	23.9	-142.0
	9-Aug-19	21.4	1.91	752	821	64.5	6.56	20.6	-143.5
	14-Aug-19	30.6	2.75	747	816	96.0	6.53	20.6	-143.0
	19-Aug-19	34.2	3.09	731	810	91.5	6.63	19.9	-145.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 2A	27-Aug-19	31.4	2.77	727	799	89.6	6.69	20.4	-143.5
	9-Sep-19	47.8	4.31	697	775	105.1	6.60	19.8	-147.0
	11-Sep-19	50.4	4.60	683	781	103.2	6.69	18.4	-145.5
	13-Sep-19	49.9	4.42	707	778	117.4	6.60	20.4	-148.0
	8-Oct-19	23.4	2.12	828	916	206.6	6.74	20.3	-151.5
	4-Nov-19	25.1	2.37	731	849	142.4	6.73	17.7	-151.5
	3-Dec-19	20.1	1.93	706	833	170.4	6.79	17.1	-163.0
Cell 2B	18-Jan-19	96.9	8.33	778	840	195.4	7.76	20.9	NA
	31-Jan-19	64.1	5.73	489	542	178.2	7.50	19.9	NA
	14-Mar-19	69.1	5.62	795	784	100.3	7.13	25.7	-139.5
	21-Mar-19	38.1	3.22	888	913	100.8	6.85	23.6	-145.5
	22-Mar-19	69.3	5.61	939	921	98.5	6.94	26.0	-150.5
	28-Mar-19	45.3	4.09	940	925	88.0	6.59	20.2	-133.0
	3-Apr-19	65.5	6.02	695	778	186.2	6.72	19.4	-123.0
	11-Apr-19	58.3	5.26	721	801	113.4	7.03	19.8	-118.5
	15-Apr-19	71.5	6.22	776	820	101.4	7.23	22.3	-125.5
	25-Apr-19	41.1	3.71	759	848	107.0	6.86	19.5	-137.5
	1-May-19	34.9	3.17	738	825	163.0	6.76	20.1	-138.0
	6-May-19	48.1	4.23	743	818	115.6	6.75	20.2	-141.0
	9-May-19	32.7	2.86	828	890	34.3	6.68	21.4	-153.0
	14-May-19	44.9	4.12	780	874	44.6	6.78	19.4	-150.5
	6-Jun-19	46.4	4.11	817	881	202.1	6.79	21.2	-188.0
	5-Jul-19	34.8	3.08	819	883	125.8	6.77	21.2	-193.0
	24-Jul-19	26.0	2.20	723	743	116.3	6.52	23.6	-206.5
	9-Aug-19	28.5	2.52	776	843	43.6	6.55	20.8	-202.5
	14-Aug-19	34.6	3.06	761	825	77.8	6.57	20.9	-197.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 2B	19-Aug-19	41.0	3.64	745	817	61.8	6.65	20.4	-200.0
	27-Aug-19	32.3	2.87	739	804	26.5	6.73	20.8	-190.5
	9-Sep-19	38.0	3.35	706	780	59.6	6.58	20.0	-192.0
	11-Sep-19	41.9	3.82	691	784	52.5	6.61	18.8	-193.5
	13-Sep-19	44.1	3.99	709	780	94.2	6.59	20.3	-191.0
	8-Oct-19	33.0	3.00	800	886	115.5	6.67	19.9	-188.0
	4-Nov-19	36.0	3.38	770	882	137.6	6.77	18.4	-188.0
	3-Dec-19	36.7	3.45	745	863	158.8	6.80	17.8	-196.0
Cell 2C	9-Jan-19	78.3	6.63	934	1002	145.4	7.73	21.5	NA
	25-Jan-19	56.5	5.01	791	877	174.3	7.57	19.9	NA
	31-Jan-19	83.3	7.53	698	771	182.2	7.84	20.0	NA
	14-Feb-19	181.2	15.63	646	680	173.9	8.85	22.4	NA
	20-Feb-19	91.7	8.27	658	724	180.7	7.87	20.2	-114.0
	28-Feb-19	128.2	10.34	701	732	188.1	7.95	22.7	-133.5
	7-Mar-19	133.2	11.61	638	679	182.1	8.08	21.9	-138.0
	14-Mar-19	80.4	6.57	734	728	66.3	7.37	25.5	-143.0
	21-Mar-19	77.7	6.63	833	863	77.6	7.22	23.2	-133.5
	22-Mar-19	85.2	6.96	886	878	84.9	7.24	25.5	-139.0
	28-Mar-19	98.4	8.89	847	931	76.6	7.16	20.2	-115.0
	3-Apr-19	100.5	9.27	730	821	181.5	7.00	19.2	-116.5
	11-Apr-19	87.2	7.94	728	815	141.7	7.28	19.5	-139.0
	15-Apr-19	93.1	7.96	801	840	99.2	7.50	22.6	-146.5
	25-Apr-19	53.2	4.80	782	876	107.6	7.04	19.3	-142.5
	1-May-19	37.8	3.41	773	857	165.5	6.86	20.4	-142.0
	6-May-19	40.3	3.62	781	856	112.1	6.84	20.5	-144.5
	9-May-19	33.2	2.91	868	932	44.1	6.70	21.4	-144.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 2C	14-May-19	44.7	4.07	819	916	97.1	6.80	19.4	-149.0
	6-Jun-19	42.3	3.76	837	908	240.9	6.79	21.0	-139.5
	5-Jul-19	37.4	3.31	860	924	115.1	6.82	21.4	-155.0
	24-Jul-19	39.7	3.37	753	776	102.5	6.68	23.5	-164.0
	9-Aug-19	47.2	4.20	807	877	90.6	6.58	20.8	-144.0
	14-Aug-19	46.2	4.10	772	835	109.9	6.58	21.1	-164.0
	19-Aug-19	50.7	4.44	759	828	119.6	6.68	20.7	-165.0
	27-Aug-19	47.6	4.14	754	811	153.8	6.78	21.3	-159.0
	9-Sep-19	47.5	4.22	713	784	131.5	6.64	20.3	-159.0
	11-Sep-19	43.9	4.05	694	784	128.4	6.66	19.0	-109.0
	13-Sep-19	49.6	4.41	702	764	156.3	6.60	20.8	-104.0
	8-Oct-19	27.2	2.50	758	850	130.2	6.66	19.3	-156.0
	4-Nov-19	41.6	3.89	810	929	131.5	6.80	18.3	-156.0
	3-Dec-19	41.4	3.87	778	903	266.5	6.82	17.7	-159.0
Cell 3A	7-Feb-19	51.9	4.36	655	668	214.0	7.42	23.4	NA
	14-Feb-19	47.6	3.82	695	706	113.0	7.50	24.2	NA
	20-Feb-19	52.0	4.50	655	691	148.9	7.57	22.3	-141.0
	28-Feb-19	73.9	6.20	576	597	192.5	7.67	23.1	-120.0
	7-Mar-19	71.0	6.18	661	704	196.7	7.14	21.8	-141.0
	14-Mar-19	68.1	5.46	851	827	60.7	6.69	26.5	-165.0
	21-Mar-19	39.3	3.26	896	905	84.8	6.44	24.5	-161.5
	22-Mar-19	49.7	3.45	940	906	101.4	6.42	27.0	-166.0
	28-Mar-19	48.3	4.35	823	902	132.4	6.19	20.4	-147.5
	3-Apr-19	50.9	4.70	684	774	185.3	6.62	19.0	-178.5
	11-Apr-19	41.7	3.65	711	798	123.8	6.72	19.3	-154.0
	15-Apr-19	61.3	5.34	765	809	107.1	6.88	22.2	-159.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 3A	25-Apr-19	19.4	1.83	736	829	76.3	6.75	19.2	-159.5
	1-May-19	12.6	1.13	719	806	111.7	6.62	19.9	-156.5
	6-May-19	39.4	3.57	723	799	112.3	6.58	20.0	-155.0
	9-May-19	36.6	3.11	798	866	70.1	6.63	21.2	-158.0
	14-May-19	28.6	2.58	756	848	69.1	6.56	19.3	-161.0
	6-Jun-19	22.7	2.00	835	863	260.1	6.49	21.5	-159.5
	5-Jul-19	6.5	0.57	786	845	67.8	6.54	21.4	-146.0
	24-Jul-19	20.5	1.72	714	715	123.1	6.33	24.0	-168.0
	9-Aug-19	26.5	2.24	769	836	93.5	6.39	20.8	-178.0
	14-Aug-19	32.1	2.83	758	819	131.7	6.43	21.1	-190.0
	19-Aug-19	38.5	3.43	740	813	123.1	6.54	20.3	-203.0
	27-Aug-19	32.1	2.50	729	801	138.7	6.57	20.3	-183.0
	9-Sep-19	46.5	4.19	696	773	143.2	6.57	19.8	-187.0
	11-Sep-19	47.1	4.33	680	774	131.6	6.52	18.6	-184.0
	13-Sep-19	49.9	4.29	715	781	148.4	6.42	21.0	-180.0
	4-Oct-19	6.2	0.57	723	803	147.5	6.45	19.8	-170.0
	21-Oct-19	12.0	1.16	701	837	59.2	6.47	16.5	-169.0
	6-Nov-19	16.4	1.55	705	813	170.6	6.51	18.1	-173.0
	13-Nov-19	16.7	1.63	699	831	173.0	6.66	16.6	-178.0
	18-Nov-19	17.0	1.65	695	830	142.0	6.82	16.6	-180.0
	25-Nov-19	29.2	2.79	672	799	164.6	6.82	16.7	-184.0
	2-Dec-19	46.8	4.52	671	793	184.0	6.77	17.0	-180.0
	4-Dec-19	58.0	5.59	694	830	162.9	6.87	16.4	-180.0
	6-Dec-19	42.4	4.12	660	793	192.4	6.97	16.2	-180.0
	12-Dec-19	43.1	4.10	747	871	125.4	6.70	17.6	-181.0
	19-Dec-19	7.1	0.83	763	1123	96.6	6.78	8.1	-46.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 3B	25-Jan-19	68.1	6.31	544	604	173.7	7.60	19.8	NA
	31-Jan-19	64.1	5.73	489	542	178.2	7.50	19.9	NA
	14-Mar-19	24.9	2.01	775	760	106.5	6.85	26.1	-111.5
	21-Mar-19	30.3	2.53	888	901	105.8	6.69	24.2	-123.0
	22-Mar-19	28.9	2.32	938	911	105.8	6.68	26.5	-106.0
	28-Mar-19	24.1	2.15	863	938	96.4	6.53	20.8	-116.0
	3-Apr-19	44.1	4.04	716	806	165.5	6.65	19.1	-109.0
	11-Apr-19	36.5	3.30	735	811	51.8	6.85	20.1	-118.0
	15-Apr-19	50.2	4.39	784	829	73.9	6.91	22.2	-118.5
	25-Apr-19	28.7	2.61	765	858	53.8	6.78	19.3	-106.5
	1-May-19	27.2	2.47	743	832	102.2	6.66	19.9	-79.5
	6-May-19	45.4	4.11	743	824	97.2	6.62	19.8	-100.5
	9-May-19	29.7	2.68	831	899	69.6	6.67	21.1	-104.0
	14-May-19	40.2	3.63	791	883	33.5	6.69	19.6	-111.5
	6-Jun-19	36.3	3.23	825	885	238.1	6.60	21.4	-121.0
	5-Jul-19	58.6	5.17	808	868	123.3	6.69	21.4	-107.0
	24-Jul-19	25.7	2.16	740	753	112.5	6.42	24.1	-133.5
	9-Aug-19	43.8	3.88	799	856	80.9	6.52	21.9	-139.5
	14-Aug-19	38.5	3.37	777	833	113.2	6.51	21.5	-144.5
	19-Aug-19	52.1	4.68	756	826	105.5	6.63	20.6	-159.0
	27-Aug-19	51.5	4.43	746	809	120.1	6.73	21.0	-139.0
	9-Sep-19	43.4	3.86	707	779	122.0	6.62	20.1	-136.0
	11-Sep-19	45.2	4.30	684	777	120.2	6.53	18.7	-130.0
	13-Sep-19	47.6	4.46	716	780	135.4	6.47	20.7	-137.5
	4-Oct-19	36.4	3.27	772	843	174.9	6.61	20.7	-121.0
	21-Oct-19	53.2	5.12	736	867	167.8	6.72	17.1	-116.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 3B	6-Nov-19	62.2	5.84	732	830	172.7	6.72	18.4	-111.5
	13-Nov-19	44.2	4.24	719	845	169.1	6.71	17.2	-112.5
	18-Nov-19	39.4	3.76	716	841	121.3	6.88	17.2	-116.0
	25-Nov-19	34.7	3.24	685	805	154.3	6.85	17.2	-115.5
	2-Dec-19	46.5	4.33	687	802	150.9	6.87	17.5	-113.5
	4-Dec-19	60.7	5.89	704	836	157.3	6.87	16.7	-116.5
	6-Dec-19	44.8	4.23	675	799	192.4	6.93	16.9	-166.0
	12-Dec-19	67.1	6.29	760	872	116.7	6.85	18.3	-119.0
	19-Dec-19	5.6	0.61	1212	1653	99.6	6.68	11.0	-24.5
Cell 3C	7-Feb-19	93.7	7.79	581	601	207.8	7.77	23.2	NA
	14-Feb-19	129.4	10.40	649	664	107.6	8.11	23.7	NA
	20-Feb-19	99.8	8.71	655	701	139.8	7.87	21.6	3.5
	28-Feb-19	75.6	6.49	658	685	193.9	7.53	23.0	-12.5
	7-Mar-19	44.6	3.89	606	643	188.1	7.32	22.0	-34.0
	14-Mar-19	27.6	2.25	701	694	18.9	7.07	25.5	-43.0
	21-Mar-19	29.9	2.51	826	842	54.3	6.93	24.0	-167.0
	22-Mar-19	18.4	1.48	883	858	46.8	6.87	26.5	-170.0
	28-Mar-19	24.3	2.17	849	922	21.9	6.69	20.9	-181.5
	3-Apr-19	47.3	4.32	780	871	163.5	6.70	19.5	-115.5
	11-Apr-19	55.8	5.04	755	833	68.9	6.96	20.1	-166.0
	15-Apr-19	63.5	5.45	810	846	28.2	7.02	22.8	-111.5
	25-Apr-19	43.3	4.02	792	883	31.8	6.85	19.6	-107.0
	1-May-19	29.2	2.58	782	860	63.0	6.70	20.8	-91.5
	6-May-19	46.1	4.12	787	854	119.8	6.71	20.9	-100.5
	9-May-19	35.5	3.09	874	936	84.6	6.67	21.6	-95.0
	14-May-19	34.7	3.17	831	923	18.1	6.70	19.8	-100.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 3C	6-Jun-19	41.7	3.67	844	907	165.2	6.64	21.4	-96.0
	5-Jul-19	45.6	4.02	840	899	98.2	6.71	21.6	-104.5
	24-Jul-19	27.6	2.21	762	776	103.4	6.46	24.0	-119.5
	9-Aug-19	42.9	3.82	831	900	83.0	6.56	21.0	-123.0
	14-Aug-19	48.2	4.23	801	856	109.1	6.51	21.6	-122.5
	19-Aug-19	56.5	5.03	776	844	85.2	6.68	20.8	-116.0
	27-Aug-19	55.7	4.63	759	820	105.9	6.72	21.1	-141.0
	9-Sep-19	49.3	4.33	710	782	117.3	6.63	20.2	-100.0
	11-Sep-19	47.8	4.37	690	783	104.0	6.57	18.8	-117.0
	13-Sep-19	49.8	4.47	716	783	126.8	6.53	20.5	-120.5
	4-Oct-19	40.1	3.60	790	864	171.3	6.64	20.5	-114.5
	21-Oct-19	49.8	4.71	779	902	161.8	6.74	17.9	-110.0
	6-Nov-19	45.5	4.22	766	872	147.3	6.68	18.6	-115.5
	13-Nov-19	45.7	4.33	743	862	164.1	6.75	17.8	-111.0
	18-Nov-19	45.4	4.27	730	849	140.8	6.92	17.7	-115.0
	25-Nov-19	46.1	4.35	695	811	134.7	6.90	17.5	-116.0
	2-Dec-19	51.9	4.97	691	806	154.2	6.90	17.6	-79.5
	4-Dec-19	58.2	5.55	710	836	169.7	6.90	17.1	-115.5
	6-Dec-19	48.6	4.59	679	802	187.9	6.96	16.9	-116.0
	12-Dec-19	65.0	6.02	767	868	118.4	6.87	18.9	-117.5
	19-Dec-19	5.4	0.63	1101	1568	98.1	6.67	9.4	-59.0
Cell 4A	9-Jan-19	25.4	2.21	913	963	133.4	7.30	21.4	NA
	18-Jan-19	25.5	2.27	673	732	198.1	7.16	20.8	NA
	25-Jan-19	39.1	3.56	511	565	156.8	7.40	20.0	NA
	31-Jan-19	38.4	3.56	534	586	186.1	7.40	20.4	NA
	14-Feb-19	9.1	0.82	709	736	189.4	7.29	23.1	NA

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 4A	20-Feb-19	9.8	0.87	645	704	193.8	7.05	20.8	-126.0
	28-Feb-19	25.7	2.10	651	685	191.3	7.14	23.9	-141.5
	7-Mar-19	19.8	1.74	717	778	164.2	6.86	20.9	-158.0
	14-Mar-19	7.0	0.97	899	888	31.6	6.32	25.6	-169.5
	18-Mar-19	13.6	1.13	915	923	-15.7	6.12	24.5	NA
	21-Mar-19	15.3	1.28	909	924	27.7	6.12	24.2	-171.5
	22-Mar-19	15.7	1.27	941	926	30.9	6.07	25.9	-176.0
	28-Mar-19	11.4	1.03	829	915	-23.8	5.91	20.1	-161.5
	3-Apr-19	3.7	0.35	699	798	79.1	6.35	18.5	-157.0
	11-Apr-19	1.9	0.17	767	866	-145.8	6.48	19.0	-155.5
	15-Apr-19	7.5	0.69	804	866	-52.1	6.53	21.2	-154.0
	25-Apr-19	2.1	0.19	753	857	-43.5	6.50	18.6	-147.5
	1-May-19	12.3	1.13	730	828	81.9	6.39	19.5	-157.5
	6-May-19	9.6	0.89	719	813	50.1	6.36	18.9	-142.0
	9-May-19	8.5	0.72	798	879	17.6	6.41	20.2	-148.5
	6-Jun-19	6.8	0.60	853	930	122.2	6.37	20.6	-165.0
	5-Jul-19	11.7	1.04	816	888	57.8	6.41	20.7	-162.5
	24-Jul-19	2.8	0.24	751	772	21.3	6.32	23.7	-176.0
	9-Aug-19	18.3	1.63	781	855	41.0	6.33	20.4	-168.5
	14-Aug-19	14.5	1.25	754	823	122.9	6.37	20.6	-169.5
	19-Aug-19	30.6	2.69	741	813	131.9	6.50	20.3	-146.0
	27-Aug-19	18.9	1.65	742	807	92.0	6.51	20.8	-165.5
	9-Sep-19	15.8	1.42	708	781	108.6	6.44	20.1	-166.0
	11-Sep-19	25.1	2.27	703	784	95.3	6.45	19.6	-164.0
	13-Sep-19	14.3	1.26	730	781	109.2	6.43	21.6	-167.0
	4-Oct-19	12.6	1.17	754	850	82.5	6.37	19.1	-164.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 4A	21-Oct-19	14.5	1.39	750	878	132.2	6.41	17.3	-160.5
	6-Nov-19	14.2	1.37	735	872	160.5	6.40	16.8	-107.5
	13-Nov-19	20.2	1.98	710	853	157.5	6.50	16.3	-161.5
	18-Nov-19	16.3	1.58	717	854	121.7	6.63	16.6	-136.5
	25-Nov-19	10.1	0.98	679	809	112.8	6.62	16.6	-129.5
	2-Dec-19	15.5	1.68	679	801	145.2	6.64	17.1	-129.0
	4-Dec-19	40.1	3.82	679	811	198.5	6.77	16.5	-75.0
	6-Dec-19	47.4	4.63	698	835	152.9	6.74	16.4	-55.0
	12-Dec-19	31.7	3.07	819	975	58.0	6.54	16.7	-53.0
	20-Dec-19	22.6	2.19	966	1153	22.8	6.64	16.5	-26.0
	27-Dec-19	40.9	4.03	1111	1345	87.2	6.81	15.9	-14.0
	2-Jan-20	13.5	1.30	1310	1540	17.9	6.97	17.2	57.0
	9-Jan-20	32.5	3.19	820	987	3.1	6.86	16.1	50.5
	13-Jan-20	47.6	4.61	707	856	122.4	6.81	15.9	-22.0
Cell 4B	7-Feb-19	43.6	0.89	638	661	215.7	7.29	23.1	NA
	14-Mar-19	2.1	0.16	927	894	65.6	6.62	26.9	-123.5
	21-Mar-19	10.8	0.90	969	984	22.6	6.32	24.2	-121.0
	22-Mar-19	8.6	0.69	1008	987	44.7	6.30	26.1	-124.0
	28-Mar-19	2.6	0.24	908	1006	-95.2	6.33	19.9	-106.0
	3-Apr-19	2.0	0.19	758	846	56.2	6.37	19.5	-100.5
	11-Apr-19	0.8	0.07	845	935	-148.6	6.57	20.0	-106.0
	15-Apr-19	1.3	0.11	898	946	-82.5	6.52	22.2	-112.0
	25-Apr-19	1.7	0.16	827	927	-56.7	6.52	19.3	-48.0
	1-May-19	6.0	0.54	792	880	66.7	6.39	20.3	-104.0
	6-May-19	8.2	0.74	779	860	44.5	6.38	20.1	-97.5
	9-May-19	8.9	0.77	866	936	6.5	6.46	21.0	-104.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 4B	6-Jun-19	23.6	2.05	948	1006	180.6	6.46	22.0	-92.5
	5-Jul-19	12.7	1.12	897	960	33.1	6.45	21.5	-131.5
	24-Jul-19	7.4	0.61	827	840	8.0	6.39	24.2	-137.5
	9-Aug-19	10.4	0.91	841	913	29.2	6.35	20.8	-120.5
	14-Aug-19	20.1	1.80	783	847	127.5	6.34	21.1	-118.0
	19-Aug-19	28.6	2.64	769	844	125.6	6.45	20.5	-113.0
	27-Aug-19	26.0	2.28	756	827	64.1	6.52	20.5	-120.5
	9-Sep-19	22.4	1.92	711	786	79.2	6.43	20.0	-114.0
	11-Sep-19	18.9	1.72	698	789	69.7	6.43	19.0	-112.0
	13-Sep-19	26.1	2.33	723	786	103.6	6.44	20.8	-112.5
	4-Oct-19	16.3	1.48	833	914	59.1	6.42	20.3	-122.0
	21-Oct-19	22.3	2.12	814	945	104.4	6.47	17.7	-95.0
	6-Nov-19	34.1	3.23	789	914	173.0	6.49	17.8	-94.5
	13-Nov-19	18.8	1.80	753	883	158.0	6.47	17.3	-106.5
	18-Nov-19	12.6	1.21	743	869	91.7	6.62	17.4	-58.0
	25-Nov-19	20.9	1.98	703	827	105.6	6.62	17.1	-106.0
	2-Dec-19	34.3	3.20	685	804	129.6	6.71	17.3	-108.0
	4-Dec-19	32.0	3.10	681	810	190.8	6.73	16.7	-104.5
	6-Dec-19	38.5	3.75	697	833	125.5	6.69	16.4	-107.0
	12-Dec-19	24.8	2.24	828	947	39.4	6.54	18.4	-110.0
	20-Dec-19	19.3	1.84	863	1005	53.8	6.59	17.6	-110.5
	27-Dec-19	43.4	4.19	961	1134	137.9	6.79	17.0	-116.5
	2-Jan-20	8.6	0.80	1084	1243	41.4	6.85	18.3	-108.5
	9-Jan-20	13.8	1.33	993	1181	38.3	6.77	16.6	-111.0
	13-Jan-20	31.0	3.03	714	861	90.3	6.75	16.0	-108.5
Cell 4C	7-Feb-19	38.2	3.21	664	691	215.0	7.24	23.0	NA

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 4C	14-Feb-19	2.5	0.22	705	730	186.6	7.18	23.3	NA
	20-Feb-19	3.2	0.56	682	743	192.4	7.05	20.7	-72.0
	28-Feb-19	3.4	0.32	708	731	193.7	7.05	23.3	-118.5
	7-Mar-19	4.5	0.42	669	703	160.9	6.99	22.5	-76.0
	14-Mar-19	0.8	0.06	865	844	-106.5	6.80	26.3	-74.5
	18-Mar-19	1.2	0.10	976	970	-95.7	6.65	24.3	NA
	21-Mar-19	4.1	0.34	995	1003	-57.9	6.54	24.6	-80.0
	22-Mar-19	6.1	0.48	1060	1015	31.4	6.51	27.3	-79.5
	28-Mar-19	3.6	0.32	969	1059	-127.8	6.50	20.5	-35.5
	3-Apr-19	1.1	0.10	858	953	26.4	6.39	19.8	-33.0
	11-Apr-19	0.5	0.05	885	973	-147.8	6.57	20.2	-46.5
	15-Apr-19	0.6	0.06	955	999	-119.1	6.63	22.7	-65.5
	25-Apr-19	1.9	0.17	893	994	-101.2	6.55	19.7	-66.5
	1-May-19	2.8	0.24	871	949	15.3	6.37	21.1	-76.0
	6-May-19	4.3	0.40	857	932	3.0	6.40	20.7	-42.0
	9-May-19	6.0	0.53	951	1011	5.1	6.44	21.9	-107.0
	6-Jun-19	6.6	0.58	1023	1091	85.9	6.35	21.6	-134.5
	5-Jul-19	8.4	0.74	1005	1073	27.7	6.48	21.7	-160.0
	24-Jul-19	5.2	0.41	916	933	-15.2	6.40	24.1	-166.0
	9-Aug-19	14.9	1.40	920	998	34.8	6.38	21.0	-161.5
	14-Aug-19	19.5	1.71	845	904	138.1	6.35	21.6	-122.5
	19-Aug-19	20.6	1.81	831	899	118.0	6.41	21.1	-108.0
	27-Aug-19	15.2	1.35	789	851	15.1	6.52	21.2	-106.0
	9-Sep-19	15.6	1.40	730	803	116.9	6.40	20.2	-118.0
	11-Sep-19	24.4	2.20	706	795	104.0	6.43	19.1	-121.5
	13-Sep-19	10.0	0.89	756	820	86.4	6.30	20.9	-124.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 4C	4-Oct-19	5.3	0.48	906	988	-29.3	6.48	20.5	-96.0
	21-Oct-19	21.9	2.08	896	1059	149.6	6.50	17.6	-85.5
	6-Nov-19	21.3	2.00	867	996	172.5	6.50	18.2	-75.0
	13-Nov-19	29.8	2.73	798	929	175.7	6.44	17.7	-66.5
	18-Nov-19	17.7	1.60	762	887	135.5	6.62	17.6	-55.0
	25-Nov-19	18.1	1.68	744	867	62.3	6.52	17.5	-45.5
	2-Dec-19	27.0	2.69	716	836	116.2	6.70	17.5	-51.0
	4-Dec-19	30.4	2.91	689	819	189.9	6.68	16.6	-39.5
	6-Dec-19	36.9	3.58	713	849	138.3	6.63	16.6	-38.0
	12-Dec-19	33.8	3.16	838	957	113.3	6.55	18.5	-46.0
	20-Dec-19	22.6	2.10	978	1131	1.1	6.63	17.9	-17.0
	27-Dec-19	54.5	5.22	1088	1274	147.8	6.77	17.3	-31.0
	2-Jan-20	6.2	0.58	1191	1366	74.1	6.85	18.3	-41.5
	9-Jan-20	19.0	1.83	1028	1203	67.3	6.74	17.4	-47.0
	13-Jan-20	18.3	1.73	960	1131	182.3	6.61	17.1	-27.0
Cell 5A	7-Feb-19	10.1	0.96	630	640	211.8	7.27	24.2	NA
	14-Feb-19	8.9	0.72	708	724	187.3	7.16	23.8	NA
	20-Feb-19	4.8	0.42	653	696	180.1	7.11	21.7	-199.5
	28-Feb-19	4.7	0.37	647	654	194.6	7.17	24.4	-253.5
	7-Mar-19	16.6	1.54	704	748	114.3	6.84	21.9	-328.0
	14-Mar-19	1.4	0.11	899	871	-5.3	6.46	26.7	-328.0
	21-Mar-19	2.8	0.23	901	902	-10.7	6.24	24.9	-320.0
	22-Mar-19	5.5	0.43	945	905	-3.6	6.21	27.3	-318.5
	28-Mar-19	1.0	0.09	844	921	-92.9	6.18	20.6	-304.5
	3-Apr-19	2.0	0.18	690	776	63.9	6.42	19.1	-300.0
	11-Apr-19	2.1	0.19	737	817	-148.7	6.52	19.9	-284.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 5A	15-Apr-19	1.5	0.13	771	814	-139.1	6.57	22.2	-273.5
	25-Apr-19	0.8	0.07	736	834	-113.2	6.52	18.9	-252.5
	1-May-19	5.1	0.48	729	810	7.8	6.43	20.2	-230.0
	6-May-19	1.7	0.15	717	796	-41.6	6.42	19.8	-226.5
	9-May-19	2.0	0.17	792	858	-43.1	6.50	21.0	-232.0
	6-Jun-19	2.4	0.21	834	890	17.7	6.37	21.7	-222.5
	5-Jul-19	5.4	0.48	834	901	43.3	6.34	21.1	-214.0
	24-Jul-19	1.7	0.15	743	765	-18.0	6.29	23.5	-202.5
	9-Aug-19	4.0	0.36	798	876	44.3	6.34	20.3	-208.5
	14-Aug-19	4.1	0.36	760	826	64.6	6.33	20.9	-227.5
	19-Aug-19	8.3	0.73	749	823	48.2	6.41	20.3	-226.5
	27-Aug-19	6.5	0.57	745	812	22.1	6.48	20.7	-226.5
	9-Sep-19	11.6	1.05	704	778	44.3	6.43	20.0	-221.5
	11-Sep-19	17.7	1.66	699	785	3.7	6.42	19.3	-215.5
	13-Sep-19	12.9	1.13	736	786	44.0	6.42	21.7	-212.0
	8-Oct-19	10.0	0.90	1007	1122	95.6	6.56	19.6	-188.0
	4-Nov-19	11.9	1.14	807	945	94.1	6.45	17.4	-188.0
	3-Dec-19	11.4	1.07	808	942	104.7	6.48	17.6	-226.0
Cell 5B	9-Jan-19	25.6	2.26	1005	1080	132.7	7.47	21.3	NA
	18-Jan-19	22.5	2.03	696	762	194.4	7.21	20.5	NA
	25-Jan-19	22.8	2.06	537	593	158.4	7.29	20.0	NA
	31-Jan-19	18.1	1.64	533	587	187.5	7.28	20.2	NA
	14-Mar-19	0.9	0.07	892	863	-96.6	6.72	26.8	-42.0
	18-Mar-19	0.6	0.05	948	946	-78.2	6.55	25.1	NA
	21-Mar-19	1.1	0.09	950	949	-70.1	6.44	25.1	-42.0
	22-Mar-19	2.9	0.23	980	940	-13.6	6.44	27.2	-51.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 5B	28-Mar-19	0.5	0.05	905	980	-153.5	6.47	21.0	-41.5
	3-Apr-19	0.7	0.06	710	785	17.1	6.48	20.0	-34.0
	11-Apr-19	0.5	0.05	765	848	-194.5	6.58	19.9	-34.5
	15-Apr-19	1.1	0.10	809	848	-182.7	6.65	22.6	-40.0
	25-Apr-19	0.5	0.05	772	867	-149.3	6.57	19.3	-112.5
	1-May-19	4.3	0.40	764	846	-63.3	6.45	20.3	-148.0
	6-May-19	4.1	0.37	759	833	-108.8	6.42	20.4	-159.0
	9-May-19	1.6	0.14	852	915	-80.2	6.46	21.4	-159.0
	6-Jun-19	3.0	0.26	910	956	19.4	6.39	22.4	-150.0
	5-Jul-19	5.9	0.51	934	991	14.5	6.41	22.0	-126.0
	24-Jul-19	1.5	0.12	818	826	-27.2	6.34	24.5	-144.0
	9-Aug-19	4.1	0.36	905	984	35.6	6.38	20.8	-163.0
	14-Aug-19	5.1	0.41	794	858	80.8	6.33	21.1	-147.0
	19-Aug-19	9.1	0.84	788	859	60.1	6.41	20.7	-154.0
	27-Aug-19	8.5	0.73	772	838	15.0	6.48	20.9	-124.0
	9-Sep-19	14.3	1.29	711	786	67.5	6.41	20.1	-124.0
	11-Sep-19	9.4	0.75	696	785	17.4	6.38	19.1	-73.0
	13-Sep-19	7.1	0.62	725	782	29.0	6.36	21.2	-76.0
	8-Oct-19	7.2	0.65	919	1021	52.3	6.48	19.8	25.0
	4-Nov-19	12.1	1.14	942	1085	95.6	6.57	18.1	25.0
	3-Dec-19	10.4	0.97	913	1062	17.9	6.56	17.8	-1.0
Cell 5C	7-Feb-19	48.4	4.17	618	648	212.0	7.36	22.7	NA
	14-Feb-19	8.1	0.70	702	738	188.6	7.18	22.5	NA
	20-Feb-19	9.1	0.82	698	766	190.6	7.13	20.4	-97.0
	28-Feb-19	3.2	0.31	680	704	194.1	7.13	23.2	-79.0
	7-Mar-19	2.3	0.20	634	675	74.1	7.04	21.9	-96.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 5C	14-Mar-19	2.2	0.18	811	795	-106.2	6.91	26.1	-91.0
	18-Mar-19	1.3	0.10	935	937	-92.0	6.79	24.9	NA
	21-Mar-19	0.9	0.08	962	974	-89.4	6.70	24.3	-86.5
	22-Mar-19	3.0	0.24	1026	982	-44.0	6.66	27.4	-85.0
	28-Mar-19	3.2	0.28	947	1035	-158.0	6.69	20.5	-50.0
	3-Apr-19	0.8	0.07	765	847	-77.6	6.59	19.9	-51.0
	11-Apr-19	0.3	0.04	779	860	-203.8	6.71	20.0	-44.0
	15-Apr-19	0.6	0.06	836	876	-185.2	6.70	22.6	-51.0
	25-Apr-19	0.5	0.05	802	902	-150.2	6.71	19.2	-47.0
	1-May-19	2.9	0.23	799	882	-47.9	6.58	20.5	-47.5
	6-May-19	3.4	0.30	796	871	-81.5	6.49	20.5	-47.5
	9-May-19	2.7	0.22	891	953	-45.1	6.52	21.6	-53.0
	6-Jun-19	4.6	0.40	959	1024	53.8	6.51	21.7	-42.0
	5-Jul-19	3.1	0.27	1015	1082	-30.4	6.49	21.7	-46.5
	24-Jul-19	1.2	0.10	874	887	-9.5	6.34	24.3	-46.5
	9-Aug-19	5.3	0.46	990	1074	44.7	6.40	20.8	-29.0
	14-Aug-19	7.1	0.63	842	904	99.0	6.30	21.3	-28.5
	19-Aug-19	10.5	0.96	828	897	31.8	6.40	21.0	-18.0
	27-Aug-19	5.5	0.50	814	878	48.0	6.46	21.2	-15.5
	9-Sep-19	15.6	1.41	724	796	72.9	6.36	20.2	-14.5
	11-Sep-19	11.3	1.04	698	786	-10.1	6.36	19.2	-9.0
	13-Sep-19	13.9	1.23	732	792	98.0	6.35	21.1	-9.5
	8-Oct-19	6.9	0.64	812	918	41.2	6.39	19.0	-6.5
	4-Nov-19	10.9	1.03	1083	1248	159.9	6.70	18.1	-6.5
	3-Dec-19	11.2	1.04	1069	1238	-23.6	6.59	17.7	-10.0
Cell 6A	7-Feb-19	62.1	5.11	675	685	209.1	7.40	24.3	NA

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 6A	14-Feb-19	8.7	0.71	723	727	126.8	7.17	24.7	NA
	20-Feb-19	9.9	0.93	652	686	156.1	7.20	22.5	-112.0
	28-Feb-19	34.3	2.87	586	587	196.4	7.18	24.9	-118.0
	7-Mar-19	25.9	2.25	710	747	182.7	6.94	22.5	-124.0
	14-Mar-19	8.0	0.64	919	884	7.0	6.48	27.1	-146.5
	18-Mar-19	6.2	0.51	927	928	-21.5	6.29	25.0	NA
	21-Mar-19	14.6	1.22	902	921	-7.9	6.35	23.9	-124.5
	22-Mar-19	22.5	1.82	941	922	-1.7	6.33	26.0	-115.0
	28-Mar-19	13.9	1.25	821	903	-43.7	6.06	20.3	-113.5
	3-Apr-19	17.2	1.68	699	783	86.6	6.46	19.4	-113.0
	11-Apr-19	12.3	1.09	738	823	-70.1	6.51	19.7	-113.5
	15-Apr-19	10.2	0.99	768	818	-51.3	6.52	21.8	-108.0
	25-Apr-19	7.3	0.68	719	823	-50.7	6.53	18.4	-68.0
	1-May-19	8.6	0.79	712	797	59.1	6.38	20.0	-147.0
	6-May-19	8.0	0.71	722	784	-8.3	6.43	20.9	-157.5
	9-May-19	20.9	1.86	784	839	-56.5	6.50	21.5	-127.0
	6-Jun-19	13.2	1.14	842	888	25.1	6.35	22.2	-90.5
	5-Jul-19	22.2	1.94	798	846	37.6	6.42	22.0	-98.5
	24-Jul-19	1.5	0.12	748	762	-29.6	6.31	24.0	-109.5
	9-Aug-19	11.8	1.06	777	846	49.1	6.36	20.7	-96.5
	14-Aug-19	7.2	0.63	767	825	55.1	6.34	21.4	-99.0
	19-Aug-19	9.3	0.82	758	816	49	6.41	21.0	-94.0
	27-Aug-19	5.8	0.51	771	833	13	6.44	21.2	-87.5
	9-Sep-19	12.2	1.08	711	782	40	6.40	20.2	-99.5
	11-Sep-19	18.8	1.64	704	783	12	6.38	19.8	-101.5
	13-Sep-19	11.3	1.00	727	786	25	6.34	21.1	-100.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 6A	4-Oct-19	6.1	0.55	744	827	-5	6.36	19.8	-82.5
	21-Oct-19	19.4	1.83	744	858	59	6.48	18.0	-54.5
	6-Nov-19	24.2	2.31	714	834	50	6.45	27.4	-79.5
	13-Nov-19	19.3	1.87	718	851	143	6.48	16.8	-80.0
	18-Nov-19	10.4	0.99	706	840	51	6.68	16.6	-80.0
	25-Nov-19	20.1	1.91	725	853	51	6.63	17.1	-86.0
	2-Dec-19	29.4	2.72	686	801	104	6.73	17.4	-76.5
	4-Dec-19	25.1	2.39	685	808	186	6.65	17.0	-75.5
	6-Dec-19	38.3	3.74	697	831	137	6.72	16.5	-71.5
	12-Dec-19	28.6	2.76	776	916	61	6.54	17.0	-74.5
	19-Dec-19	6.5	0.78	633	952	-19	6.67	7.0	-37.0
Cell 6B	31-Jan-19	45.2	3.98	464	518	176	7.25	19.6	NA
	14-Mar-19	22.2	1.76	898	861	-2	6.82	27.3	-189.5
	21-Mar-19	14.0	1.18	949	973	-15	6.55	23.7	-191.0
	22-Mar-19	24.6	1.95	1016	978	22	6.53	27.0	-192.0
	28-Mar-19	19.6	1.76	883	966	-91	6.43	20.5	-190.5
	3-Apr-19	17.6	1.72	691	772	65	6.54	19.5	-187.5
	11-Apr-19	7.7	0.71	755	845	-89	6.54	19.4	-192.5
	15-Apr-19	16.0	1.42	797	849	-59	6.60	21.8	-184.0
	25-Apr-19	8.7	0.83	746	843	-60	6.59	19.0	-168.0
	1-May-19	10.8	0.99	728	810	56	6.46	20.1	-170.5
	6-May-19	13.1	1.17	722	792	-30	6.45	20.3	-160.0
	9-May-19	16.0	1.49	790	856	-67	6.48	20.9	-163.0
	6-Jun-19	19.5	1.68	911	954	171	6.48	22.6	-165.0
	5-Jul-19	10.7	0.94	830	880	-51	6.39	22.0	-193.5
	24-Jul-19	7.0	0.56	806	811	-40	6.35	24.7	-198.5

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 6B	9-Aug-19	18.3	1.64	838	900	46	6.36	21.3	-195.0
	14-Aug-19	22.0	1.86	790	844	51	6.40	21.6	-166.0
	19-Aug-19	26.5	2.35	776	830	86	6.44	21.6	-191.5
	27-Aug-19	17.3	1.53	797	862	13	6.52	21.1	-186.0
	9-Sep-19	14.0	1.24	713	785	52	6.42	20.2	-183.0
	11-Sep-19	12.1	1.12	696	782	15	6.40	19.3	-180.0
	13-Sep-19	15.5	1.40	722	786	48	6.34	20.7	-178.0
	4-Oct-19	19.2	1.74	807	890	18	6.43	20.1	-179.0
	21-Oct-19	19.7	1.86	798	918	72	6.51	18.1	-168.0
	6-Nov-19	30.0	2.85	767	889	159	6.47	17.8	-167.0
	13-Nov-19	24.7	2.36	753	882	157	6.46	17.4	-168.0
	18-Nov-19	15.1	1.42	732	862	120	6.63	17.0	-168.0
	25-Nov-19	15.9	1.58	720	844	83	6.62	17.3	-168.5
	2-Dec-19	25.0	2.29	693	806	158	6.68	17.7	-168.5
	4-Dec-19	27.6	2.48	678	804	201	6.72	16.8	-166.0
	6-Dec-19	37.7	3.64	704	836	148	6.68	16.7	-165.0
	12-Dec-19	29.3	2.76	798	926	71	6.55	17.8	-167.0
	19-Dec-19	7.3	0.81	850	1189	8	6.60	9.2	-77.5
Cell 6C	25-Jan-19	47.3	4.26	574	643	166	7.53	19.4	NA
	14-Feb-19	9.5	0.80	729	751	120	7.36	23.5	NA
	20-Feb-19	7.6	0.72	686	722	143	7.31	22.4	-199.5
	28-Feb-19	61.5	5.08	635	651	193	7.36	23.7	-213.5
	7-Mar-19	25.4	2.17	621	646	175	7.25	23.0	-217.5
	14-Mar-19	27.1	2.17	801	780	104	7.21	26.4	-216.5
	18-Mar-19	17.7	1.47	921	926	60	7.01	24.7	NA
	21-Mar-19	16.7	1.41	953	978	85	6.93	23.7	-215.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Cell 6C	22-Mar-19	42.1	3.38	1017	991	37	6.96	26.3	-217.5
	28-Mar-19	13.8	1.23	933	1014	-72	6.69	20.9	-217.5
	3-Apr-19	18.5	1.61	704	786	15	6.69	19.5	-203.0
	11-Apr-19	10.1	0.99	767	846	-104	6.64	20.1	-211.0
	15-Apr-19	30.9	2.97	824	863	-69	6.68	22.6	-221.5
	25-Apr-19	14.3	1.38	761	855	-79	6.65	19.2	-220.5
	1-May-19	18.0	1.58	750	816	60	6.53	21.2	-213.5
	6-May-19	18.5	1.64	745	802	-44	6.54	21.3	-198.0
	9-May-19	18.6	1.61	812	870	-66	6.54	21.6	-199.0
	6-Jun-19	19.5	1.73	919	997	164	6.48	20.9	-168.0
	5-Jul-19	8.8	0.76	861	905	4	6.47	22.5	-169.0
	24-Jul-19	3.9	0.31	834	842	-46	6.36	24.5	-173.0
	9-Aug-19	7.4	0.65	868	935	34	6.38	21.2	-161.0
	14-Aug-19	7.6	0.65	818	870	15	6.37	21.9	-161.0
	19-Aug-19	15.8	1.41	791	846	52	6.42	21.6	-131.0
	27-Aug-19	34.4	3.08	813	873	15	6.57	21.4	-202.0
	9-Sep-19	22.6	1.99	722	792	32	6.45	20.4	-195.0
	11-Sep-19	27.5	2.41	701	790	-4	6.43	19.1	-188.0
	13-Sep-19	22.6	1.97	718	785	32	6.44	20.5	-184.0
	4-Oct-19	15.1	1.37	843	925	12	6.50	20.3	-169.0
	21-Oct-19	29.0	2.73	839	969	53	6.56	18.0	-147.0
	6-Nov-19	45.6	4.28	807	927	156	6.53	18.2	-154.0
	13-Nov-19	34.0	3.22	787	916	148	6.48	17.6	-163.0
	18-Nov-19	33.9	3.21	742	866	137	6.69	17.5	-163.0
	25-Nov-19	29.8	2.66	723	842	114	6.64	17.5	-191.0
	2-Dec-19	32.3	3.04	706	822	157	6.70	17.6	-182.0

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field (µS/cm)	Specific Conductivity - Field (µS/cm)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature (°C)	Soil Redox (mV)
Cell 6C	4-Dec-19	37.6	3.54	685	810	203	6.71	16.9	-177.0
	6-Dec-19	47.7	4.60	711	841	149	6.70	16.9	-172.0
	12-Dec-19	54.1	5.08	795	913	63	6.60	18.2	-175.0
	19-Dec-19	9.1	1.05	826	1202	43	6.63	8.4	-34.0
Influent	14-Mar-19	89.9	7.25	840	820	182	6.45	26.3	NA
	21-Mar-19	85.9	7.03	870	863	139	7.30	25.5	NA
	22-Mar-19	105.6	9.18	810	856	340	5.67	22.2	NA
	28-Mar-19	103.4	9.19	787	851	378	4.47	21.1	NA
	3-Apr-19	101.9	8.74	754	788	157	7.60	22.7	NA
	11-Apr-19	105.4	9.11	740	778	191	7.08	22.5	NA
	15-Apr-19	98.9	8.37	762	788	214	6.79	23.3	NA
	25-Apr-19	110.1	10.93	652	793	329	7.30	15.7	NA
	1-May-19	99.4	8.55	751	776	145	7.00	23.5	NA
	6-May-19	74.5	6.17	768	770	76	7.72	24.8	NA
	9-May-19	98.6	8.43	752	779	147	7.12	22.6	NA
	6-Jun-19	78.7	6.90	792	843	219	7.84	21.8	NA
	5-Jul-19	87.6	7.41	804	826	104	8.05	23.6	NA
	24-Jul-19	95.1	7.78	734	726	74	7.80	25.5	NA
	9-Aug-19	94.3	8.21	759	807	119	7.50	21.9	NA
	14-Aug-19	90.1	7.62	788	813	174	7.14	23.4	NA
	19-Aug-19	92.6	8.41	741	800	232	6.91	22.8	NA
	27-Aug-19	89.4	7.96	730	772	202	6.90	22.0	NA
	9-Sep-19	188.8	16.61	1474	1552	411	7.46	45.2	NA
	11-Sep-19	177.2	16.88	1448	1545	307	6.95	41.8	NA
	13-Sep-19	190.4	17.02	1448	1564	418	6.97	42.1	NA
	4-Oct-19	90.1	7.72	732	762	108	7.94	22.9	NA

Sample Point	Date	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Conductivity - Field ($\mu\text{S}/\text{cm}$)	Specific Conductivity - Field ($\mu\text{S}/\text{cm}$)	Oxidation Reduction Potential (mV)	pH - Field (pH)	Temperature ($^{\circ}\text{C}$)	Soil Redox (mV)
Influent	8-Oct-19	90.5	7.57	799	806	141	8.04	24.4	NA
	21-Oct-19	88.7	8.01	734	806	315	7.25	20.3	NA
	4-Nov-19	90.9	8.26	762	852	308	7.18	19.5	NA
	13-Nov-19	91.2	8.36	734	823	445	7.10	19.4	NA
	18-Nov-19	83.6	7.47	762	831	153	7.90	20.7	NA
	25-Nov-19	88.6	8.31	682	844	190	7.28	19.9	NA
	2-Dec-19	89.6	7.98	648	790	180	7.39	19.9	NA
	3-Dec-19	90.6	8.44	773	908	181	7.04	20.1	NA
	4-Dec-19	90.6	8.37	682	844	189	7.11	19.9	NA
	6-Dec-19	99.7	9.06	722	816	347	6.72	19.0	NA
	6-Jan-20	100.1	9.26	752	850	163	7.25	19.0	NA
	9-Jan-20	92.1	8.39	752	839	151	7.23	19.6	NA
	13-Jan-20	95.6	8.77	668	747	209	7.10	20.1	NA

NA: measurements not taken (cells) or not applicable (influent).

A2. TREATMENT

Table A2-1: Average Removal Rate Coefficients for Each Flow Period

Series	Operational Stage 1			Operational Stage 2			
	Low Flow	Medium Flow	High Flow	Very Low Flow	Low Flow	Medium Flow	High Flow
<i>Ammonia</i>							
1	--	--	--	--	0.14	0.78	1.35
2	--	--	--	0.31	--	--	--
3	--	--	--	--	0.14	0.88	1.60
4	--	--	--	--	0.15	0.76	3.01
5	--	--	--	0.28	--	--	--
6	--	--	--	--	0.21	0.73	3.01
<i>Antimony</i>							
1	0.03	0.03	0.02	--	0.03	0.01	0.002
2	0.03	0.02	0.02	0.02	--	--	--
3	0.04	0.04	0.01	--	0.05	0.02	0.003
4	0.22	0.21	0.14	--	0.10	0.11	0.025
5	0.21	0.36	0.09	0.12	--	--	--
6	0.15	0.15	0.06	--	0.09	0.08	0.005
<i>Arsenic</i>							
1	0.06	0.13	0.11	--	0.04	0.06	0.04
2	0.08	0.12	0.10	0.03	--	--	--
3	0.07	0.12	0.09	--	0.05	0.06	0.06
4	0.21	0.45	0.48	--	0.11	0.25	0.37
5	0.17	0.54	0.63	0.09	--	--	--
6	0.16	0.36	0.44	--	0.10	0.20	0.26

Series	Operational Stage 1			Operational Stage 2			
	Low Flow	Medium Flow	High Flow	Very Low Flow	Low Flow	Medium Flow	High Flow
<i>Cadmium</i>							
1	0.25	0.51	0.43	--	0.11	0.37	0.54
2	0.22	0.60	0.64	0.09	--	--	--
3	0.28	0.57	0.67	--	0.14	0.41	0.56
4	0.55	1.08	1.55	--	0.39	0.96	1.83
5	0.53	0.95	1.26	0.30	--	--	--
6	0.46	0.95	1.88	--	0.37	0.82	1.94
<i>Copper</i>							
1	0.14	0.45	1.18	--	0.08	0.40	1.47
2	0.14	0.56	1.32	0.08	--	--	--
3	0.14	0.50	1.30	--	0.09	0.42	1.51
4	0.25	0.78	1.62	--	0.21	0.64	2.05
5	0.29	0.81	1.28	0.18	--	--	--
6	0.28	0.70	1.47	--	0.19	0.52	1.71
<i>Nickel</i>							
1	0.08	0.15	0.09	--	0.04	0.21	0.07
2	0.08	0.15	0.07	0.03	--	--	--
3	0.09	0.15	0.04	--	0.03	0.18	0.03
4	0.12	0.23	0.22	--	0.04	0.23	0.22
5	0.13	0.31	0.24	0.05	--	--	--
6	0.12	0.25	0.28	--	0.05	0.24	0.30

Series	Operational Stage 1			Operational Stage 2			
	Low Flow	Medium Flow	High Flow	Very Low Flow	Low Flow	Medium Flow	High Flow
<i>Nitrate</i>							
1	0.35	0.66	0.00	--	0.28	0.10	0.00
2	0.54	0.70	1.20	0.27	--	--	--
3	0.78	1.13	0.95	--	0.81	0.71	0.37
4	0.41	1.28	2.69	--	0.49	1.45	3.48
5	0.44	1.18	2.34	0.34	--	--	--
6	0.47	1.34	3.19	--	0.45	1.35	3.45
<i>Nitrite</i>							
1	0.10	0.19	0.64	--	0.30	0.22	1.03
2	0.35	1.02	1.80	0.23	--	--	--
3	0.31	0.05	1.50	--	0.62	0.43	1.14
4	0.30	0.06	4.01	--	0.67	0.87	5.26
5	0.32	0.05	2.25	0.33	--	--	--
6	0.34	0.03	2.27	--	0.67	0.37	5.89
<i>Lead</i>							
1	0.49	1.09	2.87	--	0.45	1.01	2.85
2	0.62	1.36	3.12	0.39	--	--	--
3	0.62	1.31	3.09	--	0.50	1.11	2.97
4	0.66	1.36	3.18	--	0.41	1.12	3.13
5	0.58	1.20	2.44	0.31	--	--	--
6	0.62	1.34	3.09	--	0.44	1.04	3.11
<i>Selenium</i>							
1	0.05	0.04	0.02	--	0.05	0.02	0.02
2	0.05	0.06	0.04	0.03	--	--	--
3	0.07	0.06	0.04	--	0.09	0.04	0.02
4	0.24	0.38	0.31	--	0.16	0.25	0.20
5	0.23	0.62	0.48	0.17	--	--	--
6	0.22	0.32	0.28	--	0.16	0.19	0.13

Series	Operational Stage 1			Operational Stage 2			
	Low Flow	Medium Flow	High Flow	Very Low Flow	Low Flow	Medium Flow	High Flow
<i>Thallium</i> ¹							
1	NA	NA	NA	--	NA	NA	NA
2	NA	NA	NA	NA	--	--	--
3	NA	NA	NA	--	NA	NA	NA
4	NA	NA	NA	--	NA	NA	NA
5	NA	NA	NA	NA	--	--	--
6	NA	NA	NA	--	NA	NA	NA
<i>Uranium</i>							
1	0.03	0.09	0.25	--	0.02	0.05	0.11
2	0.06	0.16	0.30	0.01	--	--	--
3	0.09	0.20	0.37	--	0.02	0.10	0.08
4	0.30	0.52	0.71	--	0.08	0.25	0.17
5	0.34	0.74	0.79	0.06	--	--	--
6	0.22	0.46	0.74	--	0.07	0.20	0.13
<i>Zinc</i>							
1	0.14	0.19	0.04	--	0.07	0.19	0.08
2	0.12	0.20	0.07	0.04	--	--	--
3	0.15	0.21	0.11	--	0.08	0.19	0.07
4	0.33	0.59	0.59	--	0.21	0.49	0.63
5	0.32	0.78	0.77	0.16	--	--	--
6	0.35	0.65	0.77	--	0.17	0.48	0.82

All removal rate coefficients are first order (day⁻¹). Bulrush series: 1, 2, 3; Water sedge series: 4, 5, 6.

'--' not measured in that flow period. NA could not be calculated due to low concentrations.

¹ There was insufficient resolution to confidently determine the RRC for Thallium; however, thallium treatment is not needed in the CWTS.

Table A2-2: Rate Removal Coefficients Calculated for Each Sampling Event

Series	Operational Stage 1										Operational Stage 2											
	Low Flow				Medium Flow			High Flow			Very Low Flow			Low Flow			Medium Flow			High Flow		
	Jun 6	Jul 5	Jul 24	Aug 9	Aug 14	Aug 19	Aug 27	Sep 9	Sep 11	Sep 13	Oct 8	Nov 4	Dec 3	Oct 4	Oct 21	Nov 6	Nov 13	Nov 18	Nov 25	Dec 2	Dec 4	Dec 6
<i>Ammonia</i>																						
Series 1	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.22	0.20	0.77	0.91	0.65	1.29	1.36	1.40
Series 2	--	--	--	--	--	--	--	--	--	--	0	0.45	0.46	--	--	--	--	--	--	--	--	--
Series 3	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.18	0.23	0.89	1.01	0.73	1.98	1.57	1.24
Series 4	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.22	0.23	0.73	0.91	0.64	2.84	3.06	3.12
Series 5	--	--	--	--	--	--	--	--	--	--	0	0.29	0.55	--	--	--	--	--	--	--	--	--
Series 6	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.17	0.25	0.68	0.81	0.70	2.54	3.25	3.25
<i>Antimony</i>																						
Series 1	0.04	0.02	0.03	0.04	0.04	0.00	0.03	0.01	0.02	0.02	--	--	--	0.02	0.04	0.04	0.02	0.00	0.01	0.00	0.00	0.01
Series 2	0.03	0.03	0.03	0.04	0.03	0.00	0.03	0.01	0.01	0.03	0.02	0.01	0.02	--	--	--	--	--	--	--	--	--
Series 3	0.05	0.04	0.04	0.05	0.05	0.00	0.03	0.00	0.00	0.01	--	--	--	0.04	0.06	0.05	0.02	0.01	0.01	0.00	0.00	0.01
Series 4	0.17	0.19	0.22	0.29	0.21	0.17	0.24	0.21	0.10	0.11	--	--	--	0.11	0.10	0.09	0.11	0.10	0.12	0.04	0.00	0.03
Series 5	0.22	0.19	0.19	0.25	0.31	0.34	0.45	0.16	0.07	0.05	0.14	0.10	0.12	--	--	--	--	--	--	--	--	--
Series 6	0.17	0.13	0.15	0.15	0.13	0.08	0.24	0.09	0.06	0.04	--	--	--	0.10	0.09	0.09	0.12	0.05	0.07	0.01	0.00	0.00
<i>Arsenic</i>																						
Series 1	0.05	0.06	0.06	0.08	0.15	0.13	0.11	0.11	0.10	0.11	--	--	--	0.04	0.05	0.04	0.07	0.05	0.05	0.03	0.03	0.07
Series 2	0.07	0.10	0.07	0.07	0.11	0.12	0.12	0.11	0.10	0.09	0.03	0.03	0.02	--	--	--	--	--	--	--	--	--
Series 3	0.07	0.08	0.07	0.08	0.11	0.14	0.11	0.10	0.08	0.09	--	--	--	0.04	0.05	0.04	0.07	0.06	0.05	0.06	0.05	0.08
Series 4	0.14	0.22	0.23	0.24	0.39	0.53	0.42	0.55	0.46	0.42	--	--	--	0.10	0.12	0.11	0.28	0.24	0.22	0.46	0.32	0.32
Series 5	0.11	0.17	0.17	0.24	0.50	0.54	0.56	0.74	0.59	0.54	0.10	0.09	0.10	--	--	--	--	--	--	--	--	--
Series 6	0.12	0.18	0.15	0.17	0.31	0.36	0.41	0.52	0.43	0.36	--	--	--	0.09	0.10	0.11	0.26	0.17	0.19	0.33	0.21	0.24

Series	Operational Stage 1										Operational Stage 2											
	Low Flow				Medium Flow			High Flow			Very Low Flow			Low Flow			Medium Flow			High Flow		
	Jun 6	Jul 5	Jul 24	Aug 9	Aug 14	Aug 19	Aug 27	Sep 9	Sep 11	Sep 13	Oct 8	Nov 4	Dec 3	Oct 4	Oct 21	Nov 6	Nov 13	Nov 18	Nov 25	Dec 2	Dec 4	Dec 6
<i>Cadmium</i>																						
Series 1	0.24	0.24	0.22	0.30	0.57	0.51	0.44	0.58	0.38	0.33	--	--	--	0.08	0.12	0.13	0.40	0.38	0.32	0.66	0.52	0.44
Series 2	0.20	0.24	0.19	0.25	0.67	0.62	0.50	0.75	0.66	0.51	0.09	0.08	0.10	--	--	--	--	--	--	--	--	--
Series 3	0.29	0.31	0.27	0.26	0.62	0.55	0.54	0.91	0.62	0.46	--	--	--	0.11	0.15	0.16	0.45	0.41	0.36	0.75	0.52	0.42
Series 4	0.44	0.53	0.62	0.62	1.11	1.09	1.04	1.72	1.54	1.38	--	--	--	0.37	0.39	0.41	1.02	0.95	0.93	2.18	1.79	1.53
Series 5	0.43	0.51	0.54	0.66	0.90	0.88	1.08	1.31	1.24	1.24	0.32	0.28	0.31	--	--	--	--	--	--	--	--	--
Series 6	0.44	0.47	0.43	0.49	0.91	0.95	0.98	2.18	1.80	1.65	--	--	--	0.33	0.34	0.44	0.83	0.74	0.90	2.36	1.83	1.64
<i>Copper</i>																						
Series 1	0.11	0.13	0.16	0.17	0.55	0.34	0.46	1.23	1.10	1.20	--	--	--	0.05	0.09	0.10	0.40	0.40	0.38	1.38	1.02	2.01
Series 2	0.12	0.13	0.13	0.16	0.62	0.58	0.50	1.33	1.27	1.35	0.07	0.07	0.08	--	--	--	--	--	--	--	--	--
Series 3	0.13	0.15	0.14	0.16	0.53	0.48	0.50	1.35	1.22	1.32	--	--	--	0.06	0.09	0.11	0.44	0.42	0.41	1.45	1.07	2.02
Series 4	0.18	0.17	0.34	0.33	0.78	0.81	0.76	1.64	1.59	1.64	--	--	--	0.20	0.21	0.23	0.67	0.62	0.63	1.98	1.63	2.56
Series 5	0.26	0.19	0.34	0.37	0.81	0.81	0.81	1.36	1.21	1.27	0.19	0.18	0.18	--	--	--	--	--	--	--	--	--
Series 6	0.23	0.27	0.30	0.31	0.66	0.70	0.75	1.54	1.39	1.48	--	--	--	0.17	0.20	0.22	0.57	0.45	0.55	1.67	1.22	2.24
<i>Nickel</i>																						
Series 1	0.08	0.09	0.08	0.08	0.18	0.14	0.13	0.19	0.04	0.04	--	--	--	0.02	0.04	0.06	0.44	0.11	0.09	0.11	0.06	0.05
Series 2	0.09	0.08	0.07	0.07	0.19	0.15	0.12	0.09	0.09	0.04	0.02	0.03	0.03	--	--	--	--	--	--	--	--	--
Series 3	0.09	0.10	0.09	0.08	0.19	0.13	0.13	0.11	0.01	0.00	--	--	--	0.01	0.04	0.05	0.43	0.06	0.05	0.06	0.01	0.02
Series 4	0.09	0.12	0.12	0.14	0.26	0.22	0.21	0.28	0.23	0.16	--	--	--	0.03	0.05	0.06	0.43	0.13	0.13	0.28	0.23	0.14
Series 5	0.13	0.12	0.12	0.15	0.33	0.29	0.30	0.30	0.23	0.18	0.05	0.04	0.05	--	--	--	--	--	--	--	--	--
Series 6	0.10	0.14	0.12	0.13	0.26	0.24	0.25	0.42	0.25	0.18	--	--	--	0.04	0.05	0.07	0.42	0.13	0.17	0.38	0.31	0.21

Series	Operational Stage 1										Operational Stage 2											
	Low Flow				Medium Flow			High Flow			Very Low Flow			Low Flow			Medium Flow			High Flow		
	Jun 6	Jul 5	Jul 24	Aug 9	Aug 14	Aug 19	Aug 27	Sep 9	Sep 11	Sep 13	Oct 8	Nov 4	Dec 3	Oct 4	Oct 21	Nov 6	Nov 13	Nov 18	Nov 25	Dec 2	Dec 4	Dec 6
<i>Nitrate</i>																						
Series 1	0.43	0.44	0.33	0.21	1.12	0.63	0.23	0.00	0.00	0.00	--	--	--	0.20	0.40	0.24	0.10	0.00	0.00	0.00	0.00	0.00
Series 2	0.97	0.49	0.42	0.29	1.02	0.69	0.40	2.23	0.48	0.88	0.33	0.23	0.26	--	--	--	--	--	--	--	--	--
Series 3	0.76	0.81	0.85	0.68	1.20	1.00	1.18	1.47	1.11	0.26	--	--	--	0.91	0.59	0.93	0.88	0.70	0.56	0.37	0.21	0.05
Series 4	0.34	0.45	0.48	0.38	1.34	1.07	1.44	2.09	3.09	2.89	--	--	--	0.51	0.49	0.47	1.47	1.38	1.49	3.62	3.46	3.36
Series 5	0.50	0.43	0.44	0.40	1.27	1.02	1.25	2.04	3.09	1.90	0.39	0.31	0.31	--	--	--	--	--	--	--	--	--
Series 6	0.42	0.57	0.48	0.40	1.30	1.13	1.58	2.18	4.49	2.91	--	--	--	0.49	0.33	0.51	1.33	1.17	1.56	3.53	3.45	3.36
<i>Nitrite</i>																						
Series 1	0.16	0.04	0.17	0.03	0.00	0.25	0.34	0.00	1.43	0.49	--	--	--	0.43	0.00	0.16	0.09	0.52	0.04	1.13	1.06	0.89
Series 2	0.53	0.0	0.42	0.10	0.40	0.72	1.93	1.76	1.90	1.75	0.49	0.04	0.18	--	--	--	--	--	--	--	--	--
Series 3	0.51	0.14	0.51	0.10	0.05	0.00	0.71	1.10	2.31	1.09	--	--	--	0.90	0.00	0.34	0.33	0.82	0.16	1.19	1.19	1.05
Series 4	0.38	0.13	0.57	0.11	0.06	0.00	0.00	0.00	4.86	3.17	--	--	--	1.01	0.00	0.33	0.60	1.52	0.50	5.07	4.53	6.18
Series 5	0.54	0.12	0.52	0.12	0.05	0.00	0.00	0.00	3.84	0.66	0.73	0.04	0.23	--	--	--	--	--	--	--	--	--
Series 6	0.52	0.16	0.57	0.12	0.03	0.00	0.00	0.00	1.75	2.79	--	--	--	0.97	0.00	0.36	0.55	0.55	0.00	4.08	5.86	7.73
<i>Lead</i>																						
Series 1	0.41	0.56	0.54	0.46	1.12	0.99	1.15	2.63	2.98	2.99	--	--	--	0.43	0.43	0.51	1.00	1.02	1.00	2.84	2.68	3.03
Series 2	0.60	0.68	0.56	0.63	1.33	1.36	1.38	3.12	3.06	3.20	0.40	0.38	0.38	--	--	--	--	--	--	--	--	--
Series 3	0.59	0.72	0.43	0.72	1.23	1.26	1.43	2.99	3.11	3.18	--	--	--	0.47	0.44	0.58	1.12	1.10	1.12	3.03	2.75	3.11
Series 4	0.47	0.60	0.76	0.82	1.33	1.37	1.39	3.08	3.24	3.24	--	--	--	0.45	0.36	0.41	1.11	1.11	1.15	3.28	2.84	3.28
Series 5	0.47	0.57	0.61	0.65	1.19	1.14	1.26	2.25	2.56	2.50	0.32	0.29	0.30	--	--	--	--	--	--	--	--	--
Series 6	0.50	0.64	0.61	0.72	1.16	1.36	1.49	2.97	3.17	3.13	--	--	--	0.45	0.42	0.46	1.09	0.85	1.17	3.16	2.78	3.40

Series	Operational Stage 1										Operational Stage 2											
	Low Flow				Medium Flow			High Flow			Very Low Flow			Low Flow			Medium Flow			High Flow		
	Jun 6	Jul 5	Jul 24	Aug 9	Aug 14	Aug 19	Aug 27	Sep 9	Sep 11	Sep 13	Oct 8	Nov 4	Dec 3	Oct 4	Oct 21	Nov 6	Nov 13	Nov 18	Nov 25	Dec 2	Dec 4	Dec 6
<i>Selenium</i>																						
Series 1	0.04	0.04	0.05	0.06	0.06	0.03	0.03	0.01	0.00	0.04	--	--	--	0.03	0.07	0.05	0.04	0.01	0.02	0.00	0.00	0.06
Series 2	0.03	0.05	0.05	0.06	0.07	0.05	0.05	0.05	0.03	0.04	0.05	0.02	0.03	--	--	--	--	--	--	--	--	--
Series 3	0.06	0.06	0.07	0.09	0.09	0.05	0.05	0.04	0.03	0.05	--	--	--	0.07	0.11	0.08	0.06	0.03	0.03	0.02	0.01	0.04
Series 4	0.17	0.21	0.24	0.35	0.36	0.38	0.39	0.39	0.26	0.27	--	--	--	0.16	0.17	0.16	0.26	0.24	0.26	0.30	0.11	0.20
Series 5	0.22	0.20	0.22	0.26	0.58	0.64	0.63	0.58	0.43	0.41	0.18	0.14	0.17	--	--	--	--	--	--	--	--	--
Series 6	0.20	0.22	0.22	0.24	0.29	0.29	0.40	0.30	0.27	0.26	--	--	--	0.16	0.16	0.17	0.24	0.13	0.19	0.19	0.06	0.15
<i>Thallium¹</i>																						
Series 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Series 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
Series 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Series 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Series 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
Series 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
<i>Uranium</i>																						
Series 1	0.04	0.02	0.02	0.04	0.15	0.08	0.03	0.14	0.37	0.24	--	--	--	0.00	0.02	0.03	0.11	0.03	0.01	0.0	0.12	0.11
Series 2	0.05	0.06	0.06	0.09	0.24	0.15	0.09	0.38	0.24	0.27	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--
Series 3	0.11	0.10	0.08	0.10	0.28	0.20	0.11	0.31	0.44	0.34	--	--	--	0.00	0.02	0.03	0.17	0.03	0.0	0.0	0.08	0.07
Series 4	0.25	0.26	0.31	0.38	0.63	0.51	0.41	0.86	0.66	0.60	--	--	--	0.07	0.08	0.09	0.35	0.23	0.16	0.20	0.14	0.18
Series 5	0.37	0.33	0.34	0.32	0.83	0.71	0.67	1.01	0.76	0.59	0.07	0.05	0.06	--	--	--	--	--	--	--	--	--
Series 6	0.18	0.26	0.22	0.22	0.52	0.46	0.40	0.89	0.77	0.58	--	--	--	0.05	0.07	0.10	0.34	0.13	0.13	0.12	0.11	0.14

Series	Operational Stage 1										Operational Stage 2											
	Low Flow				Medium Flow			High Flow			Very Low Flow			Low Flow			Medium Flow			High Flow		
	Jun 6	Jul 5	Jul 24	Aug 9	Aug 14	Aug 19	Aug 27	Sep 9	Sep 11	Sep 13	Oct 8	Nov 4	Dec 3	Oct 4	Oct 21	Nov 6	Nov 13	Nov 18	Nov 25	Dec 2	Dec 4	Dec 6
<i>Zinc</i>																						
Series 1	0.15	0.14	0.14	0.14	0.25	0.17	0.15	0.08	0.00	0.01	--	--	--	0.05	0.08	0.09	0.27	0.19	0.12	0.12	0.00	0.03
Series 2	0.13	0.14	0.10	0.12	0.26	0.17	0.15	0.06	0.10	0.06	0.04	0.04	0.04	--	--	--	--	--	--	--	--	--
Series 3	0.15	0.18	0.14	0.13	0.29	0.18	0.17	0.11	0.00	0.00	--	--	--	0.05	0.09	0.11	0.27	0.17	0.12	0.15	0.02	0.05
Series 4	0.27	0.30	0.33	0.42	0.64	0.58	0.56	0.71	0.55	0.49	--	--	--	0.19	0.21	0.22	0.58	0.48	0.41	0.87	0.59	0.45
Series 5	0.30	0.25	0.32	0.42	0.73	0.76	0.85	0.90	0.73	0.69	0.17	0.16	0.16	--	--	--	--	--	--	--	--	--
Series 6	0.34	0.37	0.30	0.38	0.66	0.63	0.65	1.04	0.68	0.60	--	--	--	0.16	0.17	0.20	0.50	0.44	0.51	1.17	0.73	0.56

Bulrush series: 1, 2, 3; Water sedge series: 4, 5, 6.

All sampling events occurred in 2019.

'--' not measured in that sampling event. NA could not be calculated due to low concentrations.

¹ There was insufficient resolution to confidently determine the RRC for Thallium; however, thallium treatment is not needed in the CWTS.

A1. STAGNATION TESTING

Table A1-1: Water Loss During Stagnation Trials Measured as Increase in Depth From Top of Cell Barrel to Water Surface in cm

Date	Depth from top of cell to water in cm					
	1A	1B	1C	4A	4B	4C
13-Dec-19 Initial Depth	9.3	9.2	9	7.5	7.2	7.4
14-Dec-19	10.0	9.9	9.8	8.5	8.4	8.6
15-Dec-19	10.4	10.3	10.2	9.0	9.0	9.1
16-Dec-19	10.4	10.3	10.5	10.3	10.1	9.5
17-Dec-19	10.5	10.4	10.5	11.2	10.8	10.1
18-Dec-19	10.7	10.6	10.7	11.3	11.3	10.5
19-Dec-19	11	11.0	11.0	12.6	11.9	11.3
20-Dec-19	11.3	11.3	11.1	13.4	13.0	11.7
21-Dec-19	11.5	11.9	11.6	14.7	13.6	12.4
22-Dec-19	11.7	12.0	11.8	14.8	14.0	12.7
23-Dec-19	11.8	12.1	11.9	16.0	14.8	13.3
24-Dec-19	11.8	12.1	11.9	16.4	15.4	13.8
27-Dec-19	12.0	12.1	12.2	19.8	18.1	15.0
28-Dec-19	13.0	13.3	13.2	21.8	19.5	17.0
29-Dec-19	13.2	13.3	13.3	22.7	20.4	18.0
30-Dec-19	13.2	13.5	13.5	23.6	21.0	18.1
31-Dec-19	13.5	13.8	13.5	24.3	21.4	18.7
02-Jan-20	13.7	14.1	14.0	26.2	22.9	20.3
03-Jan-20	13.8	14.1	14.4	27.5	23.5	22.3
04-Jan-20	13.8	14.0	14.4	27.5	23.5	22.3
05-Jan-20	13.8	14.0	14.4	28.3	24.1	22.3
06-Jan-20 Final Depth	14.5	14.5	14.9	29.5	25.7	22.6

Bulrush cells: 1A, 1B, 1C; Water sedge cells: 4A, 4B, 4C

A2. WATER METALS DATA

Table A2-1: Dissolved (D) and Total (T) Metals in Water Collected Through Pilot-scale Testing

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Influent	2019-03-22	0.00041	0.000425	0.0581	0.0648	0.00203	0.00207	0.046	0.0396	0.022	0.0154	0.00789	0.00847	0.0252	0.0145	0.164	0.179
Influent	2019-04-15	0.0228	0.0228	0.06	0.0606	0.00211	0.00207	0.0238	0.0245	0.0198	0.0148	0.00805	0.00813	0.0273	0.0279	0.16	0.174
Influent	2019-06-06	0.0261	0.0267	0.0593	0.0606	0.00236	0.00244	0.0132	0.0169	0.0151	0.0241	0.00752	0.00778	0.0318	0.0318	0.165	0.179
Influent	2019-07-05	0.0222	0.0229	0.0633	0.0668	0.00201	0.00205	0.0134	0.0185	0.0156	0.0314	0.00744	0.00728	0.0308	0.0312	0.155	0.172
Influent	2019-07-24	0.0194	0.0213	0.058	0.063	0.00188	0.00195	0.0118	0.0142	0.0165	0.0263	0.00709	0.00725	0.0292	0.0286	0.149	0.157
Influent	2019-08-09	0.021	0.0219	0.0601	0.0614	0.00194	0.00206	0.0137	0.0179	0.0135	0.0253	0.00786	0.00767	0.0271	0.0288	0.158	0.178
Influent	2019-08-14	0.0216	0.0225	0.0612	0.0626	0.00203	0.00219	0.0232	0.023	0.0164	0.0167	0.00799	0.00805	0.0283	0.0279	0.172	0.177
Influent	2019-08-19	0.0198	0.0207	0.0575	0.06	0.00193	0.0019	0.0184	0.0197	0.0152	0.0224	0.0078	0.00766	0.0296	0.0292	0.158	0.161
Influent	2019-08-27	0.0222	0.0242	0.0636	0.0654	0.00202	0.00208	0.017	0.0177	0.0192	0.0231	0.0082	0.00815	0.0307	0.0307	0.176	0.178
Influent	2019-09-09	0.0194	0.0217	0.0592	0.0655	0.00182	0.00195	0.0145	0.0165	0.0103	0.0149	0.00718	0.00797	0.028	0.028	0.142	0.157
Influent	2019-09-09	0.0182	0.0208	0.0569	0.062	0.00177	0.00199	0.0213	0.0256	0.0142	0.0216	0.00681	0.00773	0.0282	0.0282	0.142	0.162
Influent	2019-09-11	0.0194	0.0191	0.0602	0.06	0.0019	0.0019	0.0223	0.0227	0.0185	0.0202	0.00731	0.00725	0.0286	0.0287	0.158	0.151
Influent	2019-09-11	0.0197	0.0204	0.0602	0.062	0.00192	0.00191	0.0157	0.0164	0.0154	0.0195	0.00757	0.00749	0.0298	0.0302	0.155	0.15
Influent	2019-09-13	0.0202	0.0207	0.0601	0.0583	0.00194	0.00191	0.0242	0.025	0.0158	0.019	0.0074	0.00696	0.0296	0.0286	0.169	0.157
Influent	2019-09-13	0.0206	0.021	0.0604	0.061	0.00195	0.00197	0.0295	0.0308	0.0179	0.0211	0.00751	0.00741	0.0288	0.0287	0.163	0.163
Influent	2019-10-04	0.0196	0.0216	0.0601	0.0617	0.00195	0.00202	0.0153	0.0209	0.0156	0.0306	0.00713	0.00713	0.0287	0.0292	0.15	0.16
Influent	2019-10-08	0.0191	0.0205	0.0587	0.0613	0.00193	0.00192	0.0143	0.0207	0.0147	0.0294	0.00737	0.00729	0.0281	0.0277	0.136	0.165
Influent	2019-10-21	0.0196	0.0195	0.058	0.0579	0.002	0.00196	0.0204	0.0207	0.0144	0.0185	0.00781	0.00758	0.029	0.0287	0.161	0.159
Influent	2019-11-04	0.0192	0.0194	0.0581	0.0599	0.00211	0.00209	0.0186	0.0199	0.0145	0.0186	0.00745	0.00767	0.0271	0.0279	0.172	0.175
Influent	2019-11-06	0.0192	0.0203	0.0571	0.0581	0.00205	0.00212	0.0186	0.0196	0.013	0.0191	0.00762	0.00747	0.0288	0.0299	0.174	0.179
Influent	2019-11-13	0.0197	0.0192	0.0618	0.0593	0.002	0.00191	0.0224	0.0227	0.0128	0.0189	0.00769	0.00732	0.0295	0.0288	0.159	0.153

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
Influent	2019-11-18	0.0187	0.0189	0.0599	0.0574	0.00189	0.00193	0.018	0.0201	0.0115	0.0177	0.00764	0.00702	0.0278	0.0281	0.146	0.152
Influent	2019-11-25	0.0201	0.0202	0.061	0.0616	0.00208	0.00203	0.0163	0.0181	0.012	0.0208	0.00817	0.00783	0.0301	0.0304	0.171	0.173
Influent	2019-12-02	0.0189	0.0195	0.0605	0.0643	0.002	0.00209	0.0251	0.0268	0.0146	0.0227	0.00775	0.00792	0.0285	0.0288	0.169	0.163
Influent	2019-12-03	0.0199	0.0205	0.0616	0.0592	0.00209	0.00208	0.018	0.0199	0.012	0.0236	0.00754	0.00755	0.0293	0.0296	0.171	0.161
Influent	2019-12-04	0.0197	0.0199	0.0603	0.0606	0.0021	0.00207	0.0153	0.0161	0.00971	0.0196	0.00727	0.00755	0.0289	0.0298	0.172	0.164
Influent	2019-12-06	0.02	0.0199	0.0626	0.0643	0.00207	0.00208	0.0775	0.0822	0.0188	0.025	0.00801	0.00795	0.0307	0.0292	0.174	0.171
Influent	2020-01-06	0.0194	0.0198	0.0593	0.06	0.00191	0.00197	0.0402	0.0426	0.0155	0.017	0.00745	0.00771	0.0289	0.0287	0.16	0.162
Influent	2020-01-09	0.0191	0.0204	0.062	0.0618	0.00202	0.00212	0.0627	0.0638	0.0154	0.0171	0.00786	0.00792	0.0281	0.0287	0.159	0.168
Influent	2020-01-13	0.0195	0.0195	0.059	0.0587	0.00166	0.00161	0.0577	0.0572	0.0153	0.0198	0.00758	0.00767	0.0278	0.0285	0.154	0.151
1A	2019-06-06	0.0226	0.0223	0.048	0.0481	0.000941	0.000929	0.00629	0.00692	0.00515	0.00217	0.00667	0.00667	0.0291	0.0293	0.0945	0.099
1A	2019-07-05	0.0175	0.0211	0.0284	0.0481	0.000149	0.000654	0.00236	0.00454	0.0000624	0.000701	0.00544	0.00645	0.0231	0.0286	0.0508	0.0963
1A	2019-07-24	0.018	0.0186	0.0479	0.0476	0.000827	0.000823	0.00387	0.00425	0.00077	0.000932	0.00633	0.00612	0.0254	0.0242	0.105	0.0964
1A	2019-08-09	0.0121	0.0193	0.049	0.0465	0.000572	0.000882	0.00499	0.00529	0.00145	0.0029	0.00724	0.00654	0.0174	0.0265	0.103	0.106
1A	2019-08-14	0.0208	0.0207	0.0547	0.054	0.00116	0.00119	0.00815	0.00746	0.00254	0.00193	0.00742	0.00714	0.0244	0.0241	0.151	0.146
1A	2019-08-19	0.0202	0.0207	0.0543	0.054	0.0014	0.00135	0.00929	0.00969	0.00325	0.00476	0.00756	0.00757	0.0308	0.0302	0.143	0.142
1A	2019-08-27	0.021	0.0223	0.0619	0.0609	0.00161	0.00168	0.00962	0.00962	0.00384	0.00488	0.00798	0.00801	0.0296	0.0282	0.163	0.161
1A	2019-09-09	0.0183	0.0197	0.0575	0.0563	0.00167	0.00183	0.0156	0.0166	0.00815	0.0105	0.00697	0.0079	0.0285	0.0281	0.142	0.149
1A	2019-09-11	0.0193	0.0189	0.0595	0.058	0.00183	0.00174	0.0146	0.0152	0.00747	0.00844	0.00766	0.00721	0.0281	0.0283	0.155	0.151
1A	2019-09-13	0.0191	0.0204	0.0557	0.0584	0.00181	0.00191	0.0184	0.0195	0.00693	0.00904	0.00679	0.00697	0.0265	0.0256	0.16	0.161
1A	2019-10-04	0.0169	0.0168	0.0518	0.05	0.000631	0.000642	0.0106	0.011	0.000973	0.00142	0.00552	0.00565	0.0232	0.025	0.0664	0.0641
1A	2019-10-21	0.0106	0.0102	0.0446	0.0434	0.000269	0.000292	0.00542	0.00579	0.000944	0.00118	0.00373	0.0036	0.0175	0.0176	0.0404	0.0404
1A	2019-11-06	0.0128	0.0134	0.0474	0.0474	0.000181	0.000178	0.00386	0.00427	0.000164	0.000238	0.00486	0.00479	0.0191	0.0195	0.0338	0.0353
1A	2019-11-13	0.022	0.0213	0.0601	0.0582	0.000786	0.000773	0.0076	0.00752	0.00259	0.00329	0.00769	0.00731	0.031	0.0304	0.111	0.108
1A	2019-11-18	0.0199	0.02	0.0576	0.0553	0.00106	0.00107	0.00831	0.00926	0.00438	0.00571	0.00745	0.00706	0.0305	0.0312	0.132	0.139
1A	2019-11-25	0.0203	0.0207	0.059	0.0585	0.00133	0.00131	0.00918	0.00955	0.00406	0.00589	0.00772	0.00787	0.0308	0.0324	0.155	0.155

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
1A	2019-12-02	0.0193	0.0193	0.0614	0.0623	0.00177	0.00179	0.016	0.0161	0.0068	0.00942	0.00794	0.0079	0.0287	0.0287	0.181	0.167
1A	2019-12-04	0.0195	0.0197	0.0588	0.0594	0.00174	0.00174	0.0105	0.0112	0.00457	0.0086	0.00713	0.00757	0.0287	0.0295	0.171	0.163
1A	2019-12-06	0.0198	0.0188	0.0606	0.0601	0.00178	0.00168	0.0246	0.0255	0.00603	0.00979	0.00778	0.00757	0.0295	0.0277	0.156	0.148
1A	2019-12-13	0.0191	0.0208	0.0561	0.0589	0.00157	0.00168	0.0303	0.0339	0.00685	0.012	0.00749	0.00771	0.0309	0.0326	0.132	0.137
1A	2019-12-27	0.0201	0.0199	0.0274	0.0283	0.000776	0.000901	0.00759	0.00867	0.000105	0.00026	0.00591	0.00619	0.046	0.0454	0.111	0.117
1A	2020-01-06	0.02	0.02	0.0428	0.0411	0.00116	0.00117	0.0294	0.03	0.00732	0.00788	0.00599	0.00606	0.0469	0.0463	0.132	0.128
1A	2020-01-09	0.0187	0.0201	0.057	0.0583	0.00156	0.00164	0.0298	0.0312	0.00453	0.00547	0.00769	0.00786	0.028	0.0286	0.148	0.16
1A	2020-01-13	0.0191	0.0187	0.0563	0.0555	0.00155	0.00149	0.0376	0.0387	0.00703	0.0093	0.00762	0.00747	0.0279	0.0282	0.153	0.153
1B	2019-06-06	0.0186	0.0189	0.0348	0.035	0.00024	0.000288	0.00373	0.00421	0.000152	0.000241	0.0056	0.00549	0.026	0.0256	0.0405	0.0454
1B	2019-07-05	0.0151	0.0177	0.0234	0.0307	0.0000418	0.000235	0.0015	0.0043	0.0000376	0.000174	0.00363	0.00467	0.0207	0.023	0.0155	0.0565
1B	2019-07-24	0.0149	0.0155	0.0267	0.0275	0.000215	0.000227	0.00189	0.00199	0.0000439	0.0000845	0.00474	0.00486	0.0179	0.0174	0.0547	0.0507
1B	2019-08-09	0.0154	0.0156	0.0272	0.0271	0.000216	0.000248	0.00189	0.00199	0.0000979	0.000239	0.00513	0.00512	0.0236	0.0236	0.0439	0.0447
1B	2019-08-14	0.02	0.02	0.0412	0.0417	0.000444	0.000424	0.00255	0.00278	0.000103	0.000179	0.00685	0.00675	0.0188	0.0182	0.101	0.102
1B	2019-08-19	0.0209	0.0211	0.043	0.0426	0.000612	0.000593	0.00344	0.00366	0.00015	0.000283	0.00742	0.00719	0.0269	0.0267	0.109	0.107
1B	2019-08-27	0.0204	0.0246	0.0484	0.0491	0.000814	0.000948	0.00336	0.00357	0.000219	0.000423	0.00772	0.00723	0.0303	0.034	0.116	0.116
1B	2019-09-09	0.0183	0.0194	0.0499	0.0516	0.00136	0.00146	0.00592	0.00698	0.000781	0.00164	0.00689	0.00744	0.0297	0.0291	0.131	0.148
1B	2019-09-11	0.0199	0.0189	0.0581	0.0559	0.00155	0.00147	0.00674	0.00671	0.000624	0.00111	0.00771	0.00703	0.0268	0.0267	0.153	0.14
1B	2019-09-13	0.0199	0.0202	0.0558	0.0549	0.00166	0.00168	0.00799	0.00859	0.000664	0.00135	0.00734	0.00695	0.0248	0.0242	0.162	0.159
1B	2019-10-04	0.0148	0.0151	0.0408	0.0408	0.000505	0.000552	0.00899	0.00969	0.0000738	0.000659	0.00446	0.00491	0.0341	0.0353	0.0513	0.0522
1B	2019-10-21	0.00954	0.00955	0.0333	0.0327	0.000374	0.000396	0.00823	0.0122	0.000119	0.000276	0.00245	0.00237	0.0212	0.0215	0.0476	0.0548
1B	2019-11-06	0.0123	0.0128	0.0401	0.0398	0.000295	0.000316	0.00412	0.00442	0.0000313	0.0000366	0.004	0.00396	0.0151	0.0163	0.0409	0.045
1B	2019-11-13	0.0204	0.0201	0.0541	0.0519	0.000385	0.000355	0.00336	0.00335	0.000121	0.000137	0.00706	0.00676	0.0232	0.0231	0.065	0.0629
1B	2019-11-18	0.0204	0.0198	0.0554	0.0508	0.000579	0.00057	0.00373	0.00415	0.000306	0.000427	0.00755	0.00677	0.0309	0.0315	0.099	0.101
1B	2019-11-25	0.0201	0.0203	0.0556	0.0552	0.000822	0.000781	0.00403	0.00459	0.000441	0.000692	0.00759	0.0075	0.0314	0.0328	0.129	0.129
1B	2019-12-02	0.0194	0.0192	0.0585	0.0603	0.0015	0.0015	0.00997	0.0101	0.00247	0.00448	0.00759	0.00802	0.0289	0.028	0.174	0.163

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
1B	2019-12-04	0.0197	0.02	0.0588	0.059	0.00146	0.00142	0.00662	0.00708	0.00127	0.00299	0.00706	0.00756	0.0273	0.0288	0.174	0.165
1B	2019-12-06	0.0199	0.019	0.0595	0.0604	0.00145	0.00137	0.00923	0.0096	0.00135	0.00327	0.00767	0.00753	0.03	0.0285	0.159	0.149
1B	2019-12-13	0.0203	0.0214	0.0553	0.0585	0.00145	0.00152	0.0205	0.0228	0.0036	0.00795	0.00799	0.00803	0.0346	0.0352	0.125	0.13
1B	2019-12-27	0.015	0.0155	0.0383	0.0394	0.000793	0.000841	0.00655	0.00709	0.0000317	0.0000747	0.00454	0.00492	0.0362	0.037	0.105	0.11
1B	2020-01-06	0.0151	0.0154	0.0385	0.0387	0.000887	0.000931	0.0133	0.0151	0.00169	0.00191	0.00412	0.00428	0.0464	0.0467	0.0946	0.0965
1B	2020-01-09	0.0187	0.0205	0.0558	0.058	0.00128	0.00138	0.0175	0.0182	0.00152	0.00201	0.0078	0.00779	0.0289	0.0301	0.138	0.149
1B	2020-01-13	0.0187	0.0183	0.0545	0.0545	0.00145	0.00143	0.0258	0.0264	0.00334	0.00479	0.0074	0.00718	0.028	0.0289	0.148	0.148
1C	2019-03-22	0.000362	0.000379	0.0264	0.0284	0.0000867	0.000129	0.0107	0.0118	0.0000351	0.000061	0.00574	0.00605	0.00284	0.00297	0.0115	0.0169
1C	2019-04-15	0.0105	0.0106	0.0273	0.0298	0.000184	0.000229	0.00957	0.0115	0.0000335	0.0000738	0.00444	0.00435	0.00985	0.00878	0.0379	0.0473
1C	2019-06-06	0.0144	0.0142	0.0261	0.0262	0.0000433	0.0000507	0.00218	0.00233	0.0000316	0.0000403	0.00406	0.00398	0.0151	0.0147	0.0124	0.0129
1C	2019-07-05	0.0152	0.0151	0.0237	0.0234	0.0000445	0.0000537	0.00155	0.00164	0.0000399	0.0000319	0.00387	0.00368	0.0222	0.022	0.0157	0.0154
1C	2019-07-24	0.0126	0.0129	0.0206	0.0209	0.0000523	0.0000721	0.000831	0.000967	0.0000272	0.0000346	0.00334	0.00336	0.0196	0.0184	0.0159	0.0166
1C	2019-08-09	0.0117	0.0117	0.0156	0.0157	0.0000151	0.0000338	0.000894	0.000949	<0.0000050	<0.0000050	0.00312	0.00316	0.0139	0.014	0.0154	0.0152
1C	2019-08-14	0.0173	0.0172	0.0273	0.0274	0.0001	0.000116	0.00128	0.00134	0.0000437	0.0000563	0.00582	0.00569	0.0129	0.0126	0.0454	0.0454
1C	2019-08-19	0.0194	0.0194	0.0289	0.0289	0.000135	0.000147	0.00307	0.00402	0.0000876	0.000119	0.00658	0.00657	0.0198	0.0194	0.0652	0.0656
1C	2019-08-27	0.019	0.0201	0.0362	0.0376	0.000224	0.000233	0.00173	0.00182	0.0000591	0.0000615	0.0071	0.00699	0.0264	0.0252	0.083	0.0827
1C	2019-09-09	0.0186	0.0199	0.0494	0.05	0.000794	0.000852	0.00315	0.00381	0.000296	0.000687	0.0069	0.00744	0.023	0.0231	0.127	0.141
1C	2019-09-11	0.0191	0.0189	0.052	0.051	0.00111	0.00108	0.0039	0.00408	0.000233	0.000418	0.00763	0.00723	0.0171	0.0173	0.167	0.159
1C	2019-09-13	0.0197	0.0202	0.0518	0.0515	0.00122	0.00125	0.00495	0.00531	0.000244	0.000445	0.00707	0.00688	0.0207	0.02	0.164	0.164
1C	2019-10-04	0.0128	0.0131	0.0287	0.0283	0.000429	0.000433	0.00633	0.00656	0.0000095	0.0000113	0.00395	0.00416	0.0275	0.0283	0.062	0.0629
1C	2019-10-21	0.00944	0.00928	0.0245	0.0235	0.00025	0.00026	0.00489	0.00486	0.0000186	0.0000168	0.00228	0.00219	0.0225	0.0221	0.0398	0.0373
1C	2019-11-06	0.0101	0.0106	0.027	0.027	0.000218	0.000234	0.00312	0.00337	0.0000084	0.0000171	0.00299	0.00301	0.0174	0.018	0.0325	0.0395
1C	2019-11-13	0.0175	0.0172	0.0431	0.0418	0.000229	0.000221	0.00259	0.00252	0.0000603	0.0000631	0.00618	0.00575	0.016	0.0155	0.0379	0.0372
1C	2019-11-18	0.0195	0.0197	0.0457	0.0428	0.000266	0.000271	0.00221	0.00238	0.000057	0.0000606	0.00724	0.00658	0.0235	0.024	0.0553	0.0569
1C	2019-11-25	0.0193	0.0201	0.0476	0.047	0.000406	0.000387	0.00226	0.00241	0.0000691	0.0000779	0.00733	0.0071	0.0292	0.0303	0.0923	0.0913

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
1C	2019-12-02	0.0204	0.0195	0.0578	0.0562	0.000769	0.000714	0.00341	0.00337	0.000243	0.000405	0.00781	0.00762	0.0292	0.0265	0.142	0.129
1C	2019-12-04	0.0203	0.0201	0.0575	0.0568	0.000974	0.000945	0.00343	0.00354	0.000193	0.000306	0.00741	0.00751	0.0244	0.0248	0.173	0.161
1C	2019-12-06	0.0198	0.0191	0.0567	0.0585	0.00108	0.00105	0.0041	0.00443	0.000223	0.000444	0.0073	0.0074	0.0261	0.025	0.166	0.159
1C	2019-12-13	0.0197	0.0215	0.0511	0.0547	0.00117	0.0013	0.0152	0.017	0.00273	0.00685	0.00773	0.00784	0.0346	0.0362	0.118	0.121
1C	2019-12-27	0.0143	0.0154	0.0126	0.0139	0.000269	0.000728	0.00247	0.00309	<0.0000050	0.000052	0.00366	0.00394	0.0362	0.0376	0.0594	0.0704
1C	2020-01-06	0.012	0.0123	0.0193	0.0194	0.000469	0.000496	0.00588	0.0067	0.000438	0.000519	0.00287	0.00297	0.0423	0.0438	0.0687	0.0711
1C	2020-01-09	0.0193	0.02	0.0512	0.0502	0.00071	0.000752	0.00651	0.00666	0.000144	0.000238	0.00771	0.00724	0.0295	0.0297	0.105	0.108
1C	2020-01-13	0.0188	0.0187	0.0524	0.0516	0.00116	0.00112	0.0134	0.0137	0.00107	0.00156	0.00748	0.00739	0.0269	0.0271	0.148	0.146
2A	2019-06-06	0.0223	0.0224	0.0302	0.0303	0.000801	0.000798	0.0049	0.00596	0.000532	0.000922	0.00676	0.00657	0.0273	0.028	0.0921	0.102
2A	2019-07-05	0.0156	0.0191	0.02	0.0311	0.000153	0.000598	0.00204	0.00481	0.0000283	0.000384	0.00421	0.00537	0.0173	0.0216	0.0368	0.0939
2A	2019-07-24	0.0153	0.0157	0.0334	0.0374	0.000798	0.000902	0.00385	0.00433	0.000113	0.000265	0.00482	0.00477	0.0163	0.0155	0.097	0.0878
2A	2019-08-09	0.0175	0.0182	0.0446	0.0444	0.000374	0.000382	0.00294	0.00295	0.000211	0.000364	0.00616	0.00599	0.026	0.0249	0.0646	0.0642
2A	2019-08-14	0.0212	0.0212	0.0538	0.0525	0.000968	0.000941	0.00587	0.00628	0.000734	0.00124	0.00761	0.00908	0.0314	0.0306	0.123	0.12
2A	2019-08-19	0.0201	0.0208	0.0403	0.0524	0.000355	0.00142	0.00207	0.0106	0.0000645	0.00683	0.00664	0.0074	0.0196	0.0311	0.0988	0.136
2A	2019-08-27	0.023	0.0218	0.0569	0.0573	0.00147	0.00147	0.0103	0.0107	0.00419	0.00534	0.0082	0.00813	0.0299	0.0291	0.15	0.152
2A	2019-09-09	0.0189	0.0208	0.0573	0.0588	0.0015	0.00172	0.00971	0.0115	0.00327	0.005	0.00688	0.00752	0.0313	0.0317	0.122	0.137
2A	2019-09-11	0.0197	0.0201	0.0608	0.0605	0.00181	0.00178	0.0121	0.0124	0.00738	0.00994	0.00747	0.00736	0.0299	0.0306	0.148	0.141
2A	2019-09-13	0.0203	0.0207	0.0581	0.0594	0.0018	0.00182	0.019	0.0201	0.00944	0.0121	0.00712	0.00742	0.0301	0.0309	0.151	0.151
2A	2019-10-08	0.0145	0.0143	0.0423	0.0424	0.000742	0.000877	0.0074	0.00791	0.000157	0.000249	0.00458	0.00464	0.0266	0.0265	0.0842	0.0859
2A	2019-11-04	0.0165	0.0165	0.0494	0.0508	0.000781	0.0008	0.00592	0.00629	0.0000962	0.000185	0.00554	0.00563	0.0233	0.0231	0.103	0.0996
2A	2019-12-03	0.0151	0.015	0.0658	0.066	0.000832	0.000811	0.00575	0.0064	0.000224	0.000476	0.00501	0.00544	0.0305	0.0315	0.109	0.105
2B	2019-06-06	0.0195	0.0192	0.0248	0.0243	0.000255	0.000308	0.00294	0.00325	0.0000414	0.0000739	0.00554	0.00545	0.0225	0.0233	0.0454	0.0497
2B	2019-07-05	0.0137	0.0157	0.0124	0.0203	0.0000632	0.000228	0.00167	0.00242	0.0000143	0.0000392	0.00312	0.0041	0.0125	0.0175	0.0173	0.0391
2B	2019-07-24	0.0128	0.013	0.0253	0.0255	0.000191	0.00024	0.00179	0.00459	0.0000151	0.0000217	0.00353	0.00347	0.0106	0.0109	0.0432	0.0409
2B	2019-08-09	0.0134	0.0137	0.0292	0.0282	0.0000966	0.0000991	0.00159	0.00168	0.0000151	0.0000181	0.00402	0.00389	0.01	0.00941	0.0377	0.0379

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
2B	2019-08-14	0.0196	0.0194	0.0443	0.0438	0.000254	0.000281	0.00231	0.00215	0.0000532	0.0000714	0.00667	0.00648	0.0146	0.014	0.0937	0.0862
2B	2019-08-19	0.0203	0.0209	0.0511	0.0423	0.000329	0.000376	0.00231	0.00253	0.0000693	0.0000977	0.00735	0.00685	0.0191	0.0205	0.134	0.102
2B	2019-08-27	0.0205	0.0199	0.0479	0.0457	0.000526	0.00044	0.00296	0.00325	0.000105	0.000147	0.00712	0.007	0.0237	0.0228	0.109	0.106
2B	2019-09-09	0.0187	0.02	0.056	0.0575	0.000982	0.00108	0.00444	0.00509	0.000371	0.000858	0.0068	0.00746	0.0288	0.029	0.119	0.13
2B	2019-09-11	0.02	0.0198	0.0584	0.0574	0.00123	0.00121	0.00456	0.00475	0.000589	0.00126	0.00753	0.0073	0.0292	0.0292	0.135	0.129
2B	2019-09-13	0.0203	0.0208	0.0577	0.0594	0.00139	0.00142	0.00615	0.00658	0.000556	0.0013	0.00729	0.00722	0.0309	0.0298	0.138	0.137
2B	2019-10-08	0.0126	0.0124	0.033	0.0322	0.000385	0.000376	0.00499	0.00506	0.0000129	0.0000257	0.00318	0.00317	0.0294	0.029	0.0637	0.0614
2B	2019-11-04	0.0158	0.0159	0.0353	0.0354	0.000403	0.000406	0.00398	0.00412	0.000011	0.0000227	0.00484	0.00482	0.0214	0.0215	0.0751	0.0742
2B	2019-12-03	0.0142	0.0142	0.0461	0.0458	0.000457	0.000442	0.00395	0.00415	0.000023	0.0000296	0.00418	0.00444	0.03	0.0315	0.0825	0.0801
2C	2019-03-22	0.000356	0.000356	0.0237	0.0251	0.0000639	0.0000824	0.0103	0.0112	0.0000227	0.000035	0.00504	0.00547	0.00271	0.00286	0.00942	0.0117
2C	2019-04-15	0.0125	0.0127	0.0202	0.0214	0.000159	0.000191	0.00771	0.00876	0.0000328	0.0000796	0.00394	0.00395	0.0115	0.011	0.0365	0.0399
2C	2019-06-06	0.017	0.0171	0.0199	0.0198	0.000129	0.000147	0.00226	0.00237	0.0000209	0.0000238	0.00468	0.00468	0.0155	0.0156	0.0242	0.0248
2C	2019-07-05	0.014	0.0139	0.0126	0.0129	0.0000464	0.0000707	0.00169	0.00219	0.0000135	0.0000252	0.00321	0.00328	0.013	0.0131	0.0174	0.0181
2C	2019-07-24	0.0114	0.0117	0.0159	0.0159	0.0000508	0.0000591	0.00105	0.00108	0.0000095	<0.0000050	0.00261	0.00261	0.00869	0.00897	0.0227	0.0195
2C	2019-08-09	0.0112	0.012	0.0196	0.0192	0.0000369	0.0000426	0.00102	0.000913	0.0000086	<0.0000050	0.00284	0.00259	0.00685	0.00587	0.022	0.0214
2C	2019-08-14	0.0185	0.0185	0.0367	0.0375	0.0000844	0.000102	0.00126	0.00136	0.0000317	0.0000325	0.00582	0.00598	0.00931	0.00925	0.0496	0.0494
2C	2019-08-19	0.0194	0.0197	0.0325	0.0331	0.000105	0.000129	0.00124	0.00143	0.0000257	0.0000574	0.00621	0.00603	0.0147	0.0145	0.0719	0.0735
2C	2019-08-27	0.0192	0.0186	0.0368	0.0364	0.000193	0.000191	0.00161	0.00177	0.0000273	0.0000347	0.00639	0.00616	0.0201	0.0201	0.0848	0.0853
2C	2019-09-09	0.0184	0.0195	0.0494	0.0518	0.000608	0.000664	0.00263	0.00314	0.000138	0.000223	0.00654	0.00732	0.0162	0.0163	0.131	0.15
2C	2019-09-11	0.0194	0.0193	0.052	0.0512	0.00073	0.000721	0.00295	0.00312	0.000191	0.000369	0.0071	0.00689	0.0204	0.0203	0.136	0.129
2C	2019-09-13	0.0196	0.02	0.0525	0.0527	0.000927	0.000937	0.00374	0.00389	0.000156	0.000264	0.00699	0.00685	0.0197	0.0194	0.151	0.152
2C	2019-10-08	0.011	0.0111	0.0248	0.0248	0.000205	0.000209	0.00238	0.00244	0.0000094	0.0000086	0.00208	0.00212	0.0308	0.0309	0.0495	0.0499
2C	2019-11-04	0.0141	0.014	0.0274	0.0277	0.000188	0.000193	0.00224	0.00235	0.000005	0.0000072	0.00376	0.0037	0.0221	0.0221	0.0499	0.0487
2C	2019-12-03	0.0139	0.0139	0.034	0.0342	0.000186	0.000182	0.00224	0.0022	0.0000747	<0.0000050	0.00342	0.00362	0.0236	0.0243	0.0597	0.0575
3A	2019-06-06	0.0161	0.0162	0.0306	0.0312	0.000364	0.000429	0.00299	0.00372	0.000252	0.000416	0.00422	0.00426	0.0191	0.0194	0.0472	0.0507

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
3A	2019-07-05	0.0145	0.0165	0.0271	0.0428	0.0000862	0.000328	0.00184	0.00422	0.0000284	0.000274	0.00368	0.00473	0.0117	0.0201	0.0289	0.062
3A	2019-07-24	0.0126	0.0128	0.0385	0.0402	0.000449	0.000569	0.003	0.00389	0.000384	0.000803	0.0035	0.00358	0.0168	0.016	0.0617	0.0591
3A	2019-08-09	0.00302	0.014	0.0382	0.0363	0.000045	0.00018	0.00234	0.00265	0.0000231	0.000191	0.00377	0.0047	0.00402	0.0155	0.0473	0.0468
3A	2019-08-14	0.0213	0.022	0.0539	0.054	0.000763	0.000797	0.00664	0.0071	0.000472	0.000901	0.00671	0.00695	0.0247	0.0244	0.12	0.122
3A	2019-08-19	0.0216	0.0213	0.0481	0.0472	0.000851	0.000891	0.00659	0.00714	0.00112	0.00195	0.00734	0.00723	0.0288	0.0287	0.131	0.133
3A	2019-08-27	0.0222	0.0215	0.0548	0.0546	0.000761	0.000697	0.00549	0.00579	0.000554	0.000947	0.00763	0.0076	0.0269	0.0266	0.129	0.13
3A	2019-09-09	0.0188	0.0194	0.0611	0.0649	0.00143	0.00155	0.0133	0.0158	0.00276	0.00437	0.00692	0.00721	0.0305	0.0302	0.135	0.15
3A	2019-09-11	0.02	0.02	0.0613	0.0615	0.00176	0.00175	0.0127	0.013	0.00278	0.00361	0.00725	0.00745	0.03	0.03	0.153	0.144
3A	2019-09-13	0.0207	0.0211	0.0612	0.0606	0.0019	0.00194	0.0176	0.0187	0.00389	0.00536	0.0076	0.00742	0.0274	0.0262	0.166	0.166
3A	2019-10-04	0.0117	0.0117	0.0395	0.0392	0.000199	0.000208	0.00446	0.0052	0.000654	0.000917	0.00273	0.00276	0.0184	0.0195	0.0313	0.0311
3A	2019-10-21	0.0101	0.0099	0.0373	0.0367	0.000126	0.000141	0.00375	0.00373	0.000966	0.00128	0.00259	0.00257	0.0156	0.0158	0.0256	0.0257
3A	2019-11-06	0.0118	0.0126	0.0402	0.0408	0.000165	0.000166	0.00274	0.00307	0.000262	0.000367	0.00316	0.00313	0.0164	0.0174	0.0367	0.0413
3A	2019-11-13	0.0206	0.02	0.0556	0.0532	0.000628	0.000599	0.00432	0.00449	0.000352	0.000523	0.00731	0.00681	0.0354	0.0343	0.114	0.108
3A	2019-11-18	0.0149	0.0195	0.0402	0.0513	0.000264	0.000703	0.0023	0.00563	0.000323	0.000852	0.00395	0.00671	0.0262	0.0363	0.0727	0.115
3A	2019-11-25	0.0201	0.0205	0.0562	0.0555	0.000928	0.000909	0.00497	0.00535	0.000424	0.00101	0.0077	0.00755	0.0352	0.0364	0.133	0.128
3A	2019-12-02	0.0197	0.0196	0.065	0.0671	0.00181	0.00184	0.0126	0.013	0.00225	0.00432	0.00769	0.00809	0.0298	0.029	0.169	0.159
3A	2019-12-04	0.0204	0.0204	0.0609	0.0609	0.00175	0.00175	0.00938	0.00991	0.00172	0.00478	0.00726	0.00763	0.0305	0.0314	0.16	0.152
3A	2019-12-06	0.02	0.0194	0.0599	0.0622	0.00192	0.00185	0.0142	0.0154	0.002	0.00551	0.00778	0.00787	0.0314	0.0295	0.157	0.15
3A	2019-12-13	0.0203	0.021	0.0634	0.0654	0.00176	0.00183	0.0321	0.0339	0.00638	0.0099	0.00803	0.00779	0.0331	0.0332	0.142	0.142
3A	2019-12-19	0.00685	0.00648	0.134	0.133	0.00542	0.00538	0.0643	0.0677	0.00599	0.00953	0.00258	0.0025	0.0236	0.0214	0.517	0.509
3B	2019-06-06	0.0143	0.0142	0.0225	0.0229	0.0000997	0.000118	0.00236	0.00248	0.0000348	0.0000392	0.00364	0.00356	0.0115	0.0114	0.0276	0.028
3B	2019-07-05	0.0121	0.0144	0.0204	0.0276	0.0000292	0.0000881	0.00146	0.00208	0.000014	0.0000513	0.003	0.00371	0.00698	0.0119	0.0121	0.03
3B	2019-07-24	0.0118	0.0117	0.0262	0.0257	0.000125	0.000122	0.00184	0.00184	0.000153	0.00003	0.00297	0.00293	0.00799	0.00794	0.042	0.0378
3B	2019-08-09	0.011	0.0107	0.0242	0.0235	0.0000932	0.0000898	0.00166	0.00176	0.0000059	0.0000149	0.0025	0.0026	0.00932	0.00901	0.0333	0.0332
3B	2019-08-14	0.0186	0.0197	0.0424	0.0425	0.000259	0.000237	0.00266	0.00278	0.0000535	0.00009	0.00584	0.0058	0.0124	0.0119	0.0786	0.0783

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
3B	2019-08-19	0.022	0.0219	0.0364	0.0359	0.000341	0.000319	0.00268	0.00283	0.0000663	0.00011	0.00651	0.00656	0.0176	0.0184	0.0984	0.0975
3B	2019-08-27	0.0201	0.0192	0.0424	0.0421	0.000394	0.000373	0.00279	0.0031	0.0000795	0.000129	0.00662	0.00657	0.0223	0.0222	0.103	0.105
3B	2019-09-09	0.0198	0.0199	0.0604	0.058	0.000833	0.000882	0.00522	0.00577	0.000407	0.000941	0.00728	0.00745	0.0304	0.0295	0.123	0.129
3B	2019-09-11	0.0199	0.0202	0.0544	0.056	0.00124	0.0012	0.00601	0.00653	0.000447	0.000848	0.00707	0.00731	0.0249	0.0253	0.153	0.149
3B	2019-09-13	0.0213	0.0213	0.0572	0.0568	0.0015	0.00151	0.0075	0.00793	0.000479	0.000965	0.00734	0.00715	0.0235	0.0231	0.166	0.166
3B	2019-10-04	0.0102	0.0104	0.0352	0.0354	0.000451	0.000461	0.00759	0.00905	0.0000518	0.000162	0.00202	0.00218	0.0264	0.0296	0.0546	0.0566
3B	2019-10-21	0.00783	0.00783	0.0292	0.0293	0.000234	0.000234	0.00509	0.00514	0.0000976	0.000116	0.00151	0.00148	0.0186	0.0183	0.0268	0.0294
3B	2019-11-06	0.0107	0.0114	0.0348	0.036	0.000212	0.000412	0.00358	0.0113	0.0000241	0.0000895	0.00269	0.00274	0.0158	0.0169	0.0275	0.0298
3B	2019-11-13	0.0198	0.0191	0.0519	0.0494	0.00033	0.000319	0.0032	0.00319	0.000102	0.000131	0.00698	0.00644	0.0246	0.024	0.0683	0.066
3B	2019-11-18	0.0189	0.0188	0.0505	0.0481	0.000436	0.000445	0.00314	0.00373	0.000107	0.000127	0.00709	0.00639	0.0316	0.0325	0.0954	0.1
3B	2019-11-25	0.0192	0.02	0.0506	0.0501	0.000581	0.000575	0.00322	0.0036	0.000108	0.000144	0.00719	0.00702	0.0334	0.0357	0.112	0.113
3B	2019-12-02	0.0206	0.02	0.0609	0.0609	0.00114	0.00109	0.00493	0.00512	0.000558	0.00101	0.00787	0.00804	0.0337	0.0315	0.156	0.145
3B	2019-12-04	0.021	0.0208	0.0588	0.0582	0.00141	0.00138	0.00562	0.00569	0.00047	0.000889	0.00741	0.00764	0.0272	0.0275	0.183	0.171
3B	2019-12-06	0.0203	0.0197	0.0578	0.0589	0.00146	0.00142	0.00681	0.007	0.000505	0.00122	0.00758	0.00751	0.0296	0.029	0.166	0.156
3B	2019-12-13	0.02	0.0211	0.0584	0.0615	0.00135	0.00145	0.0148	0.0166	0.00168	0.00435	0.00789	0.00791	0.0392	0.04	0.118	0.123
3B	2019-12-19	0.00624	0.00605	0.14	0.141	0.00381	0.00382	0.055	0.0582	0.000422	0.00202	0.00333	0.00333	0.0329	0.0298	0.361	0.37
3C	2019-03-22	0.000354	0.00037	0.0262	0.028	0.000118	0.000136	0.0198	0.0217	0.0000237	0.000039	0.00489	0.0056	0.000814	0.000906	0.0177	0.0205
3C	2019-04-15	0.0102	0.0103	0.0261	0.0267	0.0000524	0.0000629	0.00843	0.0089	0.0000222	0.0000401	0.00337	0.00358	0.00417	0.00402	0.0175	0.0179
3C	2019-06-06	0.0123	0.0123	0.0203	0.0201	0.0000267	0.0000387	0.00185	0.0019	0.000037	0.0000397	0.00276	0.00275	0.00581	0.00582	0.0172	0.017
3C	2019-07-05	0.0122	0.0124	0.021	0.024	0.0000231	0.0000243	0.00147	0.00184	0.0000166	0.0000251	0.00299	0.00306	0.00749	0.00742	0.0121	0.015
3C	2019-07-24	0.0109	0.0106	0.0197	0.0189	0.0000233	0.0000233	0.00112	0.00115	0.0000061	0.0000117	0.00231	0.00234	0.0083	0.00816	0.0155	0.014
3C	2019-08-09	0.00932	0.00971	0.0162	0.0165	0.0000276	0.0000338	0.00113	0.00118	<0.0000050	<0.0000050	0.00194	0.00175	0.00587	0.00564	0.0185	0.019
3C	2019-08-14	0.0167	0.0176	0.034	0.0341	0.0000822	0.000052	0.00143	0.00136	0.0000263	0.0000247	0.00507	0.00518	0.00665	0.00658	0.0385	0.0383
3C	2019-08-19	0.02	0.0201	0.0267	0.0273	0.000102	0.0000993	0.00141	0.00148	0.0000189	0.0000216	0.00609	0.00598	0.0102	0.00998	0.0618	0.0582
3C	2019-08-27	0.0189	0.0187	0.0375	0.0363	0.000161	0.000135	0.00165	0.0017	0.0000228	0.0000339	0.00635	0.00627	0.0185	0.0172	0.0782	0.0796

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
3C	2019-09-09	0.0187	0.0206	0.0501	0.0526	0.000488	0.000558	0.00262	0.0029	0.000173	0.000265	0.00665	0.00734	0.018	0.0185	0.121	0.134
3C	2019-09-11	0.0198	0.0197	0.0536	0.0535	0.000774	0.000781	0.00319	0.0033	0.000183	0.00028	0.00713	0.00713	0.0153	0.0152	0.161	0.156
3C	2019-09-13	0.02	0.0206	0.0527	0.0545	0.000984	0.00106	0.00383	0.00424	0.000156	0.000258	0.00695	0.007	0.0176	0.0171	0.166	0.173
3C	2019-10-04	0.0101	0.0104	0.0285	0.0283	0.000272	0.000279	0.00485	0.00518	0.0000493	0.000171	0.00192	0.00214	0.0304	0.0326	0.0597	0.062
3C	2019-10-21	0.0066	0.00659	0.0236	0.0234	0.000161	0.000167	0.00452	0.00449	0.0000151	0.0000159	0.00117	0.00117	0.0222	0.0228	0.0352	0.0358
3C	2019-11-06	0.00918	0.00976	0.0286	0.0292	0.000167	0.00017	0.00311	0.0033	0.0000062	0.000009	0.00196	0.0019	0.0191	0.0195	0.029	0.0304
3C	2019-11-13	0.0177	0.0169	0.0443	0.0423	0.000216	0.000206	0.00258	0.00253	0.0000515	0.0000541	0.00583	0.0056	0.0128	0.0129	0.0417	0.0398
3C	2019-11-18	0.0176	0.0182	0.0448	0.0438	0.000245	0.000266	0.00222	0.00243	0.0000471	0.0000484	0.0066	0.00615	0.024	0.0253	0.0635	0.0662
3C	2019-11-25	0.019	0.0189	0.0471	0.0451	0.000351	0.000325	0.00217	0.00228	0.0000509	0.000053	0.00702	0.00666	0.0324	0.033	0.0949	0.0923
3C	2019-12-02	0.0202	0.0199	0.0554	0.057	0.00065	0.000647	0.00283	0.00282	0.000151	0.000197	0.0075	0.00778	0.0296	0.0296	0.135	0.128
3C	2019-12-04	0.0204	0.0203	0.0561	0.0564	0.00096	0.000954	0.00302	0.00313	0.000148	0.000232	0.00719	0.00761	0.0256	0.0259	0.166	0.156
3C	2019-12-06	0.0197	0.02	0.0558	0.059	0.0011	0.00112	0.0036	0.00393	0.000164	0.00034	0.00755	0.00773	0.0275	0.0265	0.161	0.16
3C	2019-12-13	0.0202	0.0208	0.0549	0.0558	0.00109	0.00111	0.01	0.0111	0.00123	0.00289	0.0079	0.00758	0.0418	0.0415	0.107	0.108
3C	2019-12-19	0.00483	0.00575	0.0425	0.0461	0.0012	0.00155	0.0111	0.0128	0.0000335	0.000233	0.00184	0.00195	0.0163	0.0165	0.193	0.213
4A	2019-06-06	0.00408	0.00411	0.0146	0.0153	0.0000372	0.0000397	0.00105	0.00133	0.0000937	0.000219	0.00104	0.000998	0.00743	0.00751	0.00792	0.00951
4A	2019-07-05	0.00287	0.00503	0.00522	0.022	0.0000073	0.0000825	0.000686	0.00152	0.000028	0.000176	0.00049	0.00118	0.00191	0.00676	0.00413	0.0168
4A	2019-07-24	0.00287	0.00285	0.0192	0.0195	0.000053	0.0000535	0.000883	0.00108	0.000064	0.000134	0.000832	0.000801	0.00628	0.0061	0.0136	0.0125
4A	2019-08-09	0.00722	0.00724	0.0248	0.0226	0.0000827	0.000106	0.00109	0.00107	0.0000762	0.00011	0.00152	0.00152	0.00652	0.00654	0.0256	0.0218
4A	2019-08-14	0.0139	0.0141	0.0325	0.0325	0.000232	0.000225	0.00194	0.00223	0.0002	0.000278	0.00349	0.00327	0.0109	0.0106	0.0576	0.0574
4A	2019-08-19	0.0168	0.0178	0.0302	0.0331	0.000259	0.000303	0.00196	0.00233	0.000242	0.000406	0.00406	0.00415	0.0167	0.0155	0.0703	0.0739
4A	2019-08-27	0.0152	0.0146	0.0336	0.0347	0.000323	0.000333	0.00228	0.00279	0.000257	0.000479	0.00429	0.00399	0.0147	0.0145	0.0723	0.0745
4A	2019-09-09	0.0185	0.02	0.0546	0.0592	0.00114	0.00126	0.00716	0.00839	0.00102	0.00212	0.00666	0.00747	0.0273	0.0273	0.114	0.127
4A	2019-09-11	0.0215	0.022	0.0562	0.0556	0.00149	0.00147	0.00893	0.00989	0.00199	0.00376	0.00729	0.0072	0.0279	0.0264	0.144	0.146
4A	2019-09-13	0.02	0.0211	0.0559	0.0572	0.00145	0.00149	0.0121	0.0134	0.00211	0.00376	0.00708	0.00716	0.0278	0.0286	0.138	0.141
4A	2019-10-04	0.00551	0.0055	0.0275	0.0281	0.000104	0.000107	0.0022	0.00263	0.000378	0.000482	0.00139	0.00143	0.0102	0.0109	0.0211	0.021

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
4A	2019-10-21	0.00451	0.00451	0.0232	0.0231	0.0000789	0.0000844	0.00171	0.00188	0.000615	0.000748	0.00109	0.00107	0.00712	0.00691	0.0134	0.0136
4A	2019-11-06	0.00662	0.00695	0.0257	0.0257	0.0000835	0.0000944	0.00154	0.002	0.000405	0.000491	0.00142	0.00145	0.00886	0.00921	0.0196	0.0196
4A	2019-11-13	0.0148	0.0143	0.0385	0.0367	0.000204	0.000195	0.00222	0.00221	0.000363	0.000376	0.00361	0.00335	0.0219	0.0219	0.0555	0.0543
4A	2019-11-18	0.0196	0.0149	0.0556	0.0378	0.000696	0.00028	0.00467	0.00281	0.000398	0.000424	0.00757	0.0036	0.0348	0.027	0.112	0.0764
4A	2019-11-25	0.0138	0.0139	0.0416	0.0407	0.000322	0.000307	0.00217	0.00252	0.000297	0.000396	0.00381	0.0037	0.0267	0.0271	0.0853	0.0833
4A	2019-12-02	0.0206	0.0204	0.06	0.0616	0.00126	0.0013	0.00942	0.00974	0.00236	0.00476	0.00761	0.00758	0.0315	0.0305	0.143	0.133
4A	2019-12-04	0.0213	0.0207	0.0576	0.0558	0.00132	0.00127	0.00663	0.00686	0.00227	0.00535	0.0077	0.00722	0.033	0.032	0.138	0.131
4A	2019-12-06	0.0198	0.0192	0.0603	0.061	0.00188	0.00186	0.0139	0.0151	0.00176	0.00535	0.00784	0.00772	0.0304	0.0291	0.153	0.148
4A	2019-12-13	0.0199	0.0209	0.0532	0.0548	0.000973	0.00102	0.014	0.0156	0.00152	0.00439	0.00763	0.00713	0.0372	0.0392	0.103	0.105
4A	2019-12-27	0.00979	0.0468	0.0163	0.463	0.000169	0.00845	0.00239	0.153	0.000163	0.175	0.00116	0.0132	0.239	0.28	0.0262	0.466
4A	2020-01-06	0.0329	0.0354	0.124	0.131	0.00149	0.00167	0.0333	0.0334	0.00205	0.00338	0.00893	0.00991	0.118	0.123	0.155	0.158
4A	2020-01-09	0.0183	0.0195	0.0531	0.0521	0.00138	0.00141	0.0257	0.024	0.00353	0.00274	0.00795	0.00746	0.0302	0.0304	0.131	0.138
4A	2020-01-13	0.0212	0.0206	0.049	0.0482	0.00136	0.00135	0.0207	0.0213	0.00239	0.00367	0.00772	0.00761	0.0289	0.0289	0.155	0.152
4B	2019-06-06	0.00124	0.0013	0.00412	0.00447	0.0000056	0.0000088	0.00062	0.000757	0.0000238	0.0000605	0.000336	0.000325	0.00163	0.00169	0.00213	0.00325
4B	2019-07-05	0.0029	0.00282	0.00536	0.00536	0.0000086	<0.0000050	0.000699	0.000746	0.0000324	0.0000306	0.000542	0.000515	0.00203	0.00198	0.00408	0.00396
4B	2019-07-24	0.00158	0.00153	0.00625	0.00601	<0.0000050	0.0000053	0.000431	0.000446	0.0000114	0.0000078	0.00036	0.000364	0.00189	0.00182	0.00467	0.00288
4B	2019-08-09	0.000816	0.00387	0.00153	0.00661	<0.0000050	0.0000067	0.000098	0.000392	<0.0000050	0.0000118	0.000097	0.000523	0.000396	0.00167	0.00036	0.00374
4B	2019-08-14	0.0105	0.0109	0.016	0.0161	0.0000225	0.0000298	0.000895	0.00097	0.0000412	0.000054	0.00202	0.00203	0.0031	0.00308	0.0189	0.0186
4B	2019-08-19	0.0142	0.0141	0.0168	0.0171	0.000036	0.0000322	0.000849	0.000954	0.0000417	0.0000436	0.00271	0.00258	0.006	0.00584	0.0277	0.0264
4B	2019-08-27	0.0108	0.0108	0.0193	0.0206	0.0000559	0.0000504	0.00122	0.00124	0.0000589	0.0000823	0.00255	0.00255	0.00871	0.00883	0.0384	0.0348
4B	2019-09-09	0.0169	0.018	0.0398	0.0453	0.00044	0.000503	0.00327	0.00461	0.000252	0.000728	0.0054	0.00617	0.0176	0.0186	0.0857	0.102
4B	2019-09-11	0.0196	0.0195	0.0425	0.0424	0.000613	0.000609	0.00341	0.00369	0.000374	0.000808	0.00646	0.0064	0.0212	0.0211	0.109	0.106
4B	2019-09-13	0.0191	0.0193	0.0424	0.0423	0.000677	0.000671	0.00446	0.00491	0.00032	0.000643	0.00608	0.00596	0.0212	0.0207	0.113	0.113
4B	2019-10-04	0.0032	0.00325	0.0165	0.0163	0.0000362	0.0000363	0.00139	0.00149	0.0000358	0.0000481	0.000703	0.00074	0.00981	0.0103	0.0101	0.0108
4B	2019-10-21	0.00347	0.00351	0.0137	0.0137	0.000028	0.0000314	0.00114	0.0012	0.0000838	0.000102	0.000695	0.000664	0.00652	0.00649	0.00864	0.00837

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
4B	2019-11-06	0.00424	0.00458	0.0143	0.0146	0.0000223	0.000027	0.00103	0.00118	0.0000481	0.0000604	0.000836	0.000798	0.00693	0.00723	0.00828	0.0089
4B	2019-11-13	0.0124	0.0122	0.0238	0.0228	0.0000348	0.0000373	0.0012	0.00122	0.0000683	0.0000892	0.0028	0.00255	0.00921	0.00935	0.0167	0.0161
4B	2019-11-18	0.0117	0.0118	0.0268	0.0246	0.0000503	0.0000528	0.00124	0.0014	0.0000672	0.0000802	0.00291	0.00259	0.0158	0.0153	0.0276	0.0294
4B	2019-11-25	0.0118	0.0117	0.0292	0.0286	0.0000747	0.000069	0.00121	0.00141	0.000066	0.00008	0.00288	0.00287	0.0188	0.0192	0.0416	0.041
4B	2019-12-02	0.0206	0.0189	0.0418	0.0398	0.000269	0.000254	0.00253	0.00261	0.000298	0.000472	0.0064	0.00581	0.0284	0.0266	0.0847	0.0734
4B	2019-12-04	0.0208	0.0209	0.0471	0.0471	0.000509	0.000503	0.00282	0.00302	0.000321	0.000761	0.00672	0.00678	0.0287	0.0279	0.114	0.113
4B	2019-12-06	0.0192	0.0187	0.0452	0.0464	0.000596	0.000568	0.0036	0.00393	0.00035	0.00106	0.00646	0.00631	0.029	0.0275	0.117	0.11
4B	2019-12-13	0.018	0.0193	0.0402	0.0435	0.000315	0.000328	0.00455	0.00535	0.000512	0.00266	0.00658	0.00658	0.0411	0.0436	0.0658	0.0678
4B	2019-12-27	0.00373	0.00617	0.018	0.0443	0.0000714	0.00101	0.00129	0.00609	0.0000188	0.00388	0.000565	0.00112	0.0545	0.0558	0.0149	0.0632
4B	2020-01-07	0.0201	0.0211	0.0628	0.0635	0.00143	0.00149	0.0213	0.0254	0.00268	0.00364	0.00745	0.00764	0.0395	0.0407	0.126	0.128
4B	2020-01-09	0.0185	0.0196	0.0482	0.0485	0.000957	0.000991	0.0154	0.0174	0.000967	0.00171	0.00782	0.00751	0.031	0.031	0.112	0.118
4B	2020-01-13	0.0201	0.0194	0.0326	0.0325	0.000489	0.000512	0.0086	0.00931	0.000687	0.00112	0.00691	0.00684	0.0244	0.0239	0.101	0.0985
4C	2019-03-22	0.000083	0.000075	0.00541	0.00615	0.0000061	0.0000073	0.00126	0.00193	0.0000248	0.000058	0.000398	0.000568	0.0001	0.000109	0.0016	0.0024
4C	2019-04-15	0.000385	0.000279	0.00922	0.00864	<0.0000050	<0.0000050	0.000699	0.000869	0.0000289	0.000043	0.000421	0.000341	0.000172	0.00016	0.0012	0.00368
4C	2019-06-06	0.000685	0.000733	0.00299	0.00283	<0.0000050	<0.0000050	0.000308	0.000274	0.000016	0.0000346	0.000225	0.000218	0.000163	0.000163	0.00058	0.00169
4C	2019-07-05	0.00107	0.00108	0.00216	0.00205	0.0000068	0.0000123	0.000959	0.0011	0.0000195	0.0000459	0.000267	0.000324	0.000525	0.000523	0.00135	0.00224
4C	2019-07-24	0.000773	0.000786	0.00209	0.00221	<0.0000050	<0.0000050	0.00009	0.000136	0.000008	0.0000059	0.000219	0.000232	0.000333	0.000331	0.00137	0.00092
4C	2019-08-09	0.000302	0.00142	0.00184	0.00274	<0.0000050	<0.0000050	0.000117	0.000185	<0.0000050	0.0000063	0.000048	0.000278	0.000114	0.000454	0.00036	0.00079
4C	2019-08-14	0.00721	0.00717	0.008	0.00819	0.0000065	<0.0000050	0.00041	0.000475	0.0000171	0.0000409	0.00122	0.00117	0.00108	0.00106	0.00618	0.00599
4C	2019-08-19	0.00852	0.00927	0.00425	0.00462	0.0000087	0.0000114	0.000343	0.000463	0.0000174	0.0000279	0.0012	0.00129	0.00237	0.00234	0.00889	0.00946
4C	2019-08-27	0.0069	0.00662	0.00836	0.00856	0.0000135	0.0000175	0.000434	0.000535	0.0000244	0.000031	0.00129	0.00133	0.00427	0.00416	0.0122	0.0126
4C	2019-09-09	0.0135	0.0147	0.0243	0.0261	0.000117	0.000151	0.00134	0.00166	0.0000936	0.000152	0.00377	0.00415	0.00724	0.00783	0.0458	0.0537
4C	2019-09-11	0.0167	0.0161	0.0296	0.0289	0.000175	0.000184	0.00161	0.00182	0.00011	0.000175	0.00496	0.00483	0.0104	0.0105	0.0661	0.0639
4C	2019-09-13	0.0171	0.0171	0.0309	0.0306	0.000217	0.00023	0.00198	0.00227	0.0000986	0.000149	0.00482	0.00465	0.0113	0.0113	0.0761	0.0774
4C	2019-10-04	0.00349	0.00361	0.0109	0.011	0.0000069	0.0000083	0.000553	0.000666	0.0000102	0.0000349	0.000519	0.000485	0.00942	0.0102	0.00686	0.0114

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
4C	2019-10-21	0.00402	0.00413	0.00838	0.00862	<0.0000050	0.0000057	0.000665	0.000699	0.0000414	0.0000425	0.000502	0.000467	0.00731	0.0073	0.00534	0.00527
4C	2019-11-06	0.00452	0.00472	0.00862	0.00847	<0.0000050	<0.0000050	0.000427	0.000498	0.0000139	0.0000193	0.000537	0.000505	0.00613	0.00626	0.00427	0.00505
4C	2019-11-13	0.011	0.0108	0.0138	0.0133	0.0000093	0.0000075	0.000653	0.000661	0.0000354	0.000034	0.00198	0.00189	0.0046	0.0047	0.00733	0.00731
4C	2019-11-18	0.0107	0.0107	0.0162	0.0149	0.0000116	0.0000109	0.000635	0.000734	0.0000307	0.0000311	0.00206	0.00181	0.008	0.00829	0.0114	0.0119
4C	2019-11-25	0.0109	0.0112	0.02	0.0197	0.0000177	0.0000196	0.000627	0.000687	0.0000322	0.0000372	0.00217	0.0022	0.0129	0.0132	0.0206	0.02
4C	2019-12-02	0.0178	0.0175	0.0312	0.0317	0.0000087	0.0000082	0.00146	0.00152	0.000131	0.000179	0.00503	0.00517	0.0214	0.0211	0.0485	0.0452
4C	2019-12-04	0.0199	0.0193	0.0375	0.0371	0.000153	0.000146	0.00141	0.00156	0.00015	0.000214	0.00618	0.0058	0.0235	0.0228	0.0727	0.07
4C	2019-12-06	0.019	0.0183	0.0391	0.0397	0.000215	0.000217	0.00174	0.00191	0.000144	0.000384	0.00595	0.0059	0.0236	0.0228	0.0895	0.0847
4C	2019-12-13	0.0154	0.0162	0.0168	0.0185	0.0000885	0.0000886	0.00184	0.0025	0.000285	0.000812	0.00484	0.00473	0.0363	0.0371	0.0384	0.04
4C	2019-12-27	0.00278	0.00338	0.005	0.0086	0.0000068	0.0000817	0.000174	0.00064	0.0000085	0.00009	0.000338	0.000484	0.0444	0.0456	0.00352	0.015
4C	2020-01-07	0.0194	0.0227	0.062	0.0664	0.000792	0.000914	0.0156	0.0184	0.00117	0.00184	0.0073	0.00868	0.048	0.0514	0.0833	0.0973
4C	2020-01-09	0.0165	0.0184	0.0389	0.04	0.000555	0.000588	0.00879	0.0116	0.000291	0.000626	0.00725	0.00682	0.0319	0.0325	0.0844	0.0931
4C	2020-01-13	0.0175	0.0171	0.0233	0.0238	0.000281	0.000303	0.00526	0.00637	0.000148	0.000309	0.00611	0.00606	0.0208	0.0207	0.0769	0.08
5A	2019-06-06	0.00236	0.00255	0.0223	0.0263	0.000154	0.000303	0.00112	0.0027	0.000875	0.0019	0.000666	0.000619	0.00425	0.00435	0.00842	0.0191
5A	2019-07-05	0.00125	0.00381	0.00619	0.0191	0.0000051	0.0000337	0.000375	0.00119	0.0000363	0.000296	0.000259	0.000679	0.000918	0.00509	0.0025	0.15
5A	2019-07-24	0.00331	0.00337	0.0186	0.02	0.0000384	0.0000661	0.000757	0.00121	0.000166	0.000398	0.00069	0.000663	0.00526	0.00525	0.00922	0.0088
5A	2019-08-09	0.00583	0.00741	0.0212	0.0236	0.0000382	0.0000719	0.000905	0.00129	0.000101	0.000479	0.00119	0.00105	0.00483	0.00641	0.0137	0.0151
5A	2019-08-14	0.0159	0.0161	0.0349	0.0363	0.000223	0.000257	0.00286	0.0035	0.000688	0.000908	0.0032	0.00306	0.0135	0.012	0.0529	0.0525
5A	2019-08-19	0.0119	0.0117	0.0187	0.0193	0.000225	0.000271	0.00281	0.00368	0.000829	0.00123	0.00235	0.00248	0.0146	0.0146	0.0409	0.0415
5A	2019-08-27	0.0124	0.0127	0.0246	0.0252	0.000231	0.00031	0.00243	0.00329	0.000698	0.00102	0.00305	0.00302	0.0126	0.0127	0.0473	0.0512
5A	2019-09-09	0.0212	0.0219	0.0569	0.0563	0.00138	0.00147	0.00833	0.00817	0.00235	0.00128	0.00724	0.00761	0.0277	0.0276	0.136	0.146
5A	2019-09-11	0.0221	0.0225	0.0562	0.0552	0.00156	0.00157	0.00869	0.0102	0.00207	0.00403	0.00754	0.00739	0.0293	0.0274	0.153	0.156
5A	2019-09-13	0.0219	0.0216	0.0553	0.0539	0.00154	0.00153	0.0134	0.0146	0.00256	0.00429	0.00731	0.00716	0.0287	0.0279	0.157	0.154
5A	2019-10-08	0.00564	0.00577	0.0203	0.021	0.0000968	0.000108	0.00147	0.00173	0.000284	0.000394	0.00111	0.00115	0.0148	0.015	0.0222	0.0221
5A	2019-11-04	0.00879	0.00894	0.0226	0.0231	0.000151	0.000147	0.00138	0.0017	0.00017	0.000293	0.00154	0.00155	0.0161	0.0163	0.0356	0.0356

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
5A	2019-12-03	0.00688	0.00685	0.0245	0.0279	0.000118	0.00014	0.00165	0.00214	0.000196	0.00121	0.00123	0.00129	0.0227	0.023	0.0325	0.032
5B	2019-06-06	0.00132	0.00142	0.0131	0.0137	0.0000372	0.0000614	0.00037	0.000517	0.000161	0.000387	0.000379	0.000441	0.000797	0.000813	0.00257	0.00354
5B	2019-07-05	0.00129	0.00127	0.00591	0.00657	0.0000085	0.0000071	0.000368	0.000601	0.000034	0.0000596	0.000309	0.000284	0.000934	0.000901	0.00256	0.00272
5B	2019-07-24	0.00131	0.0013	0.00689	0.00771	0.0000063	0.0000096	0.000216	0.00039	0.0000241	0.000067	0.000271	0.00032	0.000875	0.000889	0.00213	0.0027
5B	2019-08-09	0.00235	0.00232	0.0056	0.00583	<0.0000050	<0.0000050	0.000352	0.000361	0.0000372	0.0000416	0.000357	0.000365	0.00147	0.00147	0.00312	0.0024
5B	2019-08-14	0.0113	0.0105	0.0151	0.0151	0.0000666	0.0000777	0.00101	0.00128	0.000153	0.000183	0.00111	0.00112	0.00211	0.00208	0.0133	0.0137
5B	2019-08-19	0.00793	0.00801	0.0094	0.00951	0.0000653	0.0000938	0.00102	0.00132	0.000203	0.000272	0.000966	0.00101	0.00354	0.00354	0.0117	0.0117
5B	2019-08-27	0.00559	0.00547	0.00901	0.0089	0.0000559	0.000065	0.000858	0.00109	0.000155	0.000199	0.000905	0.00093	0.0037	0.00375	0.0094	0.00871
5B	2019-09-09	0.0185	0.0196	0.0334	0.0341	0.000482	0.000575	0.00353	0.00455	0.000484	0.000847	0.00458	0.00496	0.013	0.0139	0.0725	0.0782
5B	2019-09-11	0.0216	0.0218	0.0341	0.0341	0.0004	0.000445	0.00369	0.00498	0.000386	0.000721	0.00544	0.00511	0.0152	0.0137	0.0838	0.0855
5B	2019-09-13	0.0209	0.0213	0.0345	0.0351	0.000393	0.000436	0.00455	0.00547	0.000399	0.000712	0.00548	0.00537	0.0177	0.0176	0.084	0.0854
5B	2019-10-08	0.0024	0.00233	0.0116	0.0115	0.000018	0.0000208	0.000531	0.00064	0.0000418	0.000069	0.000494	0.000488	0.00974	0.0095	0.00585	0.006
5B	2019-11-04	0.00358	0.00364	0.0107	0.0113	0.0000181	0.0000178	0.000443	0.000568	0.0000245	0.0000467	0.000621	0.000651	0.01	0.0101	0.00812	0.00803
5B	2019-12-03	0.00302	0.00303	0.0115	0.0122	0.000014	0.0000148	0.000508	0.000557	0.0000241	0.000056	0.000491	0.000507	0.0104	0.00995	0.00779	0.00811
5C	2019-03-22	0.000081	0.000074	0.00949	0.0104	0.0000124	0.0000212	0.00169	0.00262	0.000103	0.000183	0.000513	0.000697	0.000258	0.000295	0.00128	0.0017
5C	2019-04-15	0.000608	0.000395	0.0174	0.0163	0.0000311	0.0000312	0.00129	0.00127	0.000272	0.000307	0.000382	0.000345	0.000337	0.000302	0.00212	0.00712
5C	2019-06-06	0.00112	0.00119	0.0115	0.0116	0.00001	0.0000201	0.000288	0.000248	0.0000402	0.0000596	0.000289	0.000314	0.000145	0.000145	0.00203	0.00592
5C	2019-07-05	0.00106	0.00101	0.00406	0.00458	0.0000052	0.0000053	0.000621	0.000621	0.0000326	0.0000759	0.000277	0.000288	0.000151	0.000157	0.00278	0.00096
5C	2019-07-24	0.000898	0.000902	0.00367	0.00404	<0.0000050	<0.0000050	<0.0000050	0.00023	0.0000085	0.000055	0.000201	0.000215	0.000122	0.000135	0.00084	0.0036
5C	2019-08-09	0.000748	0.000748	0.00231	0.00215	<0.0000050	<0.0000050	0.00009	0.000095	0.0000083	0.0000092	0.00024	0.000237	0.000348	0.000352	0.00056	0.00057
5C	2019-08-14	0.00435	0.00455	0.00441	0.00453	0.000019	0.0000133	0.000333	0.000396	0.0000333	0.0000415	0.000379	0.000308	0.00038	0.000376	0.00385	0.00268
5C	2019-08-19	0.00348	0.0034	0.00343	0.00357	0.00002	0.0000365	0.000279	0.000471	0.0000414	0.0000657	0.000289	0.000325	0.000745	0.000698	0.00299	0.00287
5C	2019-08-27	0.00228	0.00218	0.00376	0.00393	0.0000087	0.0000242	0.000279	0.000395	0.0000335	0.0000552	0.000338	0.000317	0.00103	0.000986	0.00235	0.00294
5C	2019-09-09	0.0145	0.0146	0.0175	0.0176	0.000214	0.000328	0.00197	0.00266	0.000317	0.000486	0.00272	0.00275	0.00544	0.00571	0.0332	0.035
5C	2019-09-11	0.0175	0.0171	0.0239	0.0236	0.000278	0.000362	0.0029	0.00373	0.000315	0.000523	0.00379	0.00369	0.00898	0.00907	0.0505	0.0494

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
5C	2019-09-13	0.0188	0.0191	0.0257	0.0263	0.000276	0.000377	0.00366	0.00506	0.000334	0.000558	0.00391	0.00388	0.0115	0.011	0.0563	0.0598
5C	2019-10-08	0.00224	0.00228	0.00725	0.0078	0.0000065	0.0000079	0.000233	0.000266	0.000013	0.0000164	0.000424	0.000429	0.00587	0.00578	0.00351	0.00353
5C	2019-11-04	0.00343	0.00347	0.00603	0.00623	<0.0000050	<0.0000050	0.000184	0.000251	0.0000071	0.000018	0.000464	0.000451	0.0076	0.00756	0.00307	0.00302
5C	2019-12-03	0.00301	0.00291	0.00562	0.00561	<0.0000050	0.0000052	0.00021	0.000227	0.0000074	0.0000075	0.000363	0.000393	0.00604	0.00622	0.00341	0.00336
6A	2019-06-06	0.00352	0.00379	0.0145	0.0149	0.000128	0.000157	0.00133	0.00184	0.000471	0.000693	0.000847	0.000985	0.00712	0.00727	0.0111	0.0136
6A	2019-07-05	0.00925	0.00934	0.0253	0.0259	0.000249	0.000357	0.00181	0.00278	0.000491	0.000874	0.00218	0.00206	0.0109	0.0109	0.0327	0.0356
6A	2019-07-24	0.00506	0.00517	0.0185	0.0194	0.000185	0.000237	0.00149	0.00194	0.000445	0.000722	0.0015	0.00151	0.0084	0.00826	0.019	0.0184
6A	2019-08-09	0.00113	0.00129	0.00426	0.00443	0.0000155	0.0000215	0.000313	0.000354	0.000138	0.0000945	0.000319	0.000391	0.00157	0.00159	0.00425	0.00354
6A	2019-08-14	0.0156	0.0158	0.0352	0.035	0.000455	0.000488	0.00374	0.00464	0.000477	0.000868	0.00431	0.00454	0.017	0.0163	0.068	0.0695
6A	2019-08-19	0.0192	0.0193	0.0433	0.0432	0.000748	0.000714	0.00409	0.00458	0.000572	0.00119	0.00562	0.00583	0.023	0.0227	0.0968	0.0961
6A	2019-08-27	0.0161	0.0159	0.0374	0.0387	0.000539	0.000569	0.00389	0.00466	0.000573	0.000971	0.00529	0.00522	0.0194	0.0192	0.0805	0.0836
6A	2019-09-09	0.0189	0.0204	0.0574	0.0595	0.00107	0.00118	0.00777	0.00929	0.00103	0.00212	0.00679	0.00768	0.0284	0.0284	0.113	0.127
6A	2019-09-11	0.0213	0.0214	0.0589	0.0589	0.00132	0.00138	0.00807	0.00848	0.00125	0.00207	0.00753	0.00757	0.0295	0.0299	0.137	0.131
6A	2019-09-13	0.0213	0.0211	0.06	0.0584	0.00149	0.00147	0.0137	0.0146	0.00184	0.00303	0.00721	0.00695	0.0264	0.0251	0.149	0.146
6A	2019-10-04	0.00446	0.00458	0.0228	0.0235	0.000102	0.000113	0.0027	0.00307	0.000989	0.00112	0.000975	0.00105	0.0138	0.0145	0.0118	0.0178
6A	2019-10-21	0.00504	0.00521	0.0222	0.0232	0.000116	0.000143	0.00243	0.00305	0.00103	0.00141	0.00124	0.00123	0.0115	0.0115	0.0106	0.0118
6A	2019-11-06	0.0079	0.00837	0.0236	0.0247	0.0000626	0.0000806	0.0018	0.00288	0.000447	0.000764	0.00173	0.0018	0.013	0.0142	0.0133	0.0171
6A	2019-11-13	0.0143	0.0142	0.0357	0.035	0.00018	0.000226	0.00373	0.0053	0.000754	0.00115	0.00394	0.00378	0.0258	0.0259	0.0347	0.0348
6A	2019-11-18	0.0177	0.0178	0.0459	0.0436	0.000413	0.000431	0.00563	0.00705	0.00123	0.00176	0.00609	0.00551	0.0325	0.0338	0.0615	0.0654
6A	2019-11-25	0.0194	0.0193	0.049	0.0483	0.000414	0.000413	0.00634	0.00738	0.001	0.00151	0.0061	0.00605	0.0351	0.0361	0.0734	0.0719
6A	2019-12-02	0.0204	0.0195	0.0602	0.0614	0.00106	0.0011	0.00907	0.01	0.00235	0.00464	0.00777	0.00773	0.0317	0.0305	0.133	0.125
6A	2019-12-04	0.0211	0.0207	0.0604	0.0606	0.00125	0.00125	0.00719	0.00792	0.00246	0.00614	0.00794	0.00759	0.0324	0.0313	0.135	0.132
6A	2019-12-06	0.0201	0.0194	0.0618	0.0612	0.00195	0.00187	0.0143	0.0151	0.00206	0.00546	0.00803	0.00774	0.0311	0.0295	0.156	0.149
6A	2019-12-13	0.0218	0.0233	0.0527	0.0582	0.000929	0.00102	0.0161	0.0192	0.00205	0.00564	0.00746	0.00767	0.04	0.0415	0.105	0.109
6A	2019-12-19	0.0112	0.012	0.188	0.202	0.00146	0.00223	0.0313	0.0415	0.00202	0.0136	0.00486	0.00524	0.0725	0.0707	0.203	0.231

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
6B	2019-06-06	0.00282	0.00269	0.00999	0.0103	0.0000262	0.0000282	0.00122	0.00122	0.0000919	0.000119	0.0006	0.000586	0.00345	0.00355	0.00831	0.0103
6B	2019-07-05	0.00621	0.00622	0.0115	0.0117	0.0000454	0.0000619	0.000903	0.00123	0.0000877	0.000162	0.00104	0.000615	0.00323	0.00323	0.0103	0.0109
6B	2019-07-24	0.003	0.00309	0.00989	0.0101	0.0000292	0.0000338	0.000517	0.00061	0.0000486	0.0000707	0.000557	0.000557	0.0029	0.00288	0.00723	0.00517
6B	2019-08-09	0.00476	0.00491	0.00981	0.00978	0.0000222	0.0000158	0.000551	0.000578	0.0000201	0.0000233	0.000616	0.00061	0.00254	0.00248	0.00575	0.00512
6B	2019-08-14	0.0113	0.0114	0.0178	0.0183	0.0000825	0.0000946	0.00146	0.00175	0.000108	0.000259	0.00202	0.00205	0.00406	0.00403	0.0216	0.0212
6B	2019-08-19	0.0142	0.0144	0.0206	0.0206	0.000104	0.000126	0.00137	0.00149	0.000105	0.000138	0.00263	0.00254	0.00631	0.00635	0.03	0.0296
6B	2019-08-27	0.00999	0.0105	0.0192	0.0193	0.00011	0.0000841	0.0014	0.0016	0.0000948	0.00012	0.0025	0.00228	0.00859	0.00845	0.0251	0.0245
6B	2019-09-09	0.0185	0.0202	0.0385	0.0408	0.000276	0.000323	0.00306	0.00432	0.000272	0.000591	0.00543	0.00607	0.017	0.0173	0.062	0.0716
6B	2019-09-11	0.021	0.0206	0.0398	0.0403	0.000375	0.000376	0.00365	0.0043	0.000283	0.000411	0.00572	0.00548	0.0151	0.015	0.0853	0.0841
6B	2019-09-13	0.0218	0.0212	0.0437	0.0446	0.000525	0.000533	0.00461	0.0052	0.000353	0.000656	0.0059	0.00586	0.0167	0.0172	0.105	0.103
6B	2019-10-04	0.00445	0.00443	0.0183	0.0179	0.000045	0.0000465	0.00148	0.00156	0.0000423	0.0000585	0.000655	0.000655	0.0129	0.0134	0.0134	0.021
6B	2019-10-21	0.00507	0.00517	0.0154	0.0156	0.0000415	0.0000473	0.00132	0.00156	0.0000641	0.00011	0.000725	0.000777	0.0079	0.00779	0.0136	0.0144
6B	2019-11-06	0.00579	0.00614	0.0154	0.0155	0.0000247	0.0000287	0.00106	0.00135	0.0000419	0.0000606	0.000872	0.00086	0.00829	0.00848	0.00941	0.00979
6B	2019-11-13	0.0117	0.0115	0.0207	0.02	0.0000366	0.0000444	0.00133	0.00155	0.0000826	0.00014	0.0024	0.00226	0.00811	0.00823	0.0115	0.0114
6B	2019-11-18	0.0144	0.0143	0.028	0.026	0.0000614	0.0000598	0.00187	0.00251	0.000122	0.000161	0.00385	0.00344	0.0177	0.0182	0.0178	0.0198
6B	2019-11-25	0.0153	0.0156	0.031	0.0312	0.0000643	0.0000782	0.00175	0.00242	0.0000908	0.000123	0.00365	0.00368	0.0213	0.0221	0.0263	0.0259
6B	2019-12-02	0.0203	0.0199	0.0476	0.0483	0.000259	0.000262	0.00352	0.0042	0.000576	0.000939	0.00686	0.00714	0.031	0.0297	0.067	0.0642
6B	2019-12-04	0.0215	0.0205	0.0472	0.0461	0.00034	0.000349	0.00313	0.00418	0.000346	0.000699	0.00678	0.00654	0.0274	0.0263	0.0925	0.0891
6B	2019-12-06	0.0209	0.02	0.0471	0.0478	0.000369	0.000349	0.00343	0.00473	0.000196	0.000422	0.00651	0.00645	0.0285	0.0272	0.0982	0.0932
6B	2019-12-13	0.0205	0.0216	0.0443	0.0461	0.00027	0.000281	0.00764	0.00765	0.00187	0.00192	0.0067	0.00675	0.0432	0.045	0.0552	0.0575
6B	2019-12-19	0.0114	0.0172	0.192	0.238	0.00209	0.00319	0.0348	0.0427	0.000186	0.0161	0.0047	0.00581	0.0495	0.0505	0.309	0.349
6C	2019-03-22	0.000122	0.000134	0.00643	0.00722	0.0000124	0.0000189	0.0024	0.00315	0.0000404	0.000069	0.00045	0.000589	0.000207	0.000222	0.00168	0.0025
6C	2019-04-15	0.00113	0.00116	0.0101	0.0106	0.0000087	0.000008	0.0013	0.00126	0.0000269	0.0000514	0.000466	0.000562	0.000342	0.000366	0.002	0.00924
6C	2019-06-06	0.00196	0.00188	0.00894	0.00935	0.0000087	0.0000064	0.00038	0.000455	0.0000194	0.0000224	0.000385	0.000393	0.00192	0.00197	0.00094	0.00104
6C	2019-07-05	0.00447	0.00456	0.00723	0.00769	0.0000113	0.0000148	0.000533	0.000678	0.0000223	0.0000397	0.000531	0.000645	0.00133	0.00134	0.00182	0.00234

Sample Point	Date	Concentration (mg/L)															
		Antimony (D)	Antimony (T)	Arsenic (D)	Arsenic (T)	Cadmium (D)	Cadmium (T)	Copper (D)	Copper (T)	Lead (D)	Lead (T)	Selenium (D)	Selenium (T)	Uranium (D)	Uranium (T)	Zinc (D)	Zinc (T)
6C	2019-07-24	0.00235	0.00227	0.00657	0.00636	<0.0000050	<0.0000050	0.000168	0.00021	<0.0000050	0.0000092	0.000321	0.000305	0.00126	0.00123	0.00191	0.00148
6C	2019-08-09	0.00275	0.003	0.00599	0.00581	<0.0000050	<0.0000050	0.000193	0.000226	0.0000056	0.0000113	0.00031	0.000307	0.00141	0.00139	0.00089	0.00146
6C	2019-08-14	0.0102	0.00996	0.0109	0.0109	0.0000125	0.0000058	0.000579	0.00063	0.0000245	0.0000308	0.00161	0.0016	0.00156	0.00163	0.00419	0.00378
6C	2019-08-19	0.0135	0.0138	0.0106	0.0107	0.0000234	0.000024	0.000705	0.000679	0.0000267	0.0000252	0.00203	0.0021	0.00344	0.00351	0.0082	0.00812
6C	2019-08-27	0.00795	0.00795	0.0105	0.0105	0.000028	0.0000249	0.000647	0.000672	0.0000293	0.0000286	0.00145	0.00156	0.00534	0.0049	0.0105	0.00995
6C	2019-09-09	0.0163	0.0164	0.0263	0.0255	0.0000654	0.0000741	0.00171	0.00205	0.000134	0.00016	0.00446	0.00454	0.00729	0.00726	0.029	0.0299
6C	2019-09-11	0.0179	0.018	0.0312	0.0315	0.000121	0.000127	0.00225	0.00255	0.000133	0.000175	0.00492	0.00504	0.00904	0.00897	0.0556	0.0521
6C	2019-09-13	0.0193	0.0188	0.0343	0.0348	0.000144	0.000153	0.00262	0.0031	0.000122	0.000181	0.00492	0.00486	0.0117	0.0117	0.0648	0.0651
6C	2019-10-04	0.00388	0.00388	0.0141	0.0136	0.0000155	0.0000136	0.000845	0.000891	0.0000082	0.0000159	0.000502	0.000526	0.0131	0.0136	0.0104	0.0109
6C	2019-10-21	0.00406	0.00415	0.0113	0.0113	0.0000092	0.0000117	0.000735	0.000733	0.0000119	0.000012	0.000522	0.000474	0.00912	0.00901	0.00921	0.00812
6C	2019-11-06	0.00514	0.00531	0.0111	0.0111	0.0000086	0.0000104	0.000681	0.000777	0.0000127	0.0000113	0.000534	0.000532	0.00674	0.00694	0.00858	0.00924
6C	2019-11-13	0.00997	0.00946	0.0137	0.0132	0.0000159	0.0000159	0.000803	0.000798	0.0000221	0.0000251	0.00189	0.00181	0.00398	0.00403	0.00858	0.00835
6C	2019-11-18	0.0134	0.0134	0.0211	0.0197	0.0000175	0.0000204	0.00108	0.00138	0.0000533	0.0000613	0.00333	0.00302	0.0119	0.0118	0.00928	0.0105
6C	2019-11-25	0.0144	0.0149	0.0241	0.0243	0.0000252	0.0000253	0.00109	0.0013	0.0000377	0.0000474	0.00325	0.00321	0.0159	0.0162	0.0142	0.014
6C	2019-12-02	0.0185	0.0181	0.0374	0.038	0.0000623	0.0000688	0.00216	0.0026	0.00014	0.000173	0.0059	0.00582	0.0238	0.023	0.0301	0.0287
6C	2019-12-04	0.0205	0.0199	0.0442	0.0432	0.000142	0.000148	0.00254	0.00292	0.000162	0.000225	0.00664	0.00641	0.0244	0.0241	0.0586	0.0551
6C	2019-12-06	0.0201	0.0195	0.0437	0.0446	0.000183	0.000189	0.00281	0.00364	0.000122	0.000217	0.00644	0.00618	0.0248	0.0238	0.0754	0.0731
6C	2019-12-13	0.0193	0.0208	0.0281	0.0321	0.000109	0.000148	0.00346	0.00582	0.000314	0.00126	0.00554	0.00571	0.0436	0.0453	0.0436	0.0472
6C	2019-12-19	0.00821	0.00876	0.0981	0.0978	0.00086	0.000956	0.00944	0.0108	0.0000657	0.000487	0.00279	0.00281	0.0315	0.0315	0.256	0.256

Data Source: Maxxam

A3. PLANT AND ORGANIC DATA

Table A3-1: Wet Mass of Above Water Plant Biomass and Organic Material in Water Column Collected From CWTS Cells at the End of Testing

Series	Cell	Wet Mass (g)		
		Bulrush	Water Sedge	Organics ¹
1	A	28	-	921
	B	83	-	1135
	C	35	-	1667
2	A	85	-	812
	B	92	-	1390
	C	70	-	1723
3	A	193	-	1281
	B	145	-	1229
	C	145	-	1562
4	A	-	646	369
	B	-	428	182
	C	-	595	236
5	A	-	532	702
	B	-	396	1735
	C	-	618	467
6	A	-	438	1350
	B	-	635	1408
	C	-	352	1165

Bulrush series: 1, 2, 3; Water Sedge series: 4, 5, 6

¹ Organic samples consist of moss, straw, and duckweed from the CWTS cells

Table A3-2: Percent Moisture of Above Water Plant Biomass and Organic Material in Water Column Collected From CWTS Cells at the End of Testing

Sample Point	Sample Type	Moisture (%)
1A	Bulrush	57
	Organics	83
1B	Bulrush	43
	Organics	86
1C	Bulrush	62
	Organics	76
2A	Bulrush	51
	Organics	91
2B	Bulrush	57
	Organics	89
2C	Bulrush	58
	Organics	86
3A	Bulrush	63
	Organics	75
3B	Bulrush	66
	Organics	82
3C	Bulrush	65
	Organics	69
4A	Water sedge	56
	Organics	91
4B	Water sedge	48
	Organics	93
4C	Water sedge	47
	Organics	91
5A	Water sedge	61
	Organics	91
5B	Water sedge	55
	Organics	88
5C	Water sedge	63
	Organics	80
6A	Water sedge	58
	Organics	86
6B	Water sedge	53
	Organics	92
6C	Water sedge	53
	Organics	79

Table A3-3: Total Metals in Above Water Plant Biomass and Organic Material in Water Column Collected From CWTS Cells at the End of Testing

Sample Point		Data Source	Date	Total COPI (mg/kg)							
				Antimony	Arsenic	Cadmium	Copper	Lead	Selenium	Uranium	Zinc
1A	Bulrush	Maxxam	2020-01-13	0.218	1.16	0.0562	3.04	1.27	0.862	0.229	31.3
	Organics	Maxxam	2020-01-13	11.5	107	15.6	312	363	6.07	40.5	671
1B	Bulrush	Maxxam	2020-01-13	0.18	1.08	0.116	3.69	0.769	0.627	0.594	32.9
	Organics	Maxxam	2020-01-13	20.8	345	26.1	620	227	25.5	173	1270
1C	Bulrush	Maxxam	2020-01-13	0.345	2.2	0.375	2.49	0.487	0.483	0.704	54.8
	Organics	Maxxam	2020-01-13	19.6	358	19.5	158	33.1	14.9	85.1	1270
2A	Bulrush	Maxxam	2019-12-17	0.0873	1.52	0.0515	3.42	2.11	0.902	0.139	93.3
	Organics	Maxxam	2019-12-17	5.77	92.8	12	250	211	7.32	94.8	535
2B	Bulrush	Maxxam	2019-12-17	0.158	0.825	0.0503	1.73	0.365	0.519	0.229	14.3
	Organics	Maxxam	2019-12-17	11.7	103	12.7	149	78.6	10.9	97.9	663
2C	Bulrush	Maxxam	2019-12-17	0.111	0.517	0.0201	1.23	0.13	0.492	0.182	22.3
	Organics	Maxxam	2019-12-17	5.96	128	9.34	64.8	11.9	14.1	74.3	518
3A	Bulrush	Maxxam	2019-12-12	0.262	2.11	0.137	4.74	1.6	1.16	0.449	78.8
	Organics	Maxxam	2019-12-20	8.89	90.2	6.3	85.6	158	6.18	33.8	232
3B	Bulrush	Maxxam	2019-12-12	0.526	2.91	0.181	3.21	0.471	0.664	0.918	31.4
	Organics	Maxxam	2019-12-20	7.46	37.5	5.9	71.7	21.7	4.67	45.2	281
3C	Bulrush	Maxxam	2019-12-12	0.396	2.0	0.114	2.5	0.783	0.547	1.48	17.3
	Organics	Maxxam	2019-12-20	3.61	35.6	2.83	29.4	4.12	3.32	39.4	182
4A	Water sedge	Maxxam	2020-01-13	1.29	7.16	0.175	5.89	1.22	1.35	2.29	93.4
	Organics	Maxxam	2020-01-13	36.4	431	16.6	276	310	18.0	49.9	845
4B	Water sedge	Maxxam	2020-01-13	0.22	2.81	0.0716	2.76	0.407	0.566	0.383	39.5
	Organics	Maxxam	2020-01-13	27	310	12	85.4	30.5	11.1	37.3	901

4C	Water sedge	Maxxam	2020-01-13	0.504	1.85	0.023	2.01	0.264	0.267	0.747	32.2
	Organics	Maxxam	2020-01-13	16.6	150	5.07	35.1	8.22	6.9	13.8	530
5A	Water sedge	Maxxam	2019-12-17	0.44	5.37	0.0655	3.54	1.78	1.78	0.898	63.8
	Organics	Maxxam	2019-12-17	34.6	214	13.3	97.7	122	18.4	54.4	721
5B	Water sedge	Maxxam	2019-12-17	0.303	1.89	0.0078	1.67	0.194	0.303	0.617	26.6
	Organics	Maxxam	2019-12-17	17.0	81.5	2.4	19.4	4.98	7.49	24.2	291
5C	Water sedge	Maxxam	2019-12-17	0.278	1.65	0.0177	1.63	0.29	0.178	0.303	23.8
	Organics	Maxxam	2019-12-17	5.64	20.6	0.337	10.3	1.69	1.81	7.58	47
6A	Water sedge	Maxxam	2019-12-12	0.734	8.44	0.14	6.03	2.32	1.59	1.35	74.6
	Organics	Maxxam	2019-12-20	46.5	216	11.1	108	108	23.3	71.2	824
6B	Water sedge	Maxxam	2019-12-12	0.95	4.89	0.0517	2.93	0.259	0.55	1.69	27.3
	Organics	Maxxam	2019-12-20	39.6	229	8.17	70.7	28.5	18	86.5	757
6C	Water sedge	Maxxam	2019-12-12	0.617	2.01	0.012	2.18	0.562	0.284	0.694	18.4
	Organics	Maxxam	2019-12-20	5.49	52.7	0.891	11.5	2.63	2.97	14.3	113

A4. SUBSTRATE DATA

Table A4-1: Total Metals in Top 5 cm of Substrate Collected From CWTS Cells at the End of Testing

Sample Point	Data Source	Date	Total COPI (mg/kg)							
			Antimony	Arsenic	Cadmium	Copper	Lead	Selenium	Uranium	Zinc
1A	Maxxam	2020-01-13	0.34	3.33	0.147	4.2	2.98	<0.50	0.687	15.7
1B	Maxxam	2020-01-13	0.14	2.39	0.089	2.45	1.62	<0.50	0.483	11.1
1C	Maxxam	2020-01-13	0.23	2.79	0.087	3.09	1.43	<0.50	0.673	14.5
2A	Maxxam	2019-12-17	0.41	3.37	0.127	3.93	2.35	<0.50	0.807	12.9
2B	Maxxam	2019-12-17	0.7	4.57	0.198	4.8	1.83	<0.50	1.37	18.8
2C	Maxxam	2019-12-17	0.2	2.29	0.102	3.88	1.38	<0.50	0.663	12.3
3A	Maxxam	2019-12-20	0.22	2.04	0.089	2.63	1.53	<0.50	0.687	9.8
3B	Maxxam	2019-12-20	0.18	2.1	0.096	2.95	1.44	<0.50	0.553	10.6
3C	Maxxam	2019-12-20	0.15	2.28	0.081	2.12	1.22	<0.50	0.562	9.8
4A	Maxxam	2020-01-13	0.42	2.85	0.103	3.81	1.75	<0.50	0.802	14.6
4B	Maxxam	2020-01-13	0.27	2.3	0.075	3.14	1.16	<0.50	0.713	11.3
4C	Maxxam	2020-01-13	0.18	1.92	0.11	2.75	1.18	<0.50	0.529	11.1
5A	Maxxam	2019-12-17	0.54	1.97	0.142	3.54	1.72	<0.50	0.93	13.4
5B	Maxxam	2019-12-17	0.27	2.4	0.099	3.83	1.6	<0.50	0.697	11
5C	Maxxam	2019-12-17	0.2	1.54	0.078	2.53	1.16	<0.50	0.605	7.7
6A	Maxxam	2019-12-20	0.42	2.09	0.133	3.45	1.61	<0.50	0.912	13.1
6B	Maxxam	2019-12-20	0.26	1.57	0.075	2.39	1.29	<0.50	0.806	9.2
6C	Maxxam	2019-12-20	0.2	2.5	0.089	2.59	1.33	<0.50	0.626	13.1

Table A4-2: Fractionation of Metals in Top 5 cm of Substrate Collected From CWTS Cells at the End of Testing (Tessier et al., 1979)

Sample Point	Data Source	Date	Fraction	Concentration (mg/kg)							
				Antimony	Arsenic	Cadmium	Copper	Lead	Selenium	Uranium	Zinc
Initial	ALS	19-Oct-18	1	<0.1	<0.05	<0.05	<0.5	0.5	<0.2	<0.05	<1
	ALS	19-Oct-18	2	<0.1	<0.05	<0.05	<0.5	0.5	<0.2	0.072	<1
	ALS	19-Oct-18	3	<0.1	0.352	<0.05	1.24	0.66	<0.2	0.221	1.8
	ALS	19-Oct-18	4	<0.1	0.063	<0.05	<0.5	0.5	<0.2	0.098	<1
	ALS	19-Oct-18	5	0.1	2.37	<0.05	2.51	0.86	<0.2	0.273	11.4
1A	Maxxam	13-Jan-20	1	<0.050	<0.050	0.016	0.21	0.141	<0.10	0.0075	1.06
	Maxxam	13-Jan-20	2	<0.060	0.143	0.036	0.25	0.249	<0.12	0.174	1.86
	Maxxam	13-Jan-20	3	0.05	0.352	0.0395	0.307	0.454	<0.060	0.165	3.45
	Maxxam	13-Jan-20	4	0.0328	0.212	0.00851	0.756	0.16	0.0659	0.0382	0.4
	Maxxam	13-Jan-20	5	0.17	3.0	<0.02	4.8	11.2	<0.3	0.8	16.2
1B	Maxxam	13-Jan-20	1	<0.050	<0.050	<0.013	0.2	0.099	<0.10	0.0063	0.62
	Maxxam	13-Jan-20	2	<0.060	0.073	0.039	0.31	0.183	<0.12	0.093	1.35
	Maxxam	13-Jan-20	3	<0.030	0.169	0.0333	0.494	0.542	<0.060	0.116	3.4
	Maxxam	13-Jan-20	4	0.0257	0.267	0.0068	0.973	0.386	0.0221	0.0688	0.811
	Maxxam	13-Jan-20	5	0.17	2.8	<0.02	5.5	11.8	<0.3	0.9	17
1C	Maxxam	13-Jan-20	1	<0.050	<0.050	0.032	0.23	0.304	<0.10	0.0105	2.59
	Maxxam	13-Jan-20	2	<0.060	0.095	0.039	0.3	0.308	<0.12	0.103	2.23
	Maxxam	13-Jan-20	3	0.049	0.29	0.0324	0.269	0.698	<0.060	0.103	3.36
	Maxxam	13-Jan-20	4	0.00692	0.165	0.00905	1.54	0.183	0.0224	0.0278	1.25
	Maxxam	13-Jan-20	5	0.18	3.1	<0.02	4.0	11.8	<0.3	0.8	21.3
2A	Maxxam	17-Dec-19	1	<0.050	0.062	0.025	0.33	0.335	<0.10	0.0397	1
	Maxxam	17-Dec-19	2	<0.060	0.108	0.046	0.35	0.448	<0.12	0.18	2.17
	Maxxam	17-Dec-19	3	0.06	0.323	0.0697	0.338	0.53	<0.060	0.157	2.77
	Maxxam	17-Dec-19	4	0.00739	0.151	0.0065	0.69	0.159	0.0214	0.0611	0.65
	Maxxam	17-Dec-19	5	0.19	3.3	<0.02	5.3	11.1	<0.3	0.9	20

2B	Maxxam	17-Dec-19	1	<0.050	0.064	0.018	0.31	0.085	<0.10	0.017	0.74
	Maxxam	17-Dec-19	2	<0.060	<0.060	0.044	0.34	0.162	<0.12	0.114	1.24
	Maxxam	17-Dec-19	3	<0.030	0.104	0.0422	0.51	0.421	<0.060	0.201	2.48
	Maxxam	17-Dec-19	4	0.00306	0.127	0.00658	0.613	0.149	0.022	0.178	0.689
	Maxxam	17-Dec-19	5	0.16	3.2	<0.02	6.8	12.1	<0.3	0.9	19.8
2C	Maxxam	17-Dec-19	1	<0.050	<0.050	0.014	0.27	0.058	<0.10	0.0127	0.59
	Maxxam	17-Dec-19	2	<0.060	<0.060	0.033	0.33	0.13	<0.12	0.0701	1.04
	Maxxam	17-Dec-19	3	<0.030	0.134	0.0319	0.48	0.708	<0.060	0.0908	2.94
	Maxxam	17-Dec-19	4	0.00204	0.096	0.00326	0.451	0.108	0.0101	0.107	0.471
	Maxxam	17-Dec-19	5	0.2	2.9	<0.02	6.9	11.0	<0.3	1.0	20.5
3A	Maxxam	20-Dec-19	1	0.058	0.129	0.065	0.75	0.279	<0.10	0.0484	52.9
	Maxxam	20-Dec-19	2	0.085	0.167	0.053	0.92	0.638	<0.12	0.332	2.74
	Maxxam	20-Dec-19	3	0.106	0.426	0.0415	0.728	0.901	<0.060	0.187	4.22
	Maxxam	20-Dec-19	4	0.0188	0.181	0.00665	0.663	0.152	0.0438	0.0918	0.534
	Maxxam	20-Dec-19	5	0.23	3.9	<0.02	6.2	10.6	<0.3	0.6	19.3
3B	Maxxam	20-Dec-19	1	<0.050	0.074	0.022	0.39	0.058	<0.10	0.0243	12.4
	Maxxam	20-Dec-19	2	<0.060	0.109	0.043	0.55	0.138	<0.12	0.275	1.75
	Maxxam	20-Dec-19	3	0.048	0.217	0.0431	0.58	0.713	<0.060	0.19	3.58
	Maxxam	20-Dec-19	4	0.00605	0.137	0.0128	0.596	0.248	0.0463	0.0882	1.0
	Maxxam	20-Dec-19	5	0.66	8.7	<0.02	9.0	10.8	<0.3	1.1	37.3
3C	Maxxam	20-Dec-19	1	<0.050	0.119	0.017	0.23	0.034	<0.10	0.0162	1.33
	Maxxam	20-Dec-19	2	<0.060	0.11	0.041	0.5	0.126	<0.12	0.149	1.92
	Maxxam	20-Dec-19	3	<0.030	0.22	0.0571	0.602	0.498	<0.060	0.167	3.43
	Maxxam	20-Dec-19	4	0.0138	0.133	0.00809	0.823	0.162	0.0292	0.0741	0.656
	Maxxam	20-Dec-19	5	0.26	4.5	<0.02	4.4	10.1	<0.3	0.8	18
4A	Maxxam	13-Jan-20	1	<0.050	<0.050	0.057	0.37	0.661	<0.10	0.0281	7.44
	Maxxam	13-Jan-20	2	<0.060	0.101	0.074	0.53	0.835	<0.12	0.341	6.73
	Maxxam	13-Jan-20	3	<0.030	0.042	0.0189	<0.075	0.406	<0.060	0.0687	1.47

	Maxxam	13-Jan-20	4	0.0529	0.542	0.0391	2.74	0.733	0.0382	0.511	10.1
	Maxxam	13-Jan-20	5	0.39	3.9	<0.02	4.5	9.7	<0.3	1	22.1
4B	Maxxam	13-Jan-20	1	<0.050	<0.050	<0.013	0.31	0.08	<0.10	0.0247	0.83
	Maxxam	13-Jan-20	2	<0.060	<0.060	0.027	0.27	0.122	<0.12	0.137	1.74
	Maxxam	13-Jan-20	3	0.034	0.15	0.0193	0.648	0.457	<0.060	0.114	2.63
	Maxxam	13-Jan-20	4	0.00516	0.117	0.00434	1.0	0.142	0.0188	0.0915	0.865
	Maxxam	13-Jan-20	5	0.12	2.1	<0.02	6.3	9.77	<0.3	0.6	17.1
4C	Maxxam	13-Jan-20	1	<0.050	<0.050	<0.013	0.2	0.034	<0.10	0.01	0.83
	Maxxam	13-Jan-20	2	<0.060	0.072	0.03	0.38	0.166	<0.12	0.135	1.37
	Maxxam	13-Jan-20	3	0.039	0.132	0.0158	0.354	0.368	<0.060	0.0828	2.59
	Maxxam	13-Jan-20	4	0.00689	0.122	0.013	6.22	0.148	0.0241	0.064	0.599
	Maxxam	13-Jan-20	5	0.12	2.5	<0.02	4.5	15.4	<0.3	1.0	12.8
5A	Maxxam	17-Dec-19	1	<0.050	0.094	<0.013	0.25	0.074	<0.10	0.0511	0.77
	Maxxam	17-Dec-19	2	<0.060	0.12	0.035	0.33	0.247	<0.12	0.326	1.99
	Maxxam	17-Dec-19	3	0.107	0.285	0.0317	0.563	0.494	<0.060	0.165	3.92
	Maxxam	17-Dec-19	4	0.0214	0.198	0.0087	0.852	0.146	0.0739	0.079	0.822
	Maxxam	17-Dec-19	5	0.21	2	<0.02	4.1	9.46	<0.3	0.7	15.7
5B	Maxxam	17-Dec-19	1	<0.050	0.063	0.013	0.28	0.032	<0.10	0.0121	0.67
	Maxxam	17-Dec-19	2	<0.060	0.067	0.04	0.27	0.115	<0.12	0.0978	1.31
	Maxxam	17-Dec-19	3	0.052	0.233	0.0514	0.516	0.484	<0.060	0.0964	4.19
	Maxxam	17-Dec-19	4	0.00824	0.273	0.00523	0.605	0.127	0.0324	0.0582	0.391
	Maxxam	17-Dec-19	5	0.16	2.9	<0.02	5.7	10.9	<0.3	0.8	17.6
5C	Maxxam	17-Dec-19	1	<0.050	0.06	0.014	0.33	0.038	<0.10	0.0128	11.6
	Maxxam	17-Dec-19	2	<0.060	0.068	0.036	0.23	0.108	<0.12	0.0937	1.87
	Maxxam	17-Dec-19	3	0.044	0.109	0.0394	0.091	0.471	<0.060	0.0884	2.45
	Maxxam	17-Dec-19	4	0.00753	0.174	0.00753	0.782	0.143	0.0387	0.0612	0.687
	Maxxam	17-Dec-19	5	0.17	2.5	<0.02	4.8	11.5	<0.3	0.9	19.4

6A	Maxxam	20-Dec-19	1	<0.050	0.103	0.052	0.48	0.211	<0.10	0.0706	7.76
	Maxxam	20-Dec-19	2	0.095	0.246	0.055	0.58	0.617	<0.12	0.616	3.22
	Maxxam	20-Dec-19	3	0.201	0.551	0.0512	0.426	0.796	<0.060	0.286	4.97
	Maxxam	20-Dec-19	4	0.0439	0.177	0.0101	1.58	0.208	0.0689	0.056	0.862
	Maxxam	20-Dec-19	5	0.29	3.3	<0.02	4.7	10.2	<0.3	0.7	15.8
6B	Maxxam	20-Dec-19	1	<0.050	0.102	0.019	0.24	0.041	<0.10	0.0228	1.2
	Maxxam	20-Dec-19	2	<0.060	0.105	0.043	0.48	0.161	<0.12	0.325	1.77
	Maxxam	20-Dec-19	3	0.062	0.295	0.0331	0.429	0.531	<0.060	0.243	2.88
	Maxxam	20-Dec-19	4	0.015	0.235	0.0129	0.706	0.25	0.0634	0.263	0.836
	Maxxam	20-Dec-19	5	0.29	2.8	<0.02	3.8	10.0	<0.3	0.7	23.6
6C	Maxxam	20-Dec-19	1	<0.050	0.092	0.015	0.23	0.036	<0.10	0.0191	1.49
	Maxxam	20-Dec-19	2	<0.060	0.093	0.036	0.44	0.127	<0.12	0.182	1.52
	Maxxam	20-Dec-19	3	<0.030	0.137	0.0252	0.354	0.402	<0.060	0.148	2.85
	Maxxam	20-Dec-19	4	0.0273	0.177	0.00794	2.26	0.181	0.0605	0.0947	0.734
	Maxxam	20-Dec-19	5	0.23	3.3	<0.02	12.6	12.0	<0.3	0.7	19.5

Table A4-3: Acid Volatile Sulphides and Simultaneously Extracted Metals (AVS:SEM) in the Top 5 cm of Substrate Collected From CWTS Cells at the End of Testing

Sample Point	Date	Source	Acid Volatile Sulphides (μmol/g)	Simultaneously Extractable Metals (μmol/g)					
				Cadmium	Copper	Lead	Mercury	Nickel	Zinc
Initial	10-Oct-18	ALS	<0.20	<0.010	0.8	<0.040	<0.000050	<0.10	0.026
1A/3A	13-Dec-19	Maxxam	0.49	<0.0050	4.63	<0.020	<0.000050	0.327	0.131
1A	13-Jan-20	Maxxam	1.82	<0.0050	0.017	<0.020	<0.000050	<0.050	0.0615
1C/3C	13-Dec-19	Maxxam	5.06	<0.0050	0.015	<0.020	<0.000050	<0.050	0.0864
1C	13-Jan-20	Maxxam	1.16	<0.0053	<0.019	<0.020	<0.000050	<0.102	0.0291
2A	17-Dec-19	Maxxam	<0.20	<0.0050	0.019	<0.020	<0.000050	<0.050	0.0367
2C	17-Dec-19	Maxxam	<0.20	<0.0050	0.014	<0.020	<0.000050	<0.050	0.024
3A	20-Dec-19	Maxxam	<0.20	<0.0053	0.035	<0.020	<0.000050	<0.102	0.0974
3C	20-Dec-19	Maxxam	<0.20	<0.0053	<0.019	<0.020	<0.000050	<0.102	0.0373
4A/6A	13-Dec-19	Maxxam	0.62	<0.0050	0.027	<0.020	<0.000050	<0.050	0.0826
4A	13-Jan-20	Maxxam	1.79	<0.0050	0.025	<0.020	<0.000050	<0.050	0.0554
4C/6C	13-Dec-19	Maxxam	9.16	<0.0050	0.012	<0.020	<0.000050	<0.050	0.0382
4C	13-Jan-20	Maxxam	5.53	<0.0050	0.012	<0.020	<0.000050	<0.050	0.0364
5A	17-Dec-19	Maxxam	2.74	<0.0050	0.015	<0.020	<0.000050	<0.050	0.05
5C	17-Dec-19	Maxxam	5.12	<0.0050	<0.010	<0.020	<0.000050	<0.050	0.0294
6A	20-Dec-19	Maxxam	2.86	<0.0053	0.041	<0.020	<0.000050	<0.102	0.229
6C	20-Dec-19	Maxxam	3.62	<0.0053	<0.019	<0.020	<0.000050	<0.102	0.0538

A5. DETRITUS AND ACCRETION

Table A5-1: Initial and Final Dry Masses of Detritus Bags

Plant Material	Cell ¹	Bag Number ²	Date of Removal	Initial Dry Mass (g)	Final Dry Mass (g)
Bulrush	1A	1A-D1	19-Jun-19	5.011	1.882
		1A-P1		5.067	4.906
		1A-D2	10-Sep-19	5.024	0.801
		1A-P2		5.071	5.160
		1A-D3	06-Dec-19	4.987	0.201
		1A-P3		5.035	5.623
	1C	1C-D1	19-Jun-19	5.014	1.657
		1C-P1		5.000	5.016
		1C-D2	10-Sep-19	5.015	0.759
		1C-P2		4.964	5.178
		1C-D3	06-Dec-19	5.034	0.112
		1C-P3		5.024	5.557
	2A	2A-D1	19-Jun-19	5.028	1.689
		2A-P1		4.985	4.473
		2A-D2	10-Sep-19	5.030	1.224
		2A-P2		5.008	4.972
		2A-D3	06-Dec-19	5.021	0.748
		2A-P3		5.003	5.263
	2C	2C-D1	19-Jun-19	5.011	2.233
		2C-P1		4.985	5.018
		2C-D2	10-Sep-19	5.023	0.725
		2C-P2		5.008	4.887
		2C-D3	06-Dec-19	5.008	0.296
		2C-P3		5.011	4.777
	3A	3A-D R1	19-Jun-19	2.957	1.138
		3A-P R1		3.010	3.133
		3A-D R2	19-Jun-19	3.054	1.192
		3A-P R2		3.009	3.103

Plant Material	Cell ¹	Bag Number ²	Date of Removal	Initial Dry Mass (g)	Final Dry Mass (g)
Water Sedge	4A	4A-D1	19-Jun-19	5.043	2.391
		4A-P1		5.038	4.881
		4A-D2	10-Sep-19	5.034	0.946
		4A-P2		5.017	4.989
		4A-D3	06-Dec-19	5.042	1.682
		4A-P3		5.004	4.938
	4C	4C-D1	19-Jun-19	5.054	2.409
		4C-P1		4.989	5.060
		4C-D3	10-Sep-19	5.037	1.551
		4C-P3		4.980	4.827
		4C-D1	06-Dec-19	5.022	0.918
		4C-P1		5.001	5.136
	5A	5A-D1	19-Jun-19	5.021	2.330
		5A-P1		5.011	4.970
		5A-D1	10-Sep-19	5.020	1.721
		5A-P1		5.030	4.979
		5A-D2	06-Dec-19	5.031	1.785
		5A-P2		4.982	4.887
	5C	5C-D1	19-Jun-19	5.048	2.482
		5C-P1		5.015	5.108
		5C-D2	10-Sep-19	5.032	1.707
		5C-P2		5.025	5.032
		5C-D3	06-Dec-19	4.991	1.244
		5C-P3		5.011	6.222
	6A	6A-D R1	19-Jun-19	2.989	1.493
		6A-P R1		3.010	3.123
		6A-D R2	19-Jun-19	2.990	1.555
		6A-P R2		2.990	2.937

Dry weight of plant material after removed from bag and rinsed as per methodology.

¹ Location of bag within CWTS

² Bag label: D: detritus (bulrush or water sedge material); P: polyester (control material); R: reduced weight bag (initial mass 3 g rather than 5 g);
1, 2, 3: replicate and order of removal

APPENDIX B.
Microbiology
Report *(provided*
in electronic format)

APPENDIX C.

Analytical Data

Water, soil, plant and organics data from Bureau Veritas are provided in the attached reports.

Commissioning (soil and water) results
Operations results
Operations with forebays results
Operations with very low flow results
Freeze testing results
Stagnation testing results
AVS/SEM, soil, tessier, and vegetation results

Your Project #: BMC-18-02
Your C.O.C. #: 08466837

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/01
Report #: R2704747
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B921004

Received: 2019/03/22, 15:16

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	7	N/A	2019/03/26	BBY6SOP-00026	SM 22 2320 B m
Hardness Total (calculated as CaCO ₃) (1)	7	N/A	2019/03/26	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	7	N/A	2019/03/26	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	7	N/A	2019/03/26	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	7	N/A	2019/03/26	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total)	7	2019/03/25	2019/03/26	BBY7SOP-00003	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	7	N/A	2019/03/26	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals	7	N/A	2019/03/23	BBY7 WI-00004	SM 23 3030B m
Sulphate - Low Level	4	N/A	2019/03/25	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate - Low Level	3	N/A	2019/03/26	BBY6SOP-00017	SM 22 4500-SO42- E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be

Your Project #: BMC-18-02
Your C.O.C. #: 08466837

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/01
Report #: R2704747
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B921004

Received: 2019/03/22, 15:16
used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Diana Cruz, Project Manager

Email: DCruz@maxxam.ca

Phone# (604) 734 7276

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VK3924		VK3925			VK3926			VK3927		
Sampling Date		2019/03/22 14:45		2019/03/22 14:15			2019/03/22 14:20			2019/03/22 14:25		
COC Number		08466837		08466837			08466837			08466837		
	UNITS	INFL-04	QC Batch	1C	RDL	QC Batch	2C	RDL	QC Batch	3C	RDL	QC Batch

Calculated Parameters												
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE

Misc. Inorganics												
Alkalinity (Total as CaCO3)	mg/L	15.5	9361721	103	0.50	9361721	112	0.50	9361721	113	0.50	9361721
Alkalinity (PP as CaCO3)	mg/L	<0.50	9361721	<0.50	0.50	9361721	<0.50	0.50	9361721	<0.50	0.50	9361721
Bicarbonate (HCO3)	mg/L	19.0	9361721	126	0.50	9361721	137	0.50	9361721	138	0.50	9361721
Carbonate (CO3)	mg/L	<0.50	9361721	<0.50	0.50	9361721	<0.50	0.50	9361721	<0.50	0.50	9361721
Hydroxide (OH)	mg/L	<0.50	9361721	<0.50	0.50	9361721	<0.50	0.50	9361721	<0.50	0.50	9361721

Anions												
Dissolved Sulphate (SO4)	mg/L	235 (1)	9361588	210 (1)	5.0	9362300	184	0.50	9361588	203 (1)	5.0	9362300

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam ID		VK3928		VK3929	VK3930		
Sampling Date		2019/03/22 14:30		2019/03/22 14:35	2019/03/22 14:40		
COC Number		08466837		08466837	08466837		
	UNITS	4C	QC Batch	5C	6C	RDL	QC Batch

Calculated Parameters							
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	FIELD		ONSITE

Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	104	9361721	102	106	0.50	9361721
Alkalinity (PP as CaCO3)	mg/L	<0.50	9361721	<0.50	<0.50	0.50	9361721
Bicarbonate (HCO3)	mg/L	127	9361721	124	130	0.50	9361721
Carbonate (CO3)	mg/L	<0.50	9361721	<0.50	<0.50	0.50	9361721
Hydroxide (OH)	mg/L	<0.50	9361721	<0.50	<0.50	0.50	9361721

Anions							
Dissolved Sulphate (SO4)	mg/L	248 (1)	9362300	229 (1)	237 (1)	5.0	9361588

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VK3924		VK3925		VK3926		
Sampling Date		2019/03/22 14:45		2019/03/22 14:15		2019/03/22 14:20		
COC Number		08466837		08466837		08466837		
	UNITS	INFL-04	QC Batch	1C	QC Batch	2C	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	334	9359608	350	9359608	345	0.50	9359608
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0120	9360342	0.00131	9360342	0.00208	0.00050	9360342
Dissolved Antimony (Sb)	mg/L	0.000410	9360342	0.000362	9360342	0.000356	0.000020	9360342
Dissolved Arsenic (As)	mg/L	0.0581	9360342	0.0264	9360342	0.0237	0.000020	9360342
Dissolved Barium (Ba)	mg/L	0.0518	9360342	0.105	9360342	0.142	0.000020	9360342
Dissolved Beryllium (Be)	mg/L	<0.000010	9360342	<0.000010	9360342	<0.000010	0.000010	9360342
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9360342	<0.0000050	9360342	<0.0000050	0.0000050	9360342
Dissolved Boron (B)	mg/L	0.039	9360342	0.038	9360342	0.036	0.010	9360342
Dissolved Cadmium (Cd)	mg/L	0.00203	9360342	0.0000867	9360342	0.0000639	0.0000050	9360342
Dissolved Chromium (Cr)	mg/L	0.00012	9360342	<0.00010	9360342	<0.00010	0.00010	9360342
Dissolved Cobalt (Co)	mg/L	0.00275	9360342	0.0000514	9360342	0.0000567	0.0000050	9360342
Dissolved Copper (Cu)	mg/L	0.0460	9360342	0.0107	9360342	0.0103	0.000050	9360342
Dissolved Iron (Fe)	mg/L	0.0016	9360342	0.0017	9360342	0.0047	0.0010	9360342
Dissolved Lead (Pb)	mg/L	0.0220	9360342	0.0000351	9360342	0.0000227	0.0000050	9360342
Dissolved Lithium (Li)	mg/L	0.0120	9360342	0.0135	9360342	0.0137	0.00050	9360342
Dissolved Manganese (Mn)	mg/L	0.0521	9360342	0.00124	9360342	0.00432	0.000050	9360342
Dissolved Molybdenum (Mo)	mg/L	0.00164	9360342	0.00160	9360342	0.00463 (1)	0.000050	9364957
Dissolved Nickel (Ni)	mg/L	0.00792	9360342	0.00219	9360342	0.00242	0.000020	9360342
Dissolved Selenium (Se)	mg/L	0.00789	9360342	0.00574	9360342	0.00504	0.000040	9360342
Dissolved Silicon (Si)	mg/L	0.767	9360342	1.29	9360342	1.27	0.050	9360342
Dissolved Silver (Ag)	mg/L	0.0000662 (1)	9364957	0.0000055	9360342	<0.0000050	0.0000050	9360342
Dissolved Strontium (Sr)	mg/L	0.585	9360342	0.640	9360342	0.649	0.000050	9360342
Dissolved Thallium (Tl)	mg/L	<0.0000020	9360342	0.0000184	9360342	0.0000221	0.0000020	9360342
Dissolved Tin (Sn)	mg/L	<0.00020	9360342	<0.00020	9360342	<0.00020	0.00020	9360342
Dissolved Titanium (Ti)	mg/L	<0.00050	9360342	<0.00050	9360342	<0.00050	0.00050	9360342
Dissolved Uranium (U)	mg/L	0.0252 (1)	9364957	0.00284	9360342	0.00271	0.0000020	9360342
Dissolved Vanadium (V)	mg/L	<0.00020	9360342	<0.00020	9360342	<0.00020	0.00020	9360342
Dissolved Zinc (Zn)	mg/L	0.164	9360342	0.0115	9360342	0.00942	0.00010	9360342
Dissolved Zirconium (Zr)	mg/L	<0.00010	9360342	<0.00010	9360342	<0.00010	0.00010	9360342
Dissolved Calcium (Ca)	mg/L	107	9359681	108	9359681	106	0.050	9359681
Dissolved Magnesium (Mg)	mg/L	16.3	9359681	19.3	9359681	19.5	0.050	9359681
RDL = Reportable Detection Limit								
(1) Dissolved greater than total. Reanalysis yields similar results.								

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VK3924		VK3925		VK3926		
Sampling Date		2019/03/22 14:45		2019/03/22 14:15		2019/03/22 14:20		
COC Number		08466837		08466837		08466837		
	UNITS	INFL-04	QC Batch	1C	QC Batch	2C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.86	9359681	6.38	9359681	6.57	0.050	9359681
Dissolved Sodium (Na)	mg/L	25.3	9359681	29.3	9359681	30.0	0.050	9359681
Dissolved Sulphur (S)	mg/L	81.5	9359681	71.4	9359681	68.1	3.0	9359681
RDL = Reportable Detection Limit								

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VK3927	VK3928		VK3929	VK3930		
Sampling Date		2019/03/22 14:25	2019/03/22 14:30		2019/03/22 14:35	2019/03/22 14:40		
COC Number		08466837	08466837		08466837	08466837		
	UNITS	3C	4C	QC Batch	5C	6C	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	336	415	9359608	395	392	0.50	9359608
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00209	0.00152	9360342	0.00213	0.00153	0.00050	9360342
Dissolved Antimony (Sb)	mg/L	0.000354	0.000083	9360342	0.000081	0.000122	0.000020	9360342
Dissolved Arsenic (As)	mg/L	0.0262	0.00541	9360342	0.00949	0.00643	0.000020	9360342
Dissolved Barium (Ba)	mg/L	0.00800	0.0635	9360342	0.0767	0.0584	0.000020	9360342
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9360342	<0.000010	<0.000010	0.000010	9360342
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9360342	<0.0000050	<0.0000050	0.0000050	9360342
Dissolved Boron (B)	mg/L	0.038	<0.010	9360342	<0.010	0.043	0.010	9360342
Dissolved Cadmium (Cd)	mg/L	0.000118	0.0000061	9360342	0.0000124	0.0000124	0.0000050	9360342
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9360342	<0.00010	<0.00010	0.00010	9360342
Dissolved Cobalt (Co)	mg/L	0.0000551	0.000449	9360342	0.000990	0.000159	0.0000050	9360342
Dissolved Copper (Cu)	mg/L	0.0198	0.00126	9360342	0.00169	0.00240	0.000050	9360342
Dissolved Iron (Fe)	mg/L	0.0036	0.233	9360342	0.218	0.0854	0.0010	9360342
Dissolved Lead (Pb)	mg/L	0.0000237	0.0000248	9360342	0.000103	0.0000404	0.0000050	9360342
Dissolved Lithium (Li)	mg/L	0.0140	0.0159	9360342	0.0147	0.0166	0.00050	9360342
Dissolved Manganese (Mn)	mg/L	0.0267	0.495	9360342	0.591	0.0673	0.000050	9360342
Dissolved Molybdenum (Mo)	mg/L	0.00169	0.000314	9360342	0.00264 (1)	0.00317 (1)	0.000050	9364957
Dissolved Nickel (Ni)	mg/L	0.00292	0.00186	9360342	0.00217	0.00217	0.000020	9360342
Dissolved Selenium (Se)	mg/L	0.00489	0.000398	9360342	0.000513	0.000450	0.000040	9360342
Dissolved Silicon (Si)	mg/L	0.961	6.78	9360342	5.49	6.94	0.050	9360342
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9360342	<0.0000050	<0.0000050	0.0000050	9360342
Dissolved Strontium (Sr)	mg/L	0.613	0.730	9360342	0.726	0.705	0.000050	9360342
Dissolved Thallium (Tl)	mg/L	0.0000258	<0.0000020	9360342	<0.0000020	<0.0000020	0.0000020	9360342
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9360342	<0.00020	<0.00020	0.00020	9360342
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9360342	<0.00050	<0.00050	0.00050	9360342
Dissolved Uranium (U)	mg/L	0.000814	0.000100	9360342	0.000258	0.000207	0.0000020	9360342
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9360342	<0.00020	<0.00020	0.00020	9360342
Dissolved Zinc (Zn)	mg/L	0.0177	0.00160	9360342	0.00128	0.00168	0.00010	9360342
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9360342	<0.00010	<0.00010	0.00010	9360342
Dissolved Calcium (Ca)	mg/L	102	131	9359681	125	121	0.050	9359681
Dissolved Magnesium (Mg)	mg/L	19.6	21.7	9359681	20.0	21.9	0.050	9359681

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VK3927	VK3928		VK3929	VK3930		
Sampling Date		2019/03/22 14:25	2019/03/22 14:30		2019/03/22 14:35	2019/03/22 14:40		
COC Number		08466837	08466837		08466837	08466837		
	UNITS	3C	4C	QC Batch	5C	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	7.29	5.44	9359681	4.37	10.6	0.050	9359681
Dissolved Sodium (Na)	mg/L	30.3	31.6	9359681	30.0	31.5	0.050	9359681
Dissolved Sulphur (S)	mg/L	67.4	86.6	9359681	79.0	81.7	3.0	9359681
RDL = Reportable Detection Limit								

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VK3924	VK3925	VK3926	VK3927	VK3928		
Sampling Date		2019/03/22 14:45	2019/03/22 14:15	2019/03/22 14:20	2019/03/22 14:25	2019/03/22 14:30		
COC Number		08466837	08466837	08466837	08466837	08466837		
	UNITS	INFL-04	1C	2C	3C	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	351	366	362	369	436	0.50	9359607
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0138	0.0034	0.0031	<0.0030	<0.0030	0.0030	9360673
Total Antimony (Sb)	mg/L	0.000425	0.000379	0.000356	0.000370	0.000075	0.000020	9360673
Total Arsenic (As)	mg/L	0.0648	0.0284	0.0251	0.0280	0.00615	0.000020	9360673
Total Barium (Ba)	mg/L	0.0540	0.110	0.151	0.0137	0.0693	0.000050	9360673
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9360673
Total Bismuth (Bi)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9360673
Total Boron (B)	mg/L	0.036	0.037	0.036	0.039	<0.010	0.010	9360673
Total Cadmium (Cd)	mg/L	0.00207	0.000129	0.0000824	0.000136	0.0000073	0.0000050	9360673
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9360673
Total Cobalt (Co)	mg/L	0.00287	0.000056	0.000062	0.000072	0.000475	0.000010	9360673
Total Copper (Cu)	mg/L	0.0396	0.0118	0.0112	0.0217	0.00193	0.00010	9360673
Total Iron (Fe)	mg/L	<0.0050	0.0074	0.0095	<0.0050	0.345	0.0050	9360673
Total Lead (Pb)	mg/L	0.0154	0.000061	0.000035	0.000039	0.000058	0.000020	9360673
Total Lithium (Li)	mg/L	0.0132	0.0151	0.0156	0.0158	0.0176	0.00050	9360673
Total Manganese (Mn)	mg/L	0.0563	0.00367	0.0103	0.0419	0.523	0.00010	9360673
Total Molybdenum (Mo)	mg/L	0.00155	0.00165	0.00163	0.00177	0.000334	0.000050	9360673
Total Nickel (Ni)	mg/L	0.00826	0.00233	0.00246	0.00306	0.00192	0.00010	9360673
Total Selenium (Se)	mg/L	0.00847	0.00605	0.00547	0.00560	0.000568	0.000040	9360673
Total Silicon (Si)	mg/L	0.951	1.51	1.45	1.10	7.73	0.050	9360673
Total Silver (Ag)	mg/L	0.000031	0.000011	<0.000010	<0.000010	<0.000010	0.000010	9360673
Total Strontium (Sr)	mg/L	0.665	0.692	0.700	0.677	0.807	0.000050	9360673
Total Thallium (Tl)	mg/L	<0.0000020	0.0000190	0.0000232	0.0000278	0.0000021	0.0000020	9360673
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9360673
Total Titanium (Ti)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	9360673
Total Uranium (U)	mg/L	0.0145	0.00297	0.00286	0.000906	0.000109	0.0000050	9360673
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9360673
Total Zinc (Zn)	mg/L	0.179	0.0169	0.0117	0.0205	0.0024	0.0010	9360673
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9360673
Total Calcium (Ca)	mg/L	112	114	112	114	137	0.25	9359686
Total Magnesium (Mg)	mg/L	17.4	19.7	19.7	20.6	22.7	0.25	9359686
Total Potassium (K)	mg/L	4.27	6.86	6.92	7.72	5.74	0.25	9359686

RDL = Reportable Detection Limit

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VK3924	VK3925	VK3926	VK3927	VK3928		
Sampling Date		2019/03/22 14:45	2019/03/22 14:15	2019/03/22 14:20	2019/03/22 14:25	2019/03/22 14:30		
COC Number		08466837	08466837	08466837	08466837	08466837		
	UNITS	INFL-04	1C	2C	3C	4C	RDL	QC Batch
Total Sodium (Na)	mg/L	26.5	29.8	30.4	31.1	33.0	0.25	9359686
Total Sulphur (S)	mg/L	91.3	75.6	72.8	72.9	94.1	3.0	9359686
RDL = Reportable Detection Limit								

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VK3929	VK3930		
Sampling Date		2019/03/22 14:35	2019/03/22 14:40		
COC Number		08466837	08466837		
	UNITS	5C	6C	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	414	416	0.50	9359607
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	<0.0030	<0.0030	0.0030	9360673
Total Antimony (Sb)	mg/L	0.000074	0.000134	0.000020	9360673
Total Arsenic (As)	mg/L	0.0104	0.00722	0.000020	9360673
Total Barium (Ba)	mg/L	0.0937	0.0627	0.000050	9360673
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9360673
Total Bismuth (Bi)	mg/L	<0.000010	<0.000010	0.000010	9360673
Total Boron (B)	mg/L	<0.010	0.043	0.010	9360673
Total Cadmium (Cd)	mg/L	0.0000212	0.0000189	0.0000050	9360673
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9360673
Total Cobalt (Co)	mg/L	0.00103	0.000182	0.000010	9360673
Total Copper (Cu)	mg/L	0.00262	0.00315	0.00010	9360673
Total Iron (Fe)	mg/L	0.338	0.133	0.0050	9360673
Total Lead (Pb)	mg/L	0.000183	0.000069	0.000020	9360673
Total Lithium (Li)	mg/L	0.0157	0.0182	0.00050	9360673
Total Manganese (Mn)	mg/L	0.605	0.0744	0.00010	9360673
Total Molybdenum (Mo)	mg/L	0.000318	0.000811	0.000050	9360673
Total Nickel (Ni)	mg/L	0.00220	0.00220	0.00010	9360673
Total Selenium (Se)	mg/L	0.000697	0.000589	0.000040	9360673
Total Silicon (Si)	mg/L	6.11	7.83	0.050	9360673
Total Silver (Ag)	mg/L	<0.000010	<0.000010	0.000010	9360673
Total Strontium (Sr)	mg/L	0.772	0.781	0.000050	9360673
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9360673
Total Tin (Sn)	mg/L	0.00311	<0.00020	0.00020	9360673
Total Titanium (Ti)	mg/L	<0.0020	<0.0020	0.0020	9360673
Total Uranium (U)	mg/L	0.000295	0.000222	0.0000050	9360673
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9360673
Total Zinc (Zn)	mg/L	0.0017	0.0025	0.0010	9360673
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9360673
Total Calcium (Ca)	mg/L	132	129	0.25	9359686
Total Magnesium (Mg)	mg/L	20.6	23.0	0.25	9359686
Total Potassium (K)	mg/L	4.55	11.5	0.25	9359686
RDL = Reportable Detection Limit					

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

LL TOTAL METALS (DIGESTED) IN WATER

Maxxam ID		VK3929	VK3930		
Sampling Date		2019/03/22 14:35	2019/03/22 14:40		
COC Number		08466837	08466837		
	UNITS	5C	6C	RDL	QC Batch
Total Sodium (Na)	mg/L	30.3	33.1	0.25	9359686
Total Sulphur (S)	mg/L	83.7	89.5	3.0	9359686
RDL = Reportable Detection Limit					

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	21.0°C
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Sample VK3924 [INFL-04] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VK3925 [1C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VK3926 [2C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VK3927 [3C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VK3928 [4C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VK3929 [5C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VK3930 [6C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample VK3924, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VK3926, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VK3929, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VK3930, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9360342	Dissolved Aluminum (Al)	2019/03/26	100	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9360342	Dissolved Antimony (Sb)	2019/03/26	100	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9360342	Dissolved Arsenic (As)	2019/03/26	100	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9360342	Dissolved Barium (Ba)	2019/03/26	NC	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9360342	Dissolved Beryllium (Be)	2019/03/26	95	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9360342	Dissolved Bismuth (Bi)	2019/03/26	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9360342	Dissolved Boron (B)	2019/03/26	94	80 - 120	101	80 - 120	<0.010	mg/L	NC	20
9360342	Dissolved Cadmium (Cd)	2019/03/26	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9360342	Dissolved Chromium (Cr)	2019/03/26	97	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9360342	Dissolved Cobalt (Co)	2019/03/26	96	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9360342	Dissolved Copper (Cu)	2019/03/26	91	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9360342	Dissolved Iron (Fe)	2019/03/26	98	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
9360342	Dissolved Lead (Pb)	2019/03/26	99	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9360342	Dissolved Lithium (Li)	2019/03/26	96	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9360342	Dissolved Manganese (Mn)	2019/03/26	96	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9360342	Dissolved Molybdenum (Mo)	2019/03/26	104	80 - 120	102	80 - 120	<0.000050	mg/L	7.0	20
9360342	Dissolved Nickel (Ni)	2019/03/26	94	80 - 120	101	80 - 120	0.000020, RDL=0.000020 (1)	mg/L	NC	20
9360342	Dissolved Selenium (Se)	2019/03/26	99	80 - 120	100	80 - 120	<0.000040	mg/L	NC	20
9360342	Dissolved Silicon (Si)	2019/03/26	89	80 - 120	102	80 - 120	<0.050	mg/L	NC	20
9360342	Dissolved Silver (Ag)	2019/03/26	99	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9360342	Dissolved Strontium (Sr)	2019/03/26	NC	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9360342	Dissolved Thallium (Tl)	2019/03/26	101	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9360342	Dissolved Tin (Sn)	2019/03/26	101	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9360342	Dissolved Titanium (Ti)	2019/03/26	101	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9360342	Dissolved Uranium (U)	2019/03/26	103	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9360342	Dissolved Vanadium (V)	2019/03/26	98	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9360342	Dissolved Zinc (Zn)	2019/03/26	94	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9360342	Dissolved Zirconium (Zr)	2019/03/26	102	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9360673	Total Aluminum (Al)	2019/03/26	105	80 - 120	104	80 - 120	<0.0030	mg/L	0.96	20
9360673	Total Antimony (Sb)	2019/03/26	103	80 - 120	101	80 - 120	<0.000020	mg/L	3.6	20
9360673	Total Arsenic (As)	2019/03/26	108	80 - 120	103	80 - 120	<0.000020	mg/L	0.13	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9360673	Total Barium (Ba)	2019/03/26	NC	80 - 120	102	80 - 120	<0.000050	mg/L	1.9	20
9360673	Total Beryllium (Be)	2019/03/26	106	80 - 120	105	80 - 120	<0.000010	mg/L	NC	20
9360673	Total Bismuth (Bi)	2019/03/26	102	80 - 120	105	80 - 120	<0.000010	mg/L	NC	20
9360673	Total Boron (B)	2019/03/26	97	80 - 120	97	80 - 120	<0.010	mg/L	1.5	20
9360673	Total Cadmium (Cd)	2019/03/26	101	80 - 120	100	80 - 120	<0.0000050	mg/L	2.4	20
9360673	Total Chromium (Cr)	2019/03/26	99	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9360673	Total Cobalt (Co)	2019/03/26	95	80 - 120	99	80 - 120	<0.000010	mg/L	8.3	20
9360673	Total Copper (Cu)	2019/03/26	92	80 - 120	97	80 - 120	<0.00010	mg/L	0.70	20
9360673	Total Iron (Fe)	2019/03/26	101	80 - 120	105	80 - 120	<0.0050	mg/L	0.41	20
9360673	Total Lead (Pb)	2019/03/26	106	80 - 120	105	80 - 120	<0.000020	mg/L	4.5	20
9360673	Total Lithium (Li)	2019/03/26	105	80 - 120	106	80 - 120	<0.00050	mg/L	0.17	20
9360673	Total Manganese (Mn)	2019/03/26	102	80 - 120	103	80 - 120	<0.00010	mg/L	2.2	20
9360673	Total Molybdenum (Mo)	2019/03/26	110	80 - 120	103	80 - 120	<0.000050	mg/L	0.048	20
9360673	Total Nickel (Ni)	2019/03/26	95	80 - 120	100	80 - 120	<0.00010	mg/L	0.27	20
9360673	Total Selenium (Se)	2019/03/26	104	80 - 120	100	80 - 120	<0.000040	mg/L	0.54	20
9360673	Total Silicon (Si)	2019/03/26	112	80 - 120	112	80 - 120	<0.050	mg/L	2.7	20
9360673	Total Silver (Ag)	2019/03/26	100	80 - 120	101	80 - 120	<0.000010	mg/L	5.8	20
9360673	Total Strontium (Sr)	2019/03/26	NC	80 - 120	107	80 - 120	<0.000050	mg/L	0.33	20
9360673	Total Thallium (Tl)	2019/03/26	108	80 - 120	105	80 - 120	<0.0000020	mg/L	12	20
9360673	Total Tin (Sn)	2019/03/26	104	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9360673	Total Titanium (Ti)	2019/03/26	105	80 - 120	104	80 - 120	<0.0020	mg/L	NC	20
9360673	Total Uranium (U)	2019/03/26	111	80 - 120	105	80 - 120	<0.0000050	mg/L	0.73	20
9360673	Total Vanadium (V)	2019/03/26	102	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9360673	Total Zinc (Zn)	2019/03/26	96	80 - 120	102	80 - 120	<0.0010	mg/L	1.0	20
9360673	Total Zirconium (Zr)	2019/03/26	109	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
9361588	Dissolved Sulphate (SO4)	2019/03/25	NC	80 - 120	105	80 - 120	<0.50	mg/L	5.9	20
9361721	Alkalinity (PP as CaCO3)	2019/03/26					<0.50	mg/L	NC	20
9361721	Alkalinity (Total as CaCO3)	2019/03/26	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.65	20
9361721	Bicarbonate (HCO3)	2019/03/26					<0.50	mg/L	0.65	20
9361721	Carbonate (CO3)	2019/03/26					<0.50	mg/L	NC	20
9361721	Hydroxide (OH)	2019/03/26					<0.50	mg/L	NC	20
9362300	Dissolved Sulphate (SO4)	2019/03/26	NC	80 - 120	98	80 - 120	<0.50	mg/L	2.8	20
9364957	Dissolved Molybdenum (Mo)	2019/03/29			97	80 - 120	<0.000050	mg/L		

Maxxam Job #: B921004
Report Date: 2019/04/01

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9364957	Dissolved Silver (Ag)	2019/03/29			97	80 - 120	<0.0000050	mg/L		
9364957	Dissolved Uranium (U)	2019/03/29			100	80 - 120	<0.0000020	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for Ni- 2X RDL acceptable for low level metals determination.

Maxxam Job #: B921004
Report Date: 2019/04/01

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



08466837

COC #.

BBV FCD-00077/05
Page 1 of 1

Invoice Information		Report Information (if differs from Invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL GROUP	Quotation #:	860751	☒ Regular TAT 5 days (Most analyses)	
Contact Name:		Contact Name:	Mary Mloska, Renate Vanderhorst	P.O. # / A/E/P:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:	530-1130 WEST PENDER ST Vancouver, BC V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK V1A 2V3	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)	
Phone:		Phone:	(867) 668-6463	Site Location:	Kutik Zee Kayah	Same Day ☐ 2 Days ☐	
Email:		Email:	mmloska@alexcoresources.com	Site #:		1 Day ☐ 3 Days ☐	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil	☐ BC CSR Water	☐ Return Cooler	USE SCENARIO 2 12485	DISSOLVED LOW LEVEL METALS TOTAL LOW LEVEL METALS ANIONS (SO4), Alkalinity		Rush Confirmation #:	
☐ CCME (Specify)	☐ Other (Specify)	☐ Ship Sample Bottles (Please Specify)					
☐ Drinking Water	☐ BC Water Quality						
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix			
1 INFL-04		22-Mar-19	14:45	Water	X	X	X
2 1C		22-Mar-19	14:15	Water	X	X	X
3 2C		22-Mar-19	14:20	Water	X	X	X
4 3C		22-Mar-19	14:25	Water	X	X	X
5 4C		22-Mar-19	14:30	Water	X	X	X
6 5C		22-Mar-19	14:35	Water	X	X	X
7 6C		22-Mar-19	14:40	Water	X	X	X
8							
9							
10							
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Johannes Mloska		2019/03/22	15:14	J. W. W. W.		2019/03/23	11:20

B921004_COC



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08469975

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/24
Report #: R2714058
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B927650

Received: 2019/04/15, 14:45

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	7	N/A	2019/04/17	BBY6SOP-00026	SM 22 2320 B m
Hardness Total (calculated as CaCO ₃) (2)	7	N/A	2019/04/24	AB WI-00065	Auto Calc
Hardness (calculated as CaCO ₃)	7	N/A	2019/04/24	AB WI-00065	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	7	N/A	2019/04/24	AB WI-00065	Auto Calc
Elements by ICPMS Low Level (dissolved)	7	N/A	2019/04/24	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	7	N/A	2019/04/24	AB WI-00065	Auto Calc
Elements by ICPMS Low Level (total)	7	N/A	2019/04/23	CAL SOP-00265	EPA 6020 m
Filter and HNO ₃ Preserve for Metals	7	N/A	2019/04/16		
Sulphate - Low Level (1)	4	N/A	2019/04/17	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate - Low Level (1)	3	N/A	2019/04/18	BBY6SOP-00017	SM 22 4500-SO42- E m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08469975

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/04/24
Report #: R2714058
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B927650

Received: 2019/04/15, 14:45

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: smaiter@maxxam.ca

Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VN4057			VN4058		VN4059	VN4060		
Sampling Date		2019/04/15 12:45			2019/04/15 11:45		2019/04/15 12:00	2019/04/15 12:05		
COC Number		08469975			08469975		08469975	08469975		
	UNITS	INFL-10	RDL	QC Batch	1C	QC Batch	2C	3C	RDL	QC Batch

Calculated Parameters

Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD	FIELD		ONSITE
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Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	67.8	0.50	9385653	69.7	9385640	68.1	66.4	0.50	9385653
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9385653	<0.50	9385640	<0.50	<0.50	0.50	9385653
Bicarbonate (HCO3)	mg/L	82.7	0.50	9385653	85.1	9385640	83.1	81.0	0.50	9385653
Carbonate (CO3)	mg/L	<0.50	0.50	9385653	<0.50	9385640	<0.50	<0.50	0.50	9385653
Hydroxide (OH)	mg/L	<0.50	0.50	9385653	<0.50	9385640	<0.50	<0.50	0.50	9385653

Anions

Dissolved Sulphate (SO4)	mg/L	193	0.50	9385771	252 (1)	9388464	211 (1)	223 (1)	5.0	9385771
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RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam ID		VN4061			VN4062			VN4063		
Sampling Date		2019/04/15 12:00			2019/04/15 12:10			2019/04/15 12:15		
COC Number		08469975			08469975			08469975		
	UNITS	4C	RDL	QC Batch	5C	RDL	QC Batch	6C	RDL	QC Batch

Calculated Parameters

Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
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Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	162	0.50	9385640	170	0.50	9385653	82.3	0.50	9385640
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9385640	<0.50	0.50	9385653	<0.50	0.50	9385640
Bicarbonate (HCO3)	mg/L	197	0.50	9385640	208	0.50	9385653	100	0.50	9385640
Carbonate (CO3)	mg/L	<0.50	0.50	9385640	<0.50	0.50	9385653	<0.50	0.50	9385640
Hydroxide (OH)	mg/L	<0.50	0.50	9385640	<0.50	0.50	9385653	<0.50	0.50	9385640

Anions

Dissolved Sulphate (SO4)	mg/L	204 (1)	5.0	9385771	177	0.50	9388464	252 (1)	5.0	9388464
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RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VN4057	VN4058	VN4059	VN4060		
Sampling Date		2019/04/15 12:45	2019/04/15 11:45	2019/04/15 12:00	2019/04/15 12:05		
COC Number		08469975	08469975	08469975	08469975		
	UNITS	INFL-10	1C	2C	3C	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	331	371	360	359	0.50	9383729
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.0198	0.00154	0.00117	0.00218	0.00050	9387043
Dissolved Antimony (Sb)	mg/L	0.0228	0.0105	0.0125	0.0102	0.000020	9387043
Dissolved Arsenic (As)	mg/L	0.0600	0.0273	0.0202	0.0261	0.000020	9387043
Dissolved Barium (Ba)	mg/L	0.0518	0.0708	0.0664	0.0357	0.000020	9387043
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9387043
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9387043
Dissolved Boron (B)	mg/L	0.033	0.035	0.036	0.029	0.010	9387043
Dissolved Cadmium (Cd)	mg/L	0.00211	0.000184	0.000159	0.0000524	0.0000050	9387043
Dissolved Chromium (Cr)	mg/L	0.00016	<0.00010	<0.00010	<0.00010	0.00010	9387043
Dissolved Cobalt (Co)	mg/L	0.00275	0.0000221	0.0000353	0.0000417	0.0000050	9387043
Dissolved Copper (Cu)	mg/L	0.0238	0.00957	0.00771	0.00843	0.000050	9387043
Dissolved Iron (Fe)	mg/L	0.0076	0.0052	0.0110	0.0293	0.0010	9387043
Dissolved Lead (Pb)	mg/L	0.0198	0.0000335	0.0000328	0.0000222	0.0000050	9387043
Dissolved Lithium (Li)	mg/L	0.0122	0.0133	0.0129	0.0136	0.00050	9387043
Dissolved Manganese (Mn)	mg/L	0.0538	0.00502	0.00631	0.0183	0.000050	9387043
Dissolved Molybdenum (Mo)	mg/L	0.00137	0.00136	0.00119	0.00131	0.000050	9387043
Dissolved Nickel (Ni)	mg/L	0.00770	0.00299	0.00289	0.00265	0.000020	9387043
Dissolved Selenium (Se)	mg/L	0.00805	0.00444	0.00394	0.00337	0.000040	9387043
Dissolved Silicon (Si)	mg/L	0.741	1.07	0.997	0.729	0.050	9387043
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9387043
Dissolved Strontium (Sr)	mg/L	0.598	0.656	0.656	0.654	0.000050	9387043
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000072	0.0000066	<0.0000020	0.0000020	9387043
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9387043
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9387043
Dissolved Uranium (U)	mg/L	0.0273	0.00985	0.0115	0.00417	0.0000020	9387043
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9387043
Dissolved Zinc (Zn)	mg/L	0.160	0.0379	0.0365	0.0175	0.00010	9387043
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9387043
Dissolved Calcium (Ca)	mg/L	105	118	114	112	0.050	9384099
Dissolved Magnesium (Mg)	mg/L	16.8	18.9	18.1	19.1	0.050	9384099
RDL = Reportable Detection Limit							

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VN4057	VN4058	VN4059	VN4060		
Sampling Date		2019/04/15 12:45	2019/04/15 11:45	2019/04/15 12:00	2019/04/15 12:05		
COC Number		08469975	08469975	08469975	08469975		
	UNITS	INFL-10	1C	2C	3C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.89	5.24	4.65	4.68	0.050	9384099
Dissolved Sodium (Na)	mg/L	25.1	27.6	27.0	28.1	0.050	9384099
Dissolved Sulphur (S)	mg/L	87.0	91.6	90.6	90.6	3.0	9384099
RDL = Reportable Detection Limit							

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VN4061	VN4062	VN4063		
Sampling Date		2019/04/15 12:00	2019/04/15 12:10	2019/04/15 12:15		
COC Number		08469975	08469975	08469975		
	UNITS	4C	5C	6C	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	426	375	367	0.50	9384521
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00313	0.00392	0.00236	0.00050	9387043
Dissolved Antimony (Sb)	mg/L	0.000385	0.000608	0.00113	0.000020	9387043
Dissolved Arsenic (As)	mg/L	0.00922	0.0174	0.0101	0.000020	9387043
Dissolved Barium (Ba)	mg/L	0.0455	0.0170	0.0252	0.000020	9387043
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9387043
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9387043
Dissolved Boron (B)	mg/L	<0.010	<0.010	0.024	0.010	9387043
Dissolved Cadmium (Cd)	mg/L	<0.0000050	0.0000311	0.0000087	0.0000050	9387043
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9387043
Dissolved Cobalt (Co)	mg/L	0.000587	0.000484	0.0000875	0.0000050	9387043
Dissolved Copper (Cu)	mg/L	0.000699	0.00129	0.00130	0.000050	9387043
Dissolved Iron (Fe)	mg/L	0.507	0.123	0.0610	0.0010	9387043
Dissolved Lead (Pb)	mg/L	0.0000289	0.000272	0.0000269	0.0000050	9387043
Dissolved Lithium (Li)	mg/L	0.0197	0.0151	0.0154	0.00050	9387043
Dissolved Manganese (Mn)	mg/L	0.801	0.575	0.0369	0.000050	9387043
Dissolved Molybdenum (Mo)	mg/L	<0.000050	<0.000050	0.000301	0.000050	9387043
Dissolved Nickel (Ni)	mg/L	0.00234	0.00259	0.00198	0.000020	9387043
Dissolved Selenium (Se)	mg/L	0.000421	0.000382	0.000466	0.000040	9387043
Dissolved Silicon (Si)	mg/L	8.45	6.89	4.42	0.050	9387043
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9387043
Dissolved Strontium (Sr)	mg/L	0.702	0.596	0.633	0.000050	9387043
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9387043
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9387043
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9387043
Dissolved Uranium (U)	mg/L	0.000172	0.000337	0.000342	0.0000020	9387043
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9387043
Dissolved Zinc (Zn)	mg/L	0.00120	0.00212	0.00200	0.00010	9387043
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9387043
Dissolved Calcium (Ca)	mg/L	131	118	114	0.050	9384099
Dissolved Magnesium (Mg)	mg/L	23.8	19.9	20.0	0.050	9384099
RDL = Reportable Detection Limit						

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

Maxxam ID		VN4061	VN4062	VN4063		
Sampling Date		2019/04/15 12:00	2019/04/15 12:10	2019/04/15 12:15		
COC Number		08469975	08469975	08469975		
	UNITS	4C	5C	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	15.0	10.6	8.10	0.050	9384099
Dissolved Sodium (Na)	mg/L	32.3	27.9	27.6	0.050	9384099
Dissolved Sulphur (S)	mg/L	84.9	65.3	91.4	3.0	9384099
RDL = Reportable Detection Limit						

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VN4057	VN4058	VN4059	VN4060	VN4061		
Sampling Date		2019/04/15 12:45	2019/04/15 11:45	2019/04/15 12:00	2019/04/15 12:05	2019/04/15 12:00		
COC Number		08469975	08469975	08469975	08469975	08469975		
	UNITS	INFL-10	1C	2C	3C	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	327	365	353	353	424	0.50	9384268
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0228	0.00358	0.00486	0.00322	0.00800	0.00050	9386979
Total Antimony (Sb)	mg/L	0.0228	0.0106	0.0127	0.0103	0.000279	0.000020	9386979
Total Arsenic (As)	mg/L	0.0606	0.0298	0.0214	0.0267	0.00864	0.000020	9386979
Total Barium (Ba)	mg/L	0.0532	0.0747	0.0694	0.0368	0.0779	0.000020	9386979
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9386979
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9386979
Total Boron (B)	mg/L	0.038	0.042	0.043	0.035	0.012	0.010	9386979
Total Cadmium (Cd)	mg/L	0.00207	0.000229	0.000191	0.0000629	<0.0000050	0.0000050	9386979
Total Chromium (Cr)	mg/L	0.00020	0.00013	<0.00010	<0.00010	<0.00010	0.00010	9386979
Total Cobalt (Co)	mg/L	0.00286	0.0000562	0.0000325	0.0000671	0.000592	0.0000050	9386979
Total Copper (Cu)	mg/L	0.0245	0.0115	0.00876	0.00890	0.000869	0.000050	9386979
Total Iron (Fe)	mg/L	0.0082	0.0067	0.0279	0.0325	0.533	0.0010	9386979
Total Lead (Pb)	mg/L	0.0148	0.0000738	0.0000796	0.0000401	0.0000430	0.0000050	9386979
Total Lithium (Li)	mg/L	0.0112	0.0124	0.0121	0.0128	0.0179	0.00050	9386979
Total Manganese (Mn)	mg/L	0.0535	0.0110	0.00761	0.0196	0.829	0.000050	9386979
Total Molybdenum (Mo)	mg/L	0.00144	0.00138	0.00127	0.00133	0.000133	0.000050	9386979
Total Nickel (Ni)	mg/L	0.00829	0.00322	0.00301	0.00268	0.00241	0.000020	9386979
Total Selenium (Se)	mg/L	0.00813	0.00435	0.00395	0.00358	0.000341	0.000040	9386979
Total Silicon (Si)	mg/L	0.725	1.07	0.998	0.726	8.47	0.050	9386979
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9386979
Total Strontium (Sr)	mg/L	0.620	0.680	0.669	0.680	0.723	0.000050	9386979
Total Thallium (Tl)	mg/L	<0.0000020	0.0000034	0.0000060	<0.0000020	<0.0000020	0.0000020	9386979
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9386979
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9386979
Total Uranium (U)	mg/L	0.0279	0.00878	0.0110	0.00402	0.000160	0.0000020	9386979
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9386979
Total Zinc (Zn)	mg/L	0.174	0.0473	0.0399	0.0179	0.00368	0.00010	9386979
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9386979
Total Calcium (Ca)	mg/L	106	118	115	113	134	0.050	9384273
Total Magnesium (Mg)	mg/L	14.9	17.1	16.1	17.0	21.5	0.050	9384273

RDL = Reportable Detection Limit

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VN4057	VN4058	VN4059	VN4060	VN4061		
Sampling Date		2019/04/15 12:45	2019/04/15 11:45	2019/04/15 12:00	2019/04/15 12:05	2019/04/15 12:00		
COC Number		08469975	08469975	08469975	08469975	08469975		
	UNITS	INFL-10	1C	2C	3C	4C	RDL	QC Batch
Total Potassium (K)	mg/L	3.81	5.32	4.53	4.59	14.7	0.050	9384273
Total Sodium (Na)	mg/L	26.5	29.1	28.3	29.4	34.3	0.050	9384273
Total Sulphur (S)	mg/L	83.8	88.5	87.5	87.3	81.4	3.0	9384273
RDL = Reportable Detection Limit								

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VN4062	VN4063		
Sampling Date		2019/04/15 12:10	2019/04/15 12:15		
COC Number		08469975	08469975		
	UNITS	5C	6C	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	370	364	0.50	9384268
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00763	0.00420	0.00050	9386979
Total Antimony (Sb)	mg/L	0.000395	0.00116	0.000020	9386979
Total Arsenic (As)	mg/L	0.0163	0.0106	0.000020	9386979
Total Barium (Ba)	mg/L	0.0180	0.0259	0.000020	9386979
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9386979
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9386979
Total Boron (B)	mg/L	0.010	0.030	0.010	9386979
Total Cadmium (Cd)	mg/L	0.0000312	0.0000080	0.0000050	9386979
Total Chromium (Cr)	mg/L	0.00011	<0.00010	0.00010	9386979
Total Cobalt (Co)	mg/L	0.000532	0.0000782	0.0000050	9386979
Total Copper (Cu)	mg/L	0.00127	0.00126	0.000050	9386979
Total Iron (Fe)	mg/L	0.128	0.125	0.0010	9386979
Total Lead (Pb)	mg/L	0.000307	0.0000514	0.0000050	9386979
Total Lithium (Li)	mg/L	0.0144	0.0143	0.00050	9386979
Total Manganese (Mn)	mg/L	0.600	0.0391	0.000050	9386979
Total Molybdenum (Mo)	mg/L	0.000111	0.000304	0.000050	9386979
Total Nickel (Ni)	mg/L	0.00294	0.00200	0.000020	9386979
Total Selenium (Se)	mg/L	0.000345	0.000562	0.000040	9386979
Total Silicon (Si)	mg/L	6.81	4.16	0.050	9386979
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9386979
Total Strontium (Sr)	mg/L	0.620	0.668	0.000050	9386979
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9386979
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9386979
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9386979
Total Uranium (U)	mg/L	0.000302	0.000366	0.0000020	9386979
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9386979
Total Zinc (Zn)	mg/L	0.00712	0.00924	0.00010	9386979
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9386979
Total Calcium (Ca)	mg/L	119	116	0.050	9384273
Total Magnesium (Mg)	mg/L	18.1	18.3	0.050	9384273
RDL = Reportable Detection Limit					

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

Maxxam ID		VN4062	VN4063		
Sampling Date		2019/04/15 12:10	2019/04/15 12:15		
COC Number		08469975	08469975		
	UNITS	5C	6C	RDL	QC Batch
Total Potassium (K)	mg/L	10.4	7.97	0.050	9384273
Total Sodium (Na)	mg/L	29.9	29.5	0.050	9384273
Total Sulphur (S)	mg/L	63.6	89.4	3.0	9384273
RDL = Reportable Detection Limit					

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	22.0°C
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Results relate only to the items tested.

Maxxam Job #: B927650
Report Date: 2019/04/24

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9385640	Alkalinity (PP as CaCO3)	2019/04/17					<0.50	mg/L	NC	20
9385640	Alkalinity (Total as CaCO3)	2019/04/17	100	80 - 120	97	80 - 120	0.82, RDI=0.50	mg/L	5.2	20
9385640	Bicarbonate (HCO3)	2019/04/17					1.00, RDI=0.50	mg/L	5.2	20
9385640	Carbonate (CO3)	2019/04/17					<0.50	mg/L	NC	20
9385640	Hydroxide (OH)	2019/04/17					<0.50	mg/L	NC	20
9385653	Alkalinity (PP as CaCO3)	2019/04/17					<0.50	mg/L	NC	20
9385653	Alkalinity (Total as CaCO3)	2019/04/17	107	80 - 120	96	80 - 120	<0.50	mg/L	NC	20
9385653	Bicarbonate (HCO3)	2019/04/17					<0.50	mg/L	NC	20
9385653	Carbonate (CO3)	2019/04/17					<0.50	mg/L	NC	20
9385653	Hydroxide (OH)	2019/04/17					<0.50	mg/L	NC	20
9385771	Dissolved Sulphate (SO4)	2019/04/17	NC	80 - 120	98	80 - 120	<0.50	mg/L	3.1	20
9386979	Total Aluminum (Al)	2019/04/23	92	80 - 120	95	80 - 120	<0.00050	mg/L	0.21	20
9386979	Total Antimony (Sb)	2019/04/23	NC	80 - 120	91	80 - 120	<0.000020	mg/L	1.2	20
9386979	Total Arsenic (As)	2019/04/23	NC	80 - 120	93	80 - 120	<0.000020	mg/L	3.6	20
9386979	Total Barium (Ba)	2019/04/23	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.84	20
9386979	Total Beryllium (Be)	2019/04/23	100	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9386979	Total Bismuth (Bi)	2019/04/23	96	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9386979	Total Boron (B)	2019/04/23	106	80 - 120	106	80 - 120	<0.010	mg/L	12	20
9386979	Total Cadmium (Cd)	2019/04/23	97	80 - 120	99	80 - 120	<0.0000050	mg/L	3.8	20
9386979	Total Chromium (Cr)	2019/04/23	96	80 - 120	96	80 - 120	<0.00010	mg/L	9.4	20
9386979	Total Cobalt (Co)	2019/04/23	96	80 - 120	97	80 - 120	<0.0000050	mg/L	1.7	20
9386979	Total Copper (Cu)	2019/04/23	93	80 - 120	97	80 - 120	<0.000050	mg/L	0.35	20
9386979	Total Iron (Fe)	2019/04/23	101	80 - 120	103	80 - 120	<0.0010	mg/L	4.1	20
9386979	Total Lead (Pb)	2019/04/23	97	80 - 120	97	80 - 120	<0.0000050	mg/L	0.57	20
9386979	Total Lithium (Li)	2019/04/23	101	80 - 120	101	80 - 120	<0.00050	mg/L	2.1	20
9386979	Total Manganese (Mn)	2019/04/23	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.72	20
9386979	Total Molybdenum (Mo)	2019/04/23	103	80 - 120	99	80 - 120	<0.000050	mg/L	2.1	20
9386979	Total Nickel (Ni)	2019/04/23	95	80 - 120	97	80 - 120	<0.000020	mg/L	0.20	20
9386979	Total Selenium (Se)	2019/04/23	96	80 - 120	93	80 - 120	<0.000040	mg/L	2.1	20
9386979	Total Silicon (Si)	2019/04/23	74 (1)	80 - 120	78 (1)	80 - 120	<0.050	mg/L	0.43	20
9386979	Total Silver (Ag)	2019/04/23	86	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9386979	Total Strontium (Sr)	2019/04/23	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.67	20

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9386979	Total Thallium (Tl)	2019/04/23	99	80 - 120	98	80 - 120	<0.0000020	mg/L	NC	20
9386979	Total Tin (Sn)	2019/04/23	98	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9386979	Total Titanium (Ti)	2019/04/23	92	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
9386979	Total Uranium (U)	2019/04/23	104	80 - 120	102	80 - 120	<0.0000020	mg/L	0.55	20
9386979	Total Vanadium (V)	2019/04/23	99	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9386979	Total Zinc (Zn)	2019/04/23	NC	80 - 120	99	80 - 120	<0.00010	mg/L	0.59	20
9386979	Total Zirconium (Zr)	2019/04/23	96	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9387043	Dissolved Aluminum (Al)	2019/04/24	92	80 - 120	99	80 - 120	<0.00050	mg/L		
9387043	Dissolved Antimony (Sb)	2019/04/24	86	80 - 120	91	80 - 120	<0.000020	mg/L		
9387043	Dissolved Arsenic (As)	2019/04/24	103	80 - 120	99	80 - 120	<0.000020	mg/L		
9387043	Dissolved Barium (Ba)	2019/04/24	NC	80 - 120	99	80 - 120	<0.000020	mg/L		
9387043	Dissolved Beryllium (Be)	2019/04/24	85	80 - 120	96	80 - 120	<0.000010	mg/L		
9387043	Dissolved Bismuth (Bi)	2019/04/24	87	80 - 120	98	80 - 120	<0.0000050	mg/L		
9387043	Dissolved Boron (B)	2019/04/24	104	80 - 120	100	80 - 120	<0.010	mg/L		
9387043	Dissolved Cadmium (Cd)	2019/04/24	85	80 - 120	97	80 - 120	<0.0000050	mg/L		
9387043	Dissolved Chromium (Cr)	2019/04/24	90	80 - 120	99	80 - 120	<0.00010	mg/L		
9387043	Dissolved Cobalt (Co)	2019/04/24	87	80 - 120	97	80 - 120	<0.0000050	mg/L		
9387043	Dissolved Copper (Cu)	2019/04/24	84	80 - 120	98	80 - 120	<0.000050	mg/L		
9387043	Dissolved Iron (Fe)	2019/04/24	NC	80 - 120	102	80 - 120	<0.0010	mg/L		
9387043	Dissolved Lead (Pb)	2019/04/24	90	80 - 120	98	80 - 120	<0.0000050	mg/L	17	20
9387043	Dissolved Lithium (Li)	2019/04/24	95	80 - 120	99	80 - 120	<0.00050	mg/L		
9387043	Dissolved Manganese (Mn)	2019/04/24	NC	80 - 120	96	80 - 120	<0.000050	mg/L		
9387043	Dissolved Molybdenum (Mo)	2019/04/24	106	80 - 120	100	80 - 120	<0.000050	mg/L		
9387043	Dissolved Nickel (Ni)	2019/04/24	84	80 - 120	98	80 - 120	<0.000020	mg/L		
9387043	Dissolved Selenium (Se)	2019/04/24	93	80 - 120	98	80 - 120	<0.000040	mg/L		
9387043	Dissolved Silicon (Si)	2019/04/24	NC	80 - 120	78 (1)	80 - 120	<0.050	mg/L		
9387043	Dissolved Silver (Ag)	2019/04/24	85	80 - 120	99	80 - 120	<0.0000050	mg/L		
9387043	Dissolved Strontium (Sr)	2019/04/24	NC	80 - 120	104	80 - 120	<0.000050	mg/L		
9387043	Dissolved Thallium (Tl)	2019/04/24	92	80 - 120	98	80 - 120	<0.0000020	mg/L		
9387043	Dissolved Tin (Sn)	2019/04/24	94	80 - 120	96	80 - 120	<0.00020	mg/L		
9387043	Dissolved Titanium (Ti)	2019/04/24	96	80 - 120	94	80 - 120	<0.00050	mg/L		
9387043	Dissolved Uranium (U)	2019/04/24	100	80 - 120	100	80 - 120	<0.0000020	mg/L		

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9387043	Dissolved Vanadium (V)	2019/04/24	95	80 - 120	100	80 - 120	<0.00020	mg/L		
9387043	Dissolved Zinc (Zn)	2019/04/24	73 (1)	80 - 120	98	80 - 120	<0.00010	mg/L		
9387043	Dissolved Zirconium (Zr)	2019/04/24	107	80 - 120	98	80 - 120	<0.00010	mg/L		
9388464	Dissolved Sulphate (SO4)	2019/04/18			101	80 - 120	<0.50	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

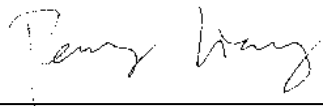
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Job #: B927650
Report Date: 2019/04/24

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Harry (Peng) Liang, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/06/18
 Report #: R2739472
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B944565

Received: 2019/06/06, 15:35

Sample Matrix: Water
 # Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	9	N/A	2019/06/11	AB SOP-00005	SM 23 2320 B m
Alkalinity - Low Level (1)	10	N/A	2019/06/13	BBY6SOP-00026	SM 22 2320 B m
Chloride - Low Level	19	N/A	2019/06/13	AB SOP-00020	SM 23-4500-Cl-E m
Hardness Total (calculated as CaCO3) (2)	9	N/A	2019/06/11		Auto Calc
Hardness Total (calculated as CaCO3) (2)	10	N/A	2019/06/13		Auto Calc
Hardness (calculated as CaCO3)	9	N/A	2019/06/12		Auto Calc
Hardness (calculated as CaCO3)	10	N/A	2019/06/13		Auto Calc
Ion Balance (as Cations/Anions Ratio)	19	N/A	2019/06/13		Auto Calc
Ion Balance	9	N/A	2019/06/10		Auto Calc
Ion Balance	10	N/A	2019/06/13		Auto Calc
Sum of cations, anions	9	N/A	2019/06/12		Auto Calc
Sum of cations, anions	10	N/A	2019/06/13		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	9	N/A	2019/06/12		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	10	N/A	2019/06/13		Auto Calc
Elements by ICPMS Low Level (dissolved)	9	N/A	2019/06/11	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (dissolved)	10	N/A	2019/06/12	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	9	N/A	2019/06/11		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total)	10	N/A	2019/06/13		Auto Calc
Elements by ICPMS Low Level (total)	9	N/A	2019/06/11	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	10	N/A	2019/06/13	CAL SOP-00265	EPA 6020 m
Nitrate and Nitrite - Low Level	9	N/A	2019/06/10		Auto Calc
Nitrate and Nitrite - Low Level	10	N/A	2019/06/13		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	9	N/A	2019/06/10		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	10	N/A	2019/06/13		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	9	N/A	2019/06/09	AB SOP-00023	SM 23 4110 B m
Nitrogen (Nitrite - Nitrate) Low Level	2	N/A	2019/06/12	AB SOP-00023	SM 23 4110 B m
Nitrogen (Nitrite - Nitrate) Low Level	8	N/A	2019/06/13	AB SOP-00023	SM 23 4110 B m
Sulphate - Low Level	19	N/A	2019/06/13	AB SOP-00018	SM 23 4500-SO4 E m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/06/18
Report #: R2739472
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B944565

Received: 2019/06/06, 15:35

by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: smaiter@bvlabs.com

Phone# (403) 291-3077

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VV6637	VV6638	VV6639	VV6640		
Sampling Date		2019/06/06 09:20	2019/06/06 11:30	2019/06/06 12:30	2019/06/06 12:20		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4A	4B	4C	5A	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	9.3	10	11	9.0	N/A	9457768
Cation Sum	meq/L	9.7	10	11	9.1	N/A	9457768
Ion Balance	N/A	1.0	0.98	0.98	1.0	0.010	9462082
Ion Balance (% Difference)	%	2.2	0.93	0.96	0.54	N/A	9457767
Dissolved Nitrate (NO3)	mg/L	0.023	0.014	<0.013	<0.013	0.013	9457952
Nitrate plus Nitrite (N)	mg/L	0.0052	<0.0042	<0.0042	<0.0042	0.0042	9457955
Dissolved Nitrite (NO2)	mg/L	<0.0099	<0.0099	<0.0099	<0.0099	0.0099	9457952
Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	94.1	107	114	92.9	0.50	9459482
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9459482
Bicarbonate (HCO3)	mg/L	115	130	139	113	0.50	9459482
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9459482
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9459482
Anions							
Dissolved Sulphate (SO4)	mg/L	262 (1)	294 (1)	325 (1)	250 (1)	1.0	9464233
Dissolved Chloride (Cl)	mg/L	70	78	85	67	0.50	9464216
Nutrients							
Dissolved Nitrite (N)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	9458020
Dissolved Nitrate (N)	mg/L	0.0051	0.0032	<0.0030	<0.0030	0.0030	9458020
RDL = Reportable Detection Limit							
N/A = Not Applicable							
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.							



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VV6641	VV6642	VV6643	VV6644		
Sampling Date		2019/06/06 11:50	2019/06/06 09:30	2019/06/06 12:00	2019/06/06 11:45		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	5B	5C	6A	6B	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	9.4	10	8.9	9.7	N/A	9457768
Cation Sum	meq/L	9.7	11	8.9	9.7	N/A	9457768
Ion Balance	N/A	1.0	1.0	1.0	1.0	0.010	9462082
Ion Balance (% Difference)	%	1.7	0.57	0.051	0.27	N/A	9457767
Dissolved Nitrate (NO3)	mg/L	<0.013	<0.013	<0.013	0.023	0.013	9457952
Nitrate plus Nitrite (N)	mg/L	<0.0042	<0.0042	<0.0042	0.0052	0.0042	9457955
Dissolved Nitrite (NO2)	mg/L	<0.0099	<0.0099	<0.0099	<0.0099	0.0099	9457952
Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	105	127	89.0	100	0.50	9459482
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9459482
Bicarbonate (HCO3)	mg/L	128	155	109	122	0.50	9459482
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9459482
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9459482
Anions							
Dissolved Sulphate (SO4)	mg/L	255 (1)	272 (1)	257 (1)	269 (1)	1.0	9464233
Dissolved Chloride (Cl)	mg/L	71	78	64	73	0.50	9464216
Nutrients							
Dissolved Nitrite (N)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	9458020
Dissolved Nitrate (N)	mg/L	<0.0030	<0.0030	<0.0030	0.0052	0.0030	9458020
RDL = Reportable Detection Limit							
N/A = Not Applicable							
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.							



BUREAU
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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VV6645		VV6646	VV6647	VV6648		
Sampling Date		2019/06/06 09:40						
COC Number		BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	6C	QC Batch	1A	1B	1C	RDL	QC Batch

Calculated Parameters								
Anion Sum	meq/L	10	9457768	8.8	8.9	9.4	N/A	9458631
Cation Sum	meq/L	10	9457768	8.7	9.1	9.5	N/A	9458631
Ion Balance	N/A	1.0	9462082	1.0	1.0	1.0	0.010	9462082
Ion Balance (% Difference)	%	0.24	9457767	0.23	1.1	0.23	N/A	9458628
Dissolved Nitrate (NO3)	mg/L	<0.013	9457952	0.80	<0.013	<0.013	0.013	9458644
Nitrate plus Nitrite (N)	mg/L	<0.0042	9457955	0.19	<0.0042	<0.0042	0.0042	9458646
Dissolved Nitrite (NO2)	mg/L	<0.0099	9457952	0.038	<0.0099	<0.0099	0.0099	9458644

Misc. Inorganics								
Alkalinity (Total as CaCO3)	mg/L	118	9459482	80.0	83.9	86.6	0.50	9464523
Alkalinity (PP as CaCO3)	mg/L	<0.50	9459482	<0.50	<0.50	<0.50	0.50	9464523
Bicarbonate (HCO3)	mg/L	144	9459482	97.6	102	106	0.50	9464523
Carbonate (CO3)	mg/L	<0.50	9459482	<0.50	<0.50	<0.50	0.50	9464523
Hydroxide (OH)	mg/L	<0.50	9459482	<0.50	<0.50	<0.50	0.50	9464523

Anions								
Dissolved Sulphate (SO4)	mg/L	270 (1)	9464233	258 (1)	254 (1)	273 (1)	1.0	9464233
Dissolved Chloride (Cl)	mg/L	80	9464216	63	67	71	0.50	9464216

Nutrients								
Dissolved Nitrite (N)	mg/L	<0.0030	9458020	0.012	<0.0030	<0.0030	0.0030	9461772
Dissolved Nitrate (N)	mg/L	<0.0030	9458020	0.18	<0.0030	<0.0030	0.0030	9461772

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VV6649	VV6650	VV6651	VV6652		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	2A	2B	2C	3A	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	8.9	8.7	9.2	8.4	N/A	9458631
Cation Sum	meq/L	8.7	9.0	9.2	8.8	N/A	9458631
Ion Balance	N/A	0.98	1.0	1.0	1.0	0.010	9462082
Ion Balance (% Difference)	%	0.99	1.3	0.39	2.1	N/A	9458628
Dissolved Nitrate (NO ₃)	mg/L	<0.013	0.045	<0.013	0.031	0.013	9458644
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.010	<0.0042	0.0071	0.0042	9458646
Dissolved Nitrite (NO ₂)	mg/L	<0.0099	<0.0099	<0.0099	<0.0099	0.0099	9458644
Misc. Inorganics							
Alkalinity (Total as CaCO ₃)	mg/L	84.0	84.2	89.1	85.6	0.50	9464523
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9464523
Bicarbonate (HCO ₃)	mg/L	102	103	109	104	0.50	9464523
Carbonate (CO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9464523
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9464523
Anions							
Dissolved Sulphate (SO ₄)	mg/L	264 (1)	250 (1)	263 (1)	236 (1)	1.0	9464233
Dissolved Chloride (Cl)	mg/L	61	66	68	63	0.50	9464216
Nutrients							
Dissolved Nitrite (N)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	9461772
Dissolved Nitrate (N)	mg/L	<0.0030	0.010	<0.0030	0.0071	0.0030	9461772
RDL = Reportable Detection Limit							
N/A = Not Applicable							
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.							



BUREAU
VERITAS

BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		VV6653	VV6654	VV6655		
Sampling Date						
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	3B	3C	INFL	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	8.7	9.1	8.3	N/A	9458631
Cation Sum	meq/L	9.0	9.2	8.5	N/A	9458631
Ion Balance	N/A	1.0	1.0	1.0	0.010	9462082
Ion Balance (% Difference)	%	1.4	0.85	0.88	N/A	9458628
Dissolved Nitrate (NO3)	mg/L	<0.013	<0.013	1.6	0.013	9458644
Nitrate plus Nitrite (N)	mg/L	<0.0042	<0.0042	0.40	0.0042	9458646
Dissolved Nitrite (NO2)	mg/L	<0.0099	<0.0099	0.14	0.0099	9458644
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	85.5	88.7	83.2	0.50	9464523
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0	0.50	9464523
Bicarbonate (HCO3)	mg/L	104	108	101	0.50	9464523
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	0.50	9464523
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	0.50	9464523
Anions						
Dissolved Sulphate (SO4)	mg/L	249 (1)	256 (1)	237 (1)	1.0	9464233
Dissolved Chloride (Cl)	mg/L	64	69	60	0.50	9464216
Nutrients						
Dissolved Nitrite (N)	mg/L	<0.0030	<0.0030	0.041	0.0030	9461772
Dissolved Nitrate (N)	mg/L	<0.0030	<0.0030	0.36	0.0030	9461772
RDL = Reportable Detection Limit						
N/A = Not Applicable						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						

BUREAU
VERITASBV Labs Job #: B944565
Report Date: 2019/06/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		VV6637	VV6638	VV6639	VV6640		
Sampling Date		2019/06/06 09:20	2019/06/06 11:30	2019/06/06 12:30	2019/06/06 12:20		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4A	4B	4C	5A	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	410	435	482	380	0.50	9457935
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00093	0.00156	0.00185	0.00205	0.00050	9458269
Dissolved Antimony (Sb)	mg/L	0.00408	0.00124	0.000685	0.00236	0.000020	9458269
Dissolved Arsenic (As)	mg/L	0.0146	0.00412	0.00299	0.0223	0.000020	9458269
Dissolved Barium (Ba)	mg/L	0.0629	0.0669	0.0730	0.0707	0.000020	9458269
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000021	<0.000010	<0.000010	0.000010	9458269
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9458269
Dissolved Boron (B)	mg/L	0.018	<0.010	<0.010	0.023	0.010	9458269
Dissolved Cadmium (Cd)	mg/L	0.0000372	0.0000056	<0.0000050	0.000154	0.0000050	9458269
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9458269
Dissolved Cobalt (Co)	mg/L	0.000198	0.0000851	0.000135	0.00141	0.0000050	9458269
Dissolved Copper (Cu)	mg/L	0.00105	0.000620	0.000308	0.00112	0.000050	9458269
Dissolved Iron (Fe)	mg/L	0.0154	0.0176	0.0620	0.0776	0.0010	9458269
Dissolved Lead (Pb)	mg/L	0.0000937	0.0000238	0.0000160	0.000875	0.0000050	9458269
Dissolved Lithium (Li)	mg/L	0.0160	0.0161	0.0183	0.0140	0.00050	9458269
Dissolved Manganese (Mn)	mg/L	0.0346	0.0289	0.118	0.177	0.000050	9458269
Dissolved Molybdenum (Mo)	mg/L	0.000402	0.000121	0.000132	0.000413	0.000050	9458269
Dissolved Nickel (Ni)	mg/L	0.00400	0.00213	0.00123	0.00371	0.000020	9458269
Dissolved Selenium (Se)	mg/L	0.00104	0.000336	0.000225	0.000666	0.000040	9458269
Dissolved Silicon (Si)	mg/L	2.24	2.72	4.26	2.06	0.050	9458269
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9458269
Dissolved Strontium (Sr)	mg/L	0.741	0.753	0.830	0.671	0.000050	9458269
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9458269
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9458269
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9458269
Dissolved Uranium (U)	mg/L	0.00743	0.00163	0.000163	0.00425	0.0000020	9458269
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9458269
Dissolved Zinc (Zn)	mg/L	0.00792	0.00213	0.00058	0.00842	0.00010	9458269
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9458269
Dissolved Calcium (Ca)	mg/L	128	136	150	119	0.050	9457940
Dissolved Magnesium (Mg)	mg/L	21.8	22.8	26.1	20.2	0.050	9457940

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6637	VV6638	VV6639	VV6640		
Sampling Date		2019/06/06 09:20	2019/06/06 11:30	2019/06/06 12:30	2019/06/06 12:20		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4A	4B	4C	5A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.03	2.21	1.57	3.66	0.050	9457940
Dissolved Sodium (Na)	mg/L	33.5	34.7	36.0	31.2	0.050	9457940
Dissolved Sulphur (S)	mg/L	102	107	120	92.9	3.0	9457940
RDL = Reportable Detection Limit							



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6641		VV6642		VV6643		
Sampling Date		2019/06/06 11:50		2019/06/06 09:30		2019/06/06 12:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	5B	QC Batch	5C	QC Batch	6A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	408	9457935	446	9457935	379	0.50	9457935
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00140	9458269	0.00178	9454208	0.00260	0.00050	9458269
Dissolved Antimony (Sb)	mg/L	0.00132	9458269	0.00112	9458269	0.00352	0.000020	9458269
Dissolved Arsenic (As)	mg/L	0.0131	9458269	0.0115	9458269	0.0145	0.000020	9458269
Dissolved Barium (Ba)	mg/L	0.0736	9458269	0.0949	9458269	0.0784	0.000020	9458269
Dissolved Beryllium (Be)	mg/L	<0.000010	9454208	0.000019	9458269	0.000017	0.000010	9458269
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9458269	<0.0000050	9458269	<0.0000050	0.0000050	9458269
Dissolved Boron (B)	mg/L	<0.010	9458269	<0.010	9458269	0.013	0.010	9458269
Dissolved Cadmium (Cd)	mg/L	0.0000372	9458269	0.0000100	9458269	0.000128	0.0000050	9458269
Dissolved Chromium (Cr)	mg/L	<0.00010	9458269	<0.00010	9458269	<0.00010	0.00010	9458269
Dissolved Cobalt (Co)	mg/L	0.000734	9458269	0.000453	9458269	0.00162	0.0000050	9458269
Dissolved Copper (Cu)	mg/L	0.000370	9458269	0.000288	9458269	0.00133	0.000050	9458269
Dissolved Iron (Fe)	mg/L	0.0872	9458269	0.128	9458269	0.0900	0.0010	9458269
Dissolved Lead (Pb)	mg/L	0.000161	9458269	0.0000402	9458269	0.000471	0.0000050	9458269
Dissolved Lithium (Li)	mg/L	0.0147	9458269	0.0160	9458269	0.0146	0.00050	9458269
Dissolved Manganese (Mn)	mg/L	0.204	9458269	0.248	9458269	0.134	0.000050	9458269
Dissolved Molybdenum (Mo)	mg/L	0.000141	9458269	0.000059	9458269	0.000439	0.000050	9458269
Dissolved Nickel (Ni)	mg/L	0.00198	9458269	0.00125	9458269	0.00444	0.000020	9458269
Dissolved Selenium (Se)	mg/L	0.000379	9458269	0.000289	9458269	0.000847	0.000040	9458269
Dissolved Silicon (Si)	mg/L	2.72	9458269	4.15	9458269	2.00	0.050	9458269
Dissolved Silver (Ag)	mg/L	<0.0000050	9458269	<0.0000050	9458269	<0.0000050	0.0000050	9458269
Dissolved Strontium (Sr)	mg/L	0.712	9458269	0.770	9458269	0.712	0.000050	9458269
Dissolved Thallium (Tl)	mg/L	<0.0000020	9458269	<0.0000020	9458269	<0.0000020	0.0000020	9458269
Dissolved Tin (Sn)	mg/L	<0.00020	9458269	<0.00020	9458269	<0.00020	0.00020	9458269
Dissolved Titanium (Ti)	mg/L	<0.00050	9458269	<0.00050	9458269	<0.00050	0.00050	9458269
Dissolved Uranium (U)	mg/L	0.000797	9458269	0.000145	9458269	0.00712	0.0000020	9458269
Dissolved Vanadium (V)	mg/L	<0.00020	9458269	<0.00020	9458269	<0.00020	0.00020	9458269
Dissolved Zinc (Zn)	mg/L	0.00257	9458269	0.00203	9454208	0.0111	0.00010	9458269
Dissolved Zirconium (Zr)	mg/L	<0.00010	9458269	<0.00010	9458269	<0.00010	0.00010	9458269
Dissolved Calcium (Ca)	mg/L	127	9457940	141	9457940	118	0.050	9457940
Dissolved Magnesium (Mg)	mg/L	21.8	9457940	23.2	9457940	20.3	0.050	9457940

RDL = Reportable Detection Limit



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6641		VV6642		VV6643		
Sampling Date		2019/06/06 11:50		2019/06/06 09:30		2019/06/06 12:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	5B	QC Batch	5C	QC Batch	6A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.86	9457940	4.48	9457940	2.25	0.050	9457940
Dissolved Sodium (Na)	mg/L	33.7	9457940	33.9	9457940	30.1	0.050	9457940
Dissolved Sulphur (S)	mg/L	97.7	9457940	103	9457940	96.0	3.0	9457940
RDL = Reportable Detection Limit								

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VERITASBV Labs Job #: B944565
Report Date: 2019/06/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6644		VV6645		VV6646		
Sampling Date		2019/06/06 11:45		2019/06/06 09:40				
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	6B	QC Batch	6C	QC Batch	1A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	413	9457935	439	9457935	367	0.50	9458624
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00401	9454208	<0.00050	9458269	0.00723 (1)	0.00050	9460876
Dissolved Antimony (Sb)	mg/L	0.00282	9458269	0.00196	9458269	0.0226	0.000020	9460876
Dissolved Arsenic (As)	mg/L	0.00999	9458269	0.00894	9458269	0.0480	0.000020	9460876
Dissolved Barium (Ba)	mg/L	0.0855	9458269	0.0902	9458269	0.0642	0.000020	9460876
Dissolved Beryllium (Be)	mg/L	0.000041	9458269	<0.000010	9458269	0.000022	0.000010	9460876
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9458269	<0.0000050	9458269	0.0000095 (1)	0.0000050	9460876
Dissolved Boron (B)	mg/L	<0.010	9458269	<0.010	9458269	0.034	0.010	9460876
Dissolved Cadmium (Cd)	mg/L	0.0000262	9458269	0.0000087	9458269	0.000941	0.0000050	9460876
Dissolved Chromium (Cr)	mg/L	<0.00010	9458269	<0.00010	9458269	<0.00010	0.00010	9460876
Dissolved Cobalt (Co)	mg/L	0.000348	9458269	0.0000721	9458269	0.000432	0.0000050	9460876
Dissolved Copper (Cu)	mg/L	0.00122	9458269	0.000380	9458269	0.00629	0.000050	9460876
Dissolved Iron (Fe)	mg/L	0.0664	9458269	0.0322	9458269	0.0207	0.0010	9460876
Dissolved Lead (Pb)	mg/L	0.0000919	9454208	0.0000194	9458269	0.00515 (1)	0.0000050	9460876
Dissolved Lithium (Li)	mg/L	0.0147	9458269	0.0164	9458269	0.0139	0.00050	9460876
Dissolved Manganese (Mn)	mg/L	0.0878	9458269	0.0207	9458269	0.0184	0.000050	9460876
Dissolved Molybdenum (Mo)	mg/L	0.000259	9458269	0.000178	9458269	0.00162	0.000050	9460876
Dissolved Nickel (Ni)	mg/L	0.00305	9458269	0.00185	9458269	0.00498	0.000020	9460876
Dissolved Selenium (Se)	mg/L	0.000600	9458269	0.000385	9458269	0.00667	0.000040	9460876
Dissolved Silicon (Si)	mg/L	2.92	9458269	4.36	9458269	0.878	0.050	9460876
Dissolved Silver (Ag)	mg/L	<0.0000050	9458269	<0.0000050	9458269	<0.0000050	0.0000050	9460876
Dissolved Strontium (Sr)	mg/L	0.754	9458269	0.798	9458269	0.683	0.000050	9460876
Dissolved Thallium (Tl)	mg/L	<0.0000020	9458269	<0.0000020	9458269	0.0000027	0.0000020	9460876
Dissolved Tin (Sn)	mg/L	<0.00020	9458269	<0.00020	9458269	<0.00020	0.00020	9460876
Dissolved Titanium (Ti)	mg/L	<0.00050	9458269	<0.00050	9458269	<0.00050	0.00050	9460876
Dissolved Uranium (U)	mg/L	0.00345	9458269	0.00192	9458269	0.0291	0.0000020	9460876
Dissolved Vanadium (V)	mg/L	<0.00020	9458269	<0.00020	9458269	<0.00020	0.00020	9460876
Dissolved Zinc (Zn)	mg/L	0.00831	9458269	0.00094	9458269	0.0945	0.00010	9460876
Dissolved Zirconium (Zr)	mg/L	<0.00010	9458269	<0.00010	9458269	<0.00010	0.00010	9460876
Dissolved Calcium (Ca)	mg/L	128	9457940	136	9457940	118	0.050	9458633

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6644		VV6645		VV6646		
Sampling Date		2019/06/06 11:45		2019/06/06 09:40				
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	6B	QC Batch	6C	QC Batch	1A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	22.6	9457940	24.1	9457940	17.8	0.050	9458633
Dissolved Potassium (K)	mg/L	1.22	9457940	0.721	9457940	4.32	0.050	9458633
Dissolved Sodium (Na)	mg/L	32.5	9457940	34.9	9457940	29.8	0.050	9458633
Dissolved Sulphur (S)	mg/L	101	9457940	103	9457940	97.1	3.0	9458633
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B944565
Report Date: 2019/06/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		VV6647	VV6648	VV6649	VV6650		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	1B	1C	2A	2B	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	380	396	366	375	0.50	9458624
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00363	0.00061	0.00313	0.00082	0.00050	9460876
Dissolved Antimony (Sb)	mg/L	0.0186	0.0144	0.0223	0.0195	0.000020	9460876
Dissolved Arsenic (As)	mg/L	0.0348	0.0261	0.0302	0.0248	0.000020	9460876
Dissolved Barium (Ba)	mg/L	0.0635	0.0652	0.0647	0.0640	0.000020	9460876
Dissolved Beryllium (Be)	mg/L	0.000020	<0.000010	<0.000010	<0.000010	0.000010	9460876
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9460876
Dissolved Boron (B)	mg/L	0.034	0.036	0.036	0.032	0.010	9460876
Dissolved Cadmium (Cd)	mg/L	0.000240	0.0000433	0.000801	0.000255	0.0000050	9460876
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9460876
Dissolved Cobalt (Co)	mg/L	0.0000704	0.0000278	0.000229	0.0000329	0.0000050	9460876
Dissolved Copper (Cu)	mg/L	0.00373	0.00218	0.00490	0.00294	0.000050	9460876
Dissolved Iron (Fe)	mg/L	0.0167	0.0249	0.0085	0.0139	0.0010	9460876
Dissolved Lead (Pb)	mg/L	0.000152	0.0000316	0.000532	0.0000414	0.0000050	9460876
Dissolved Lithium (Li)	mg/L	0.0142	0.0157	0.0127	0.0136	0.00050	9460876
Dissolved Manganese (Mn)	mg/L	0.00759	0.00507	0.00848	0.00654	0.000050	9460876
Dissolved Molybdenum (Mo)	mg/L	0.00142	0.00111	0.000967	0.000933	0.000050	9460876
Dissolved Nickel (Ni)	mg/L	0.00298	0.00198	0.00506	0.00314	0.000020	9460876
Dissolved Selenium (Se)	mg/L	0.00560	0.00406	0.00676	0.00554	0.000040	9460876
Dissolved Silicon (Si)	mg/L	1.06	2.02	0.390	0.874	0.050	9460876
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9460876
Dissolved Strontium (Sr)	mg/L	0.713	0.737	0.666	0.682	0.000050	9460876
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000023	0.0000023	0.0000020	9460876
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9460876
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9460876
Dissolved Uranium (U)	mg/L	0.0260	0.0151	0.0273	0.0225	0.0000020	9460876
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9460876
Dissolved Zinc (Zn)	mg/L	0.0405	0.0124	0.0921	0.0454	0.00010	9460876
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9460876
Dissolved Calcium (Ca)	mg/L	122	127	117	120	0.050	9458633
Dissolved Magnesium (Mg)	mg/L	18.3	19.2	17.8	18.3	0.050	9458633
RDL = Reportable Detection Limit							



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6647	VV6648	VV6649	VV6650		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	1B	1C	2A	2B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.64	5.72	4.04	4.11	0.050	9458633
Dissolved Sodium (Na)	mg/L	30.8	32.2	30.4	31.4	0.050	9458633
Dissolved Sulphur (S)	mg/L	101	104	95.5	98.4	3.0	9458633
RDL = Reportable Detection Limit							

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VERITASBV Labs Job #: B944565
Report Date: 2019/06/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		VV6651	VV6652	VV6653	VV6654		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	2C	3A	3B	3C	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	387	366	376	387	0.50	9458624
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00072	0.00139	0.00101	0.00245	0.00050	9460876
Dissolved Antimony (Sb)	mg/L	0.0170	0.0161	0.0143	0.0123	0.000020	9460876
Dissolved Arsenic (As)	mg/L	0.0199	0.0306	0.0225	0.0203	0.000020	9460876
Dissolved Barium (Ba)	mg/L	0.0641	0.0623	0.0636	0.0648	0.000020	9460876
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9460876
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9460876
Dissolved Boron (B)	mg/L	0.035	0.016	<0.010	<0.010	0.010	9460876
Dissolved Cadmium (Cd)	mg/L	0.000129	0.000364	0.0000997	0.0000267	0.0000050	9460876
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9460876
Dissolved Cobalt (Co)	mg/L	0.0000310	0.000356	0.0000468	0.0000369	0.0000050	9460876
Dissolved Copper (Cu)	mg/L	0.00226	0.00299	0.00236	0.00185	0.000050	9460876
Dissolved Iron (Fe)	mg/L	0.0212	0.0200	0.0144	0.0231	0.0010	9460876
Dissolved Lead (Pb)	mg/L	0.0000209	0.000252	0.0000348	0.0000370	0.0000050	9460876
Dissolved Lithium (Li)	mg/L	0.0133	0.0116	0.0129	0.0133	0.00050	9460876
Dissolved Manganese (Mn)	mg/L	0.00496	0.0273	0.00732	0.00390	0.000050	9460876
Dissolved Molybdenum (Mo)	mg/L	0.000866	0.00106	0.000737	0.000674	0.000050	9460876
Dissolved Nickel (Ni)	mg/L	0.00230	0.00495	0.00314	0.00205	0.000020	9460876
Dissolved Selenium (Se)	mg/L	0.00468	0.00422	0.00364	0.00276	0.000040	9460876
Dissolved Silicon (Si)	mg/L	1.48	1.28	1.46	1.32	0.050	9460876
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9460876
Dissolved Strontium (Sr)	mg/L	0.693	0.651	0.673	0.697	0.000050	9460876
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9460876
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9460876
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00054	0.00050	9460876
Dissolved Uranium (U)	mg/L	0.0155	0.0191	0.0115	0.00581	0.0000020	9460876
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9460876
Dissolved Zinc (Zn)	mg/L	0.0242	0.0472	0.0276	0.0172	0.00010	9460876
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9460876
Dissolved Calcium (Ca)	mg/L	125	117	120	124	0.050	9458633
Dissolved Magnesium (Mg)	mg/L	18.5	18.0	18.2	18.7	0.050	9458633
RDL = Reportable Detection Limit							



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6651	VV6652	VV6653	VV6654		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	2C	3A	3B	3C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.37	3.62	3.22	3.16	0.050	9458633
Dissolved Sodium (Na)	mg/L	31.9	30.7	31.3	32.1	0.050	9458633
Dissolved Sulphur (S)	mg/L	101	95.4	99.8	100	3.0	9458633
RDL = Reportable Detection Limit							



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6655		
Sampling Date				
COC Number		BBY FCD-00077/05		
	UNITS	INFL	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	352	0.50	9458624
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.0146	0.00050	9460876
Dissolved Antimony (Sb)	mg/L	0.0261	0.000020	9460876
Dissolved Arsenic (As)	mg/L	0.0593	0.000020	9460876
Dissolved Barium (Ba)	mg/L	0.0660	0.000020	9460876
Dissolved Beryllium (Be)	mg/L	0.000024	0.000010	9460876
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9460876
Dissolved Boron (B)	mg/L	0.034	0.010	9460876
Dissolved Cadmium (Cd)	mg/L	0.00236	0.0000050	9460876
Dissolved Chromium (Cr)	mg/L	0.00015	0.00010	9460876
Dissolved Cobalt (Co)	mg/L	0.00285	0.0000050	9460876
Dissolved Copper (Cu)	mg/L	0.0132	0.000050	9460876
Dissolved Iron (Fe)	mg/L	0.0023	0.0010	9460876
Dissolved Lead (Pb)	mg/L	0.0151	0.0000050	9460876
Dissolved Lithium (Li)	mg/L	0.0133	0.00050	9460876
Dissolved Manganese (Mn)	mg/L	0.0509	0.000050	9460876
Dissolved Molybdenum (Mo)	mg/L	0.00169	0.000050	9460876
Dissolved Nickel (Ni)	mg/L	0.00813	0.000020	9460876
Dissolved Selenium (Se)	mg/L	0.00752	0.000040	9460876
Dissolved Silicon (Si)	mg/L	0.670	0.050	9460876
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9460876
Dissolved Strontium (Sr)	mg/L	0.629	0.000050	9460876
Dissolved Thallium (Tl)	mg/L	0.0000042	0.0000020	9460876
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9460876
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9460876
Dissolved Uranium (U)	mg/L	0.0318	0.0000020	9460876
Dissolved Vanadium (V)	mg/L	<0.00020	0.00020	9460876
Dissolved Zinc (Zn)	mg/L	0.165	0.00010	9460876
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	9460876
Dissolved Calcium (Ca)	mg/L	112	0.050	9458633
Dissolved Magnesium (Mg)	mg/L	17.6	0.050	9458633
RDL = Reportable Detection Limit				



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		VV6655		
Sampling Date				
COC Number		BBY FCD-00077/05		
	UNITS	INFL	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.10	0.050	9458633
Dissolved Sodium (Na)	mg/L	30.4	0.050	9458633
Dissolved Sulphur (S)	mg/L	92.4	3.0	9458633
RDL = Reportable Detection Limit				



BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV6637	VV6638	VV6639	VV6640		
Sampling Date		2019/06/06 09:20	2019/06/06 11:30	2019/06/06 12:30	2019/06/06 12:20		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4A	4B	4C	5A	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	406	435	482	377	0.50	9457934
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00417	0.00411	0.00264	0.0134	0.00050	9458300
Total Antimony (Sb)	mg/L	0.00411	0.00130	0.000733	0.00255	0.000020	9458300
Total Arsenic (As)	mg/L	0.0153	0.00447	0.00283	0.0263	0.000020	9458300
Total Barium (Ba)	mg/L	0.0632	0.0682	0.0735	0.0718	0.000020	9458300
Total Beryllium (Be)	mg/L	<0.000010	0.000025	<0.000010	<0.000010	0.000010	9458300
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9458300
Total Boron (B)	mg/L	0.017	<0.010	<0.010	0.020	0.010	9458300
Total Cadmium (Cd)	mg/L	0.0000397	0.0000088	<0.0000050	0.000303	0.0000050	9458300
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9458300
Total Cobalt (Co)	mg/L	0.000228	0.000102	0.000132	0.00142	0.0000050	9458300
Total Copper (Cu)	mg/L	0.00133	0.000757	0.000274	0.00270	0.000050	9458300
Total Iron (Fe)	mg/L	0.0590	0.0534	0.107	0.254	0.0010	9458300
Total Lead (Pb)	mg/L	0.000219	0.0000605	0.0000346	0.00190	0.0000050	9458300
Total Lithium (Li)	mg/L	0.0149	0.0150	0.0163	0.0121	0.00050	9458300
Total Manganese (Mn)	mg/L	0.0361	0.0362	0.117	0.182	0.000050	9458300
Total Molybdenum (Mo)	mg/L	0.000450	0.000133	0.000079	0.000426	0.000050	9458300
Total Nickel (Ni)	mg/L	0.00435	0.00220	0.00132	0.00393	0.000020	9458300
Total Selenium (Se)	mg/L	0.000998	0.000325	0.000218	0.000619	0.000040	9458300
Total Silicon (Si)	mg/L	2.18	2.61	4.06	2.04	0.050	9458300
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9458300
Total Strontium (Sr)	mg/L	0.738	0.750	0.812	0.673	0.000050	9458300
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9458300
Total Tin (Sn)	mg/L	<0.00020	0.00059	<0.00020	<0.00020	0.00020	9458300
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00110	0.00050	9458300
Total Uranium (U)	mg/L	0.00751	0.00169	0.000163	0.00435	0.0000020	9458300
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9458300
Total Zinc (Zn)	mg/L	0.00951	0.00325	0.00169	0.0191	0.00010	9458300
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9458300
Total Calcium (Ca)	mg/L	127	137	151	118	0.050	9457944
Total Magnesium (Mg)	mg/L	21.4	22.8	25.5	20.1	0.050	9457944

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV6637	VV6638	VV6639	VV6640		
Sampling Date		2019/06/06 09:20	2019/06/06 11:30	2019/06/06 12:30	2019/06/06 12:20		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4A	4B	4C	5A	RDL	QC Batch
Total Potassium (K)	mg/L	3.04	2.22	1.54	3.74	0.050	9457944
Total Sodium (Na)	mg/L	33.0	34.8	36.3	31.3	0.050	9457944
Total Sulphur (S)	mg/L	104	107	119	93.3	3.0	9457944
RDL = Reportable Detection Limit							



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV6641		VV6642		VV6643		
Sampling Date		2019/06/06 11:50		2019/06/06 09:30		2019/06/06 12:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	5B	QC Batch	5C	QC Batch	6A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	410	9457934	445	9457934	380	0.50	9457934
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00455	9458300	0.00735	9460877	0.00474	0.00050	9458300
Total Antimony (Sb)	mg/L	0.00142	9458300	0.00119	9458300	0.00379	0.000020	9458300
Total Arsenic (As)	mg/L	0.0137	9458300	0.0116	9458300	0.0149	0.000020	9458300
Total Barium (Ba)	mg/L	0.0739	9458300	0.0962	9458300	0.0793	0.000020	9458300
Total Beryllium (Be)	mg/L	<0.000010	9460877	<0.000010	9458300	0.000032	0.000010	9458300
Total Bismuth (Bi)	mg/L	0.0000160	9458300	<0.0000050	9458300	<0.0000050	0.0000050	9458300
Total Boron (B)	mg/L	<0.010	9458300	<0.010	9458300	0.012	0.010	9458300
Total Cadmium (Cd)	mg/L	0.0000614	9458300	0.0000201	9458300	0.000157	0.0000050	9458300
Total Chromium (Cr)	mg/L	<0.00010	9458300	<0.00010	9458300	<0.00010	0.00010	9458300
Total Cobalt (Co)	mg/L	0.000792	9458300	0.000452	9458300	0.00172	0.0000050	9458300
Total Copper (Cu)	mg/L	0.000517	9458300	0.000248	9458300	0.00184	0.000050	9458300
Total Iron (Fe)	mg/L	0.113	9458300	0.200	9458300	0.131	0.0010	9458300
Total Lead (Pb)	mg/L	0.000387	9458300	0.0000596	9458300	0.000693	0.0000050	9458300
Total Lithium (Li)	mg/L	0.0149	9458300	0.0165	9458300	0.0140	0.00050	9458300
Total Manganese (Mn)	mg/L	0.207	9458300	0.256	9458300	0.135	0.000050	9458300
Total Molybdenum (Mo)	mg/L	0.000139	9458300	0.000064	9458300	0.000440	0.000050	9458300
Total Nickel (Ni)	mg/L	0.00207	9458300	0.00133	9458300	0.00456	0.000020	9458300
Total Selenium (Se)	mg/L	0.000441	9458300	0.000314	9458300	0.000985	0.000040	9458300
Total Silicon (Si)	mg/L	2.84	9458300	4.21	9458300	1.90	0.050	9458300
Total Silver (Ag)	mg/L	<0.0000050	9458300	<0.0000050	9458300	<0.0000050	0.0000050	9458300
Total Strontium (Sr)	mg/L	0.724	9458300	0.777	9458300	0.686	0.000050	9458300
Total Thallium (Tl)	mg/L	<0.0000020	9458300	<0.0000020	9458300	<0.0000020	0.0000020	9458300
Total Tin (Sn)	mg/L	<0.00020	9458300	<0.00020	9458300	<0.00020	0.00020	9458300
Total Titanium (Ti)	mg/L	<0.00050	9458300	<0.00050	9458300	<0.00050	0.00050	9458300
Total Uranium (U)	mg/L	0.000813	9458300	0.000145	9458300	0.00727	0.0000020	9458300
Total Vanadium (V)	mg/L	<0.00020	9458300	<0.00020	9458300	<0.00020	0.00020	9458300
Total Zinc (Zn)	mg/L	0.00354	9458300	0.00592	9460877	0.0136	0.00010	9458300
Total Zirconium (Zr)	mg/L	<0.00010	9458300	<0.00010	9458300	<0.00010	0.00010	9458300
Total Calcium (Ca)	mg/L	128	9457944	139	9457944	118	0.050	9457944
Total Magnesium (Mg)	mg/L	22.2	9457944	24.0	9457944	20.8	0.050	9457944

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV6641		VV6642		VV6643		
Sampling Date		2019/06/06 11:50		2019/06/06 09:30		2019/06/06 12:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	5B	QC Batch	5C	QC Batch	6A	RDL	QC Batch
Total Potassium (K)	mg/L	3.87	9457944	4.50	9457944	2.29	0.050	9457944
Total Sodium (Na)	mg/L	33.5	9457944	34.5	9457944	31.3	0.050	9457944
Total Sulphur (S)	mg/L	98.3	9457944	103	9457944	94.8	3.0	9457944
RDL = Reportable Detection Limit								

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VERITASBV Labs Job #: B944565
Report Date: 2019/06/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		VV6644	VV6645		VV6646	VV6647		
Sampling Date		2019/06/06 11:45	2019/06/06 09:40					
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	6B	6C	QC Batch	1A	1B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	410	442	9457934	366	378	0.50	9458623
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00375	0.00064	9458300	0.00565	0.00283	0.00050	9460877
Total Antimony (Sb)	mg/L	0.00269	0.00188	9458300	0.0223	0.0189	0.000020	9460877
Total Arsenic (As)	mg/L	0.0103	0.00935	9458300	0.0481	0.0350	0.000020	9460877
Total Barium (Ba)	mg/L	0.0853	0.0904	9458300	0.0642	0.0636	0.000020	9460877
Total Beryllium (Be)	mg/L	<0.000010	0.000023	9458300	<0.000010	0.000043	0.000010	9460877
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9458300	<0.0000050	<0.0000050	0.0000050	9460877
Total Boron (B)	mg/L	<0.010	<0.010	9458300	0.033	0.036	0.010	9460877
Total Cadmium (Cd)	mg/L	0.0000282	0.0000064	9458300	0.000929	0.000288	0.0000050	9460877
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	9458300	<0.00010	<0.00010	0.00010	9460877
Total Cobalt (Co)	mg/L	0.000387	0.0000733	9458300	0.000454	0.0000939	0.0000050	9460877
Total Copper (Cu)	mg/L	0.00122	0.000455	9458300	0.00692	0.00421	0.000050	9460877
Total Iron (Fe)	mg/L	0.0594	0.0352	9458300	0.0155	0.0229	0.0010	9460877
Total Lead (Pb)	mg/L	0.000119	0.0000224	9458300	0.00217	0.000241	0.0000050	9460877
Total Lithium (Li)	mg/L	0.0142	0.0147	9458300	0.0135	0.0139	0.00050	9460877
Total Manganese (Mn)	mg/L	0.0890	0.0217	9458300	0.0177	0.00804	0.000050	9460877
Total Molybdenum (Mo)	mg/L	0.000268	0.000179	9458300	0.00154	0.00141	0.000050	9460877
Total Nickel (Ni)	mg/L	0.00320	0.00205	9458300	0.00501	0.00303	0.000020	9460877
Total Selenium (Se)	mg/L	0.000586	0.000393	9458300	0.00667	0.00549	0.000040	9460877
Total Silicon (Si)	mg/L	2.76	4.22	9458300	0.880	1.06	0.050	9460877
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	9458300	<0.0000050	<0.0000050	0.0000050	9460877
Total Strontium (Sr)	mg/L	0.735	0.830	9458300	0.703	0.723	0.000050	9460877
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9458300	0.0000026	<0.0000020	0.0000020	9460877
Total Tin (Sn)	mg/L	<0.00020	<0.00020	9458300	<0.00020	<0.00020	0.00020	9460877
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	9458300	<0.00050	<0.00050	0.00050	9460877
Total Uranium (U)	mg/L	0.00355	0.00197	9458300	0.0293	0.0256	0.0000020	9460877
Total Vanadium (V)	mg/L	<0.00020	<0.00020	9458300	<0.00020	<0.00020	0.00020	9460877
Total Zinc (Zn)	mg/L	0.0103	0.00104	9458300	0.0990	0.0454	0.00010	9460877
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	9458300	<0.00010	<0.00010	0.00010	9460877
Total Calcium (Ca)	mg/L	127	134	9457944	118	121	0.050	9458638
Total Magnesium (Mg)	mg/L	22.7	26.0	9457944	17.5	18.1	0.050	9458638

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV6644	VV6645		VV6646	VV6647		
Sampling Date		2019/06/06 11:45	2019/06/06 09:40					
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	6B	6C	QC Batch	1A	1B	RDL	QC Batch
Total Potassium (K)	mg/L	1.22	0.779	9457944	4.33	4.63	0.050	9458638
Total Sodium (Na)	mg/L	33.2	37.7	9457944	29.2	30.4	0.050	9458638
Total Sulphur (S)	mg/L	99.4	102	9457944	97.2	101	3.0	9458638
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B944565
Report Date: 2019/06/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		VV6648	VV6649	VV6650	VV6651		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	1C	2A	2B	2C	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	394	369	374	388	0.50	9458623
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00114	0.0153	0.00289	0.00175	0.00050	9460877
Total Antimony (Sb)	mg/L	0.0142	0.0224	0.0192	0.0171	0.000020	9460877
Total Arsenic (As)	mg/L	0.0262	0.0303	0.0243	0.0198	0.000020	9460877
Total Barium (Ba)	mg/L	0.0655	0.0664	0.0647	0.0649	0.000020	9460877
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000025	0.000010	9460877
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9460877
Total Boron (B)	mg/L	0.036	0.034	0.026	0.030	0.010	9460877
Total Cadmium (Cd)	mg/L	0.0000507	0.000798	0.000308	0.000147	0.0000050	9460877
Total Chromium (Cr)	mg/L	<0.00010	0.00013	<0.00010	<0.00010	0.00010	9460877
Total Cobalt (Co)	mg/L	0.0000349	0.000246	0.0000411	0.0000314	0.0000050	9460877
Total Copper (Cu)	mg/L	0.00233	0.00596	0.00325	0.00237	0.000050	9460877
Total Iron (Fe)	mg/L	0.0295	0.0348	0.0198	0.0258	0.0010	9460877
Total Lead (Pb)	mg/L	0.0000403	0.000922	0.0000739	0.0000238	0.0000050	9460877
Total Lithium (Li)	mg/L	0.0143	0.0127	0.0135	0.0131	0.00050	9460877
Total Manganese (Mn)	mg/L	0.00597	0.0106	0.00718	0.00556	0.000050	9460877
Total Molybdenum (Mo)	mg/L	0.00114	0.000927	0.000904	0.000863	0.000050	9460877
Total Nickel (Ni)	mg/L	0.00194	0.00550	0.00330	0.00234	0.000020	9460877
Total Selenium (Se)	mg/L	0.00398	0.00657	0.00545	0.00468	0.000040	9460877
Total Silicon (Si)	mg/L	2.04	0.413	0.878	1.50	0.050	9460877
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9460877
Total Strontium (Sr)	mg/L	0.747	0.684	0.689	0.707	0.000050	9460877
Total Thallium (Tl)	mg/L	<0.0000020	0.0000035	<0.0000020	<0.0000020	0.0000020	9460877
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9460877
Total Titanium (Ti)	mg/L	<0.00050	0.00084	<0.00050	<0.00050	0.00050	9460877
Total Uranium (U)	mg/L	0.0147	0.0280	0.0233	0.0156	0.0000020	9460877
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9460877
Total Zinc (Zn)	mg/L	0.0129	0.102	0.0497	0.0248	0.00010	9460877
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9460877
Total Calcium (Ca)	mg/L	126	118	120	125	0.050	9458638
Total Magnesium (Mg)	mg/L	19.0	17.8	18.0	18.4	0.050	9458638

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV6648	VV6649	VV6650	VV6651		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	1C	2A	2B	2C	RDL	QC Batch
Total Potassium (K)	mg/L	5.75	4.13	4.09	4.37	0.050	9458638
Total Sodium (Na)	mg/L	31.7	29.9	31.0	31.5	0.050	9458638
Total Sulphur (S)	mg/L	107	97.6	98.4	101	3.0	9458638
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B944565
Report Date: 2019/06/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		VV6652	VV6653	VV6654	VV6655		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	3A	3B	3C	INFL	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	368	375	387	351	0.50	9458623
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00491	0.00273	0.00303	0.0328	0.00050	9460877
Total Antimony (Sb)	mg/L	0.0162	0.0142	0.0123	0.0267	0.000020	9460877
Total Arsenic (As)	mg/L	0.0312	0.0229	0.0201	0.0606	0.000020	9460877
Total Barium (Ba)	mg/L	0.0637	0.0632	0.0654	0.0675	0.000020	9460877
Total Beryllium (Be)	mg/L	0.000057	<0.000010	0.000026	0.000021	0.000010	9460877
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9460877
Total Boron (B)	mg/L	0.013	<0.010	<0.010	0.031	0.010	9460877
Total Cadmium (Cd)	mg/L	0.000429	0.000118	0.0000387	0.00244	0.0000050	9460877
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00018	0.00010	9460877
Total Cobalt (Co)	mg/L	0.000351	0.0000485	0.0000239	0.00302	0.0000050	9460877
Total Copper (Cu)	mg/L	0.00372	0.00248	0.00190	0.0169	0.000050	9460877
Total Iron (Fe)	mg/L	0.0312	0.0168	0.0186	0.0305	0.0010	9460877
Total Lead (Pb)	mg/L	0.000416	0.0000392	0.0000397	0.0241	0.0000050	9460877
Total Lithium (Li)	mg/L	0.0118	0.0122	0.0138	0.0123	0.00050	9460877
Total Manganese (Mn)	mg/L	0.0284	0.00801	0.00443	0.0573	0.000050	9460877
Total Molybdenum (Mo)	mg/L	0.00101	0.000735	0.000656	0.00173	0.000050	9460877
Total Nickel (Ni)	mg/L	0.00513	0.00310	0.00251	0.00827	0.000020	9460877
Total Selenium (Se)	mg/L	0.00426	0.00356	0.00275	0.00778	0.000040	9460877
Total Silicon (Si)	mg/L	1.32	1.50	1.35	0.729	0.050	9460877
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000083	0.0000050	9460877
Total Strontium (Sr)	mg/L	0.658	0.687	0.721	0.653	0.000050	9460877
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000044	0.0000020	9460877
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9460877
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00064	0.00050	9460877
Total Uranium (U)	mg/L	0.0194	0.0114	0.00582	0.0318	0.0000020	9460877
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9460877
Total Zinc (Zn)	mg/L	0.0507	0.0280	0.0170	0.179	0.00010	9460877
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9460877
Total Calcium (Ca)	mg/L	118	121	124	112	0.050	9458638
Total Magnesium (Mg)	mg/L	17.8	17.8	18.6	17.5	0.050	9458638

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		VV6652	VV6653	VV6654	VV6655		
Sampling Date							
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	3A	3B	3C	INFL	RDL	QC Batch
Total Potassium (K)	mg/L	3.62	3.20	3.20	4.11	0.050	9458638
Total Sodium (Na)	mg/L	30.1	30.5	31.7	29.6	0.050	9458638
Total Sulphur (S)	mg/L	96.9	97.3	102	93.3	3.0	9458638
RDL = Reportable Detection Limit							



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6637
Sample ID: 4A
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9457935	N/A	2019/06/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9458269	N/A	2019/06/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6637 Dup
Sample ID: 4A
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton

BV Labs ID: VV6638
Sample ID: 4B
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9457935	N/A	2019/06/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9458269	N/A	2019/06/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6639
Sample ID: 4C
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9457935	N/A	2019/06/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9458269	N/A	2019/06/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6640
Sample ID: 5A
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9457935	N/A	2019/06/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9458269	N/A	2019/06/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6641
Sample ID: 5B
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9457935	N/A	2019/06/12	Automated Statchk



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VERITAS

BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6641
Sample ID: 5B
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9458269	N/A	2019/06/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6642
Sample ID: 5C
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9457935	N/A	2019/06/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9454208	N/A	2019/06/13	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6643
Sample ID: 6A
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9457935	N/A	2019/06/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6643
Sample ID: 6A
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9458269	N/A	2019/06/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6643 Dup
Sample ID: 6A
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6644
Sample ID: 6B
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9457935	N/A	2019/06/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9454208	N/A	2019/06/13	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6645
Sample ID: 6C
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9459482	N/A	2019/06/11	Ilonka Kovac
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9457934	N/A	2019/06/11	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9457935	N/A	2019/06/12	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6645
Sample ID: 6C
Matrix: Water

Collected: 2019/06/06
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9457767	N/A	2019/06/10	Automated Statchk
Sum of cations, anions	CALC	9457768	N/A	2019/06/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9457940	N/A	2019/06/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9458269	N/A	2019/06/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9457944	N/A	2019/06/11	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9458300	N/A	2019/06/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9457952	N/A	2019/06/10	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9457955	N/A	2019/06/10	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9458020	N/A	2019/06/09	Kathleen Dalton
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6646
Sample ID: 1A
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9458623	N/A	2019/06/13	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/13	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6646 Dup
Sample ID: 1A
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada



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BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6647
Sample ID: 1B
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9458623	N/A	2019/06/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/13	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6648
Sample ID: 1C
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9458623	N/A	2019/06/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/13	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6649
Sample ID: 2A
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9458623	N/A	2019/06/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9458624	N/A	2019/06/13	Automated Statchk



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VERITAS

BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6649
Sample ID: 2A
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/13	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6650
Sample ID: 2B
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9458623	N/A	2019/06/13	Ghayasuddin Khan
Hardness (calculated as CaCO3)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Ghayasuddin Khan
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/13	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6651
Sample ID: 2C
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9458623	N/A	2019/06/13	Ghayasuddin Khan
Hardness (calculated as CaCO3)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk



BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6651
Sample ID: 2C
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Ghayasuddin Khan
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/13	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6652
Sample ID: 3A
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9458623	N/A	2019/06/13	Ghayasuddin Khan
Hardness (calculated as CaCO3)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Ghayasuddin Khan
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/12	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6653
Sample ID: 3B
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9458623	N/A	2019/06/13	Ghayasuddin Khan
Hardness (calculated as CaCO3)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Ghayasuddin Khan
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk



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VERITAS

BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6653
Sample ID: 3B
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/12	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6653 Dup
Sample ID: 3B
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/12	Parniyan Roosta

BV Labs ID: VV6654
Sample ID: 3C
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9458623	N/A	2019/06/13	Ghayasuddin Khan
Hardness (calculated as CaCO ₃)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Ghayasuddin Khan
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/13	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal

BV Labs ID: VV6655
Sample ID: INFL
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9464523	N/A	2019/06/13	Coco Guo
Chloride - Low Level	KONE/COL	9464216	N/A	2019/06/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9458623	N/A	2019/06/13	Ghayasuddin Khan
Hardness (calculated as CaCO ₃)	CALC	9458624	N/A	2019/06/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9462082	N/A	2019/06/13	Automated Statchk
Ion Balance	CALC	9458628	N/A	2019/06/13	Automated Statchk
Sum of cations, anions	CALC	9458631	N/A	2019/06/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9458633	N/A	2019/06/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9460876	N/A	2019/06/12	Paula Calzada



BUREAU
VERITAS

BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: VV6655
Sample ID: INFL
Matrix: Water

Collected:
Shipped:
Received: 2019/06/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9458638	N/A	2019/06/13	Ghayasuddin Khan
Elements by ICPMS Low Level (total)	ICP/CRCM	9460877	N/A	2019/06/13	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9458644	N/A	2019/06/13	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9458646	N/A	2019/06/13	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9461772	N/A	2019/06/13	Parniyan Roosta
Sulphate - Low Level	KONE/COL	9464233	N/A	2019/06/13	Zafar Iqbal



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.7°C
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Sample VV6646 [1A] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6647 [1B] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6648 [1C] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6649 [2A] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6650 [2B] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6651 [2C] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6652 [3A] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6653 [3B] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6654 [3C] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6655 [INFL] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) Low Level. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample VV6641, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VV6642, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VV6644, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample VV6641, Elements by ICPMS Low Level (total): Test repeated.

Sample VV6642, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B944565
Report Date: 2019/06/18

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9454208	Dissolved Aluminum (Al)	2019/06/10	107	80 - 120	98	80 - 120	<0.00050	mg/L	10	20
9454208	Dissolved Beryllium (Be)	2019/06/10	107	80 - 120	107	80 - 120	<0.000010	mg/L	NC	20
9454208	Dissolved Lead (Pb)	2019/06/10	100	80 - 120	102	80 - 120	<0.0000050	mg/L	18	20
9454208	Dissolved Zinc (Zn)	2019/06/10	100	80 - 120	99	80 - 120	<0.00010	mg/L	0.49	20
9458020	Dissolved Nitrate (N)	2019/06/09	101	80 - 120	100	80 - 120	<0.0030	mg/L	13	20
9458020	Dissolved Nitrite (N)	2019/06/09	100	80 - 120	99	80 - 120	<0.0030	mg/L	NC	20
9458269	Dissolved Aluminum (Al)	2019/06/11	101	80 - 120	93	80 - 120	<0.00050	mg/L	3.1	20
9458269	Dissolved Antimony (Sb)	2019/06/11	100	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9458269	Dissolved Arsenic (As)	2019/06/11	102	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9458269	Dissolved Barium (Ba)	2019/06/11	99	80 - 120	99	80 - 120	<0.000020	mg/L	8.6	20
9458269	Dissolved Beryllium (Be)	2019/06/11	98	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9458269	Dissolved Bismuth (Bi)	2019/06/11	102	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9458269	Dissolved Boron (B)	2019/06/11	109	80 - 120	97	80 - 120	<0.010	mg/L	12	20
9458269	Dissolved Cadmium (Cd)	2019/06/11	99	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9458269	Dissolved Chromium (Cr)	2019/06/11	98	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9458269	Dissolved Cobalt (Co)	2019/06/11	97	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9458269	Dissolved Copper (Cu)	2019/06/11	97	80 - 120	100	80 - 120	<0.0000050	mg/L	2.5	20
9458269	Dissolved Iron (Fe)	2019/06/11	104	80 - 120	106	80 - 120	<0.0010	mg/L	3.6	20
9458269	Dissolved Lead (Pb)	2019/06/11	101	80 - 120	101	80 - 120	<0.0000050	mg/L	0.23	20
9458269	Dissolved Lithium (Li)	2019/06/11	99	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9458269	Dissolved Manganese (Mn)	2019/06/11	101	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9458269	Dissolved Molybdenum (Mo)	2019/06/11	104	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9458269	Dissolved Nickel (Ni)	2019/06/11	96	80 - 120	99	80 - 120	<0.000020	mg/L	14	20
9458269	Dissolved Selenium (Se)	2019/06/11	96	80 - 120	93	80 - 120	<0.000040	mg/L	NC	20
9458269	Dissolved Silicon (Si)	2019/06/11	92	80 - 120	87	80 - 120	<0.050	mg/L	NC	20
9458269	Dissolved Silver (Ag)	2019/06/11	96	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9458269	Dissolved Strontium (Sr)	2019/06/11	108	80 - 120	102	80 - 120	<0.000050	mg/L	11	20
9458269	Dissolved Thallium (Tl)	2019/06/11	102	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9458269	Dissolved Tin (Sn)	2019/06/11	98	80 - 120	107	80 - 120	<0.00020	mg/L	NC	20
9458269	Dissolved Titanium (Ti)	2019/06/11	105	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9458269	Dissolved Uranium (U)	2019/06/11	102	80 - 120	105	80 - 120	<0.0000020	mg/L	10	20
9458269	Dissolved Vanadium (V)	2019/06/11	100	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20



BV Labs Job #: B944565
Report Date: 2019/06/18

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9458269	Dissolved Zinc (Zn)	2019/06/11	104	80 - 120	104	80 - 120	<0.00010	mg/L	3.4	20
9458269	Dissolved Zirconium (Zr)	2019/06/11	103	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9458300	Total Aluminum (Al)	2019/06/11	96	80 - 120	93	80 - 120	<0.00050	mg/L	7.4	20
9458300	Total Antimony (Sb)	2019/06/11	101	80 - 120	100	80 - 120	<0.000020	mg/L	0.39	20
9458300	Total Arsenic (As)	2019/06/11	102	80 - 120	101	80 - 120	<0.000020	mg/L	1.8	20
9458300	Total Barium (Ba)	2019/06/11	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.16	20
9458300	Total Beryllium (Be)	2019/06/11	91	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9458300	Total Bismuth (Bi)	2019/06/11	99	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9458300	Total Boron (B)	2019/06/11	94	80 - 120	99	80 - 120	<0.010	mg/L	17	20
9458300	Total Cadmium (Cd)	2019/06/11	98	80 - 120	100	80 - 120	<0.0000050	mg/L	5.3	20
9458300	Total Chromium (Cr)	2019/06/11	97	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9458300	Total Cobalt (Co)	2019/06/11	94	80 - 120	100	80 - 120	<0.0000050	mg/L	1.5	20
9458300	Total Copper (Cu)	2019/06/11	92	80 - 120	101	80 - 120	<0.000050	mg/L	0.27	20
9458300	Total Iron (Fe)	2019/06/11	105	80 - 120	107	80 - 120	<0.0010	mg/L	0.81	20
9458300	Total Lead (Pb)	2019/06/11	99	80 - 120	103	80 - 120	<0.0000050	mg/L	1.5	20
9458300	Total Lithium (Li)	2019/06/11	96	80 - 120	97	80 - 120	<0.00050	mg/L	3.2	20
9458300	Total Manganese (Mn)	2019/06/11	98	80 - 120	104	80 - 120	<0.000050	mg/L	0.12	20
9458300	Total Molybdenum (Mo)	2019/06/11	110	80 - 120	104	80 - 120	<0.000050	mg/L	1.1	20
9458300	Total Nickel (Ni)	2019/06/11	92	80 - 120	100	80 - 120	<0.000020	mg/L	0.42	20
9458300	Total Selenium (Se)	2019/06/11	97	80 - 120	94	80 - 120	<0.000040	mg/L	7.2	20
9458300	Total Silicon (Si)	2019/06/11	88	80 - 120	87	80 - 120	<0.050	mg/L	0.85	20
9458300	Total Silver (Ag)	2019/06/11	91	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9458300	Total Strontium (Sr)	2019/06/11	NC	80 - 120	105	80 - 120	<0.000050	mg/L	2.2	20
9458300	Total Thallium (Tl)	2019/06/11	102	80 - 120	105	80 - 120	<0.0000020	mg/L	NC	20
9458300	Total Tin (Sn)	2019/06/11	99	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9458300	Total Titanium (Ti)	2019/06/11	101	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9458300	Total Uranium (U)	2019/06/11	105	80 - 120	108	80 - 120	<0.0000020	mg/L	1.2	20
9458300	Total Vanadium (V)	2019/06/11	101	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9458300	Total Zinc (Zn)	2019/06/11	97	80 - 120	104	80 - 120	<0.00010	mg/L	1.8	20
9458300	Total Zirconium (Zr)	2019/06/11	108	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9459482	Alkalinity (PP as CaCO3)	2019/06/11					<0.50	mg/L	NC	20
9459482	Alkalinity (Total as CaCO3)	2019/06/11			92	80 - 120	<0.50	mg/L	0.64	20



BV Labs Job #: B944565
Report Date: 2019/06/18

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9459482	Bicarbonate (HCO3)	2019/06/11					<0.50	mg/L	0.64	20
9459482	Carbonate (CO3)	2019/06/11					<0.50	mg/L	NC	20
9459482	Hydroxide (OH)	2019/06/11					<0.50	mg/L	NC	20
9460876	Dissolved Aluminum (Al)	2019/06/12	92	80 - 120	88	80 - 120	<0.00050	mg/L	8.0	20
9460876	Dissolved Antimony (Sb)	2019/06/12	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.051	20
9460876	Dissolved Arsenic (As)	2019/06/12	102	80 - 120	101	80 - 120	<0.000020	mg/L	0.31	20
9460876	Dissolved Barium (Ba)	2019/06/12	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.29	20
9460876	Dissolved Beryllium (Be)	2019/06/12	95	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9460876	Dissolved Bismuth (Bi)	2019/06/12	100	80 - 120	105	80 - 120	<0.0000050	mg/L	2.6	20
9460876	Dissolved Boron (B)	2019/06/12	84	80 - 120	85	80 - 120	<0.010	mg/L	13	20
9460876	Dissolved Cadmium (Cd)	2019/06/12	103	80 - 120	105	80 - 120	<0.0000050	mg/L	0.32	20
9460876	Dissolved Chromium (Cr)	2019/06/12	99	80 - 120	106	80 - 120	<0.00010	mg/L	NC	20
9460876	Dissolved Cobalt (Co)	2019/06/12	97	80 - 120	106	80 - 120	<0.0000050	mg/L	1.8	20
9460876	Dissolved Copper (Cu)	2019/06/12	94	80 - 120	105	80 - 120	<0.000050	mg/L	0.94	20
9460876	Dissolved Iron (Fe)	2019/06/12	105	80 - 120	110	80 - 120	<0.0010	mg/L	0.92	20
9460876	Dissolved Lead (Pb)	2019/06/12	101	80 - 120	104	80 - 120	<0.0000050	mg/L	1.4	20
9460876	Dissolved Lithium (Li)	2019/06/12	95	80 - 120	99	80 - 120	<0.00050	mg/L	2.3	20
9460876	Dissolved Manganese (Mn)	2019/06/12	102	80 - 120	106	80 - 120	<0.000050	mg/L	0.75	20
9460876	Dissolved Molybdenum (Mo)	2019/06/12	115	80 - 120	108	80 - 120	<0.000050	mg/L	3.9	20
9460876	Dissolved Nickel (Ni)	2019/06/12	95	80 - 120	105	80 - 120	<0.000020	mg/L	1.2	20
9460876	Dissolved Selenium (Se)	2019/06/12	101	80 - 120	98	80 - 120	<0.000040	mg/L	0.94	20
9460876	Dissolved Silicon (Si)	2019/06/12	87	80 - 120	86	80 - 120	<0.050	mg/L	0.22	20
9460876	Dissolved Silver (Ag)	2019/06/12	99	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9460876	Dissolved Strontium (Sr)	2019/06/12	NC	80 - 120	106	80 - 120	<0.000050	mg/L	0.54	20
9460876	Dissolved Thallium (Tl)	2019/06/12	103	80 - 120	106	80 - 120	<0.0000020	mg/L	17	20
9460876	Dissolved Tin (Sn)	2019/06/12	102	80 - 120	106	80 - 120	<0.00020	mg/L	NC	20
9460876	Dissolved Titanium (Ti)	2019/06/12	102	80 - 120	103	80 - 120	<0.00050	mg/L	18	20
9460876	Dissolved Uranium (U)	2019/06/12	98	80 - 120	107	80 - 120	<0.0000020	mg/L	0.20	20
9460876	Dissolved Vanadium (V)	2019/06/12	102	80 - 120	106	80 - 120	<0.00020	mg/L	NC	20
9460876	Dissolved Zinc (Zn)	2019/06/12	95	80 - 120	105	80 - 120	<0.00010	mg/L	0.036	20
9460876	Dissolved Zirconium (Zr)	2019/06/12	106	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9460877	Total Aluminum (Al)	2019/06/13	95	80 - 120	91	80 - 120	<0.00050	mg/L	15	20



BV Labs Job #: B944565
Report Date: 2019/06/18

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9460877	Total Antimony (Sb)	2019/06/13	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.80	20
9460877	Total Arsenic (As)	2019/06/13	101	80 - 120	100	80 - 120	<0.000020	mg/L	3.2	20
9460877	Total Barium (Ba)	2019/06/13	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.20	20
9460877	Total Beryllium (Be)	2019/06/13	103	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9460877	Total Bismuth (Bi)	2019/06/13	102	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
9460877	Total Boron (B)	2019/06/13	86	80 - 120	87	80 - 120	<0.010	mg/L	14	20
9460877	Total Cadmium (Cd)	2019/06/13	102	80 - 120	103	80 - 120	<0.0000050	mg/L	3.2	20
9460877	Total Chromium (Cr)	2019/06/13	99	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9460877	Total Cobalt (Co)	2019/06/13	98	80 - 120	103	80 - 120	<0.0000050	mg/L	3.2	20
9460877	Total Copper (Cu)	2019/06/13	94	80 - 120	102	80 - 120	<0.000050	mg/L	1.4	20
9460877	Total Iron (Fe)	2019/06/13	105	80 - 120	110	80 - 120	<0.0010	mg/L	11	20
9460877	Total Lead (Pb)	2019/06/13	102	80 - 120	104	80 - 120	<0.0000050	mg/L	0.76	20
9460877	Total Lithium (Li)	2019/06/13	101	80 - 120	95	80 - 120	<0.00050	mg/L	2.1	20
9460877	Total Manganese (Mn)	2019/06/13	103	80 - 120	105	80 - 120	<0.000050	mg/L	0.34	20
9460877	Total Molybdenum (Mo)	2019/06/13	114	80 - 120	110	80 - 120	<0.000050	mg/L	5.4	20
9460877	Total Nickel (Ni)	2019/06/13	96	80 - 120	103	80 - 120	<0.000020	mg/L	0.093	20
9460877	Total Selenium (Se)	2019/06/13	100	80 - 120	96	80 - 120	<0.000040	mg/L	2.4	20
9460877	Total Silicon (Si)	2019/06/13	90	80 - 120	87	80 - 120	<0.050	mg/L	0.48	20
9460877	Total Silver (Ag)	2019/06/13	98	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9460877	Total Strontium (Sr)	2019/06/13	NC	80 - 120	106	80 - 120	<0.000050	mg/L	0.46	20
9460877	Total Thallium (Tl)	2019/06/13	105	80 - 120	106	80 - 120	<0.0000020	mg/L	NC	20
9460877	Total Tin (Sn)	2019/06/13	101	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9460877	Total Titanium (Ti)	2019/06/13	103	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9460877	Total Uranium (U)	2019/06/13	103	80 - 120	111	80 - 120	<0.0000020	mg/L	0.38	20
9460877	Total Vanadium (V)	2019/06/13	103	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9460877	Total Zinc (Zn)	2019/06/13	95	80 - 120	103	80 - 120	<0.00010	mg/L	2.2	20
9460877	Total Zirconium (Zr)	2019/06/13	108	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9461772	Dissolved Nitrate (N)	2019/06/12	103	80 - 120	101	80 - 120	<0.0030	mg/L	NC	20
9461772	Dissolved Nitrite (N)	2019/06/12	101	80 - 120	99	80 - 120	<0.0030	mg/L	NC	20
9464216	Dissolved Chloride (Cl)	2019/06/13	NC	80 - 120	105	80 - 120	<0.50	mg/L	1.4	20
9464233	Dissolved Sulphate (SO4)	2019/06/13	NC	80 - 120	103	95 - 109	<0.50	mg/L	4.8	20
9464523	Alkalinity (PP as CaCO3)	2019/06/13					<0.50	mg/L	NC	20



BV Labs Job #: B944565
Report Date: 2019/06/18

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9464523	Alkalinity (Total as CaCO3)	2019/06/13	104	80 - 120	96	80 - 120	<0.50	mg/L	0.73	20
9464523	Bicarbonate (HCO3)	2019/06/13					<0.50	mg/L	0.73	20
9464523	Carbonate (CO3)	2019/06/13					<0.50	mg/L	NC	20
9464523	Hydroxide (OH)	2019/06/13					<0.50	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

BV Labs Job #: B944565
Report Date: 2019/06/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5, Toll Free (800) 665-8566

CHAIN OF CUSTODY RECORD

COC #: _____

BBY FCD-00077/05
Page _____ of _____

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required			
Company Name: BMC MINERALS LTD.				Company Name: ALESCO ENVIRONMENTAL				Quotation #: B60751				☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS			
Contact Name: _____				Contact Name: Mary Mioska; Renate Vanderhorst				P.O. #/ A/E/F: _____				Rush TAT (Surcharges will be applied)			
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02				☐ Same Day ☐ 1 Day ☐ 2 Days ☐ 3 Days			
Vancouver, BC PC: V6E 4A4				Whitehorse, YK PC: V1A 2V3				Site location: Kudze Kayah				Date Required: _____			
Phone: _____				Phone: (867) 668-6463				Site #: _____				Date Required: _____			
Email: _____				Email: mmioska@alexcoenv.com				Sampled By: _____				Rush Confirmation #: _____			
Regulatory Criteria				Special Instructions				Analysis Requested				LABORATORY USE ONLY			
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) _____ ☐ Other (Specify) _____ ☐ Drinking Water ☐ BC Water Quality				☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) _____ USE SCENARIO # 12485				Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity				# OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE			
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM															
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	LABORATORY USE ONLY	COMMENTS			
1 4A		06-Jun-19	9:20	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
2 4B		06-Jun-19	11:30	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
3 4C		06-Jun-19	12:30	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
4 5A		06-Jun-19	12:20	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
5 5B		06-Jun-19	11:50	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
6 5C		06-Jun-19	9:30	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
7 6A		06-Jun-19	12:00	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
8 6B		06-Jun-19	11:45	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
9 6C		06-Jun-19	9:40	Water	X	X	X	X				Metals preserved with HNO3, dissolved			
REUNQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)				RECEIVED BY: (Signature/Print)			
_____				_____				_____				_____			
_____				_____				_____				_____			

06-Jun-19 15:35

Safiam Maiter

B944565

SBZ INS-0127

CHAIN OF CUSTODY RECORD

COC #:

BBY FCD-00077/05
Page 1 of 1

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required															
Company Name: BMC MINERALS LTD. Contact Name: Mary Moska; Renate Vanderhorst Address: 530-1130 WEST PENDER ST Vancouver, BC V6E 4A4 Phone: (607) 668-6463 Email: marymoska@alexcoenvy.com				Company Name: ALESCO ENVIRONMENTAL Contact Name: Mary Moska; Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK Phone: (867) 668-6463 Email: marymoska@alexcoenvy.com				Quotation #: 960751 P.O. # / A/E/F: Project #: BMC-18-02 Site location: Kudze Kayah Site #: Sampled By:				Regular TAT 5 days (Most analyses) ☒ Regular TAT 5 days (Most analyses) Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 1 Day ☐ 2 Days ☐ 3 Days															
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485				Analysis Requested ☐ Low Level Dissolved Metals ☐ Low Level Total Metals ☐ Anions (SO4, NO2, NO3, Cl) ☐ Alkalinity				Rush Confirmation #: LABORATORY USE ONLY <table border="1"> <tr> <td>CUSTOMER SEAL</td> <td>Y</td> <td>COOLER TEMPERATURES</td> <td>3.0, 2</td> </tr> <tr> <td>Present</td> <td>Y</td> <td>Present</td> <td>Y</td> </tr> <tr> <td colspan="4">ice yes</td> </tr> </table>				CUSTOMER SEAL	Y	COOLER TEMPERATURES	3.0, 2	Present	Y	Present	Y	ice yes			
CUSTOMER SEAL	Y	COOLER TEMPERATURES	3.0, 2																								
Present	Y	Present	Y																								
ice yes																											
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																											
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS																
1 4A		06-Jun-19	9:20	Water	X	X	X	X			Metals preserved with HNO3, dissolved																
2 4B		06-Jun-19	11:30	Water	X	X	X	X			metals field filtered																
3 4C		06-Jun-19	12:30	Water	X	X	X	X			Metals preserved with HNO3, dissolved																
4 5A		06-Jun-19	12:20	Water	X	X	X	X			metals field filtered																
5 5B		06-Jun-19	11:50	Water	X	X	X	X			Metals preserved with HNO3, dissolved																
6 5C		06-Jun-19	9:30	Water	X	X	X	X			metals field filtered																
7 6A		06-Jun-19	12:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved																
8 6B		06-Jun-19	11:45	Water	X	X	X	X			metals field filtered																
9 6C		06-Jun-19	9:40	Water	X	X	X	X			Metals preserved with HNO3, dissolved																
REINQUISHED BY: (Signature/Print) <i>Mary Moska</i> DATE: (YYYY/MM/DD) 2019/06/19 TIME: (HH:MM) 3:35 RECEIVED BY: (Signature/Print) <i>Sara Bischoff</i> DATE: (YYYY/MM/DD) 2019/06/19 TIME: (HH:MM) 8:35																											

Safam Maiter
B944565

06-Jun-19 15:35

SBZ INS-0127

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses)	
Contact Name:		Contact Name:	Mary Mioska, Renate Vanderhorst	P.O. # / AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Rush TAT (Surcharges will be applied) Same Day 2 Days 1 Day 3 Days	
Address:	530-1130 WEST PENDER ST	Address:	UNIT 3 151 INDUSTRIAL RD	Project #:	BMC-18-02		
	Vancouver, BC PC: V6E 4A4		Whitehorse, YK PC: V1A 2V3	Site Location:	Kudz Ze Kayah		
Phone:		Phone:	(867) 668-6463 rvanderhorst@alexcoenv.com	Site #:			
Email:		Email:	mmioska@alexcoenv.com	Sampled By:		Date Required:	

Regulatory Criteria						Special Instructions						Analysis Requested								Rush Confirmation #:			
☐ BC CSR Soil ☐ BC CSR Water						☐ Return Cooler																	
☐ CCME (Specify) ☐ Other (Specify)						☐ Ship Sample Bottles (Please Specify)																	
☐ Drinking Water ☐ BC Water Quality						USE SCENARIO # 12485																	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																							
Sample Identification		Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH-MM)	Matrix																		
1	Influent		06-Jun-19	1:15	Water	X	X	X	X									# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	LABORATORY USE ONLY CUSTODY SEAL Y / N COOLER TEMPERATURES Present Intact			
2	1A		06-Jun-19	1:10	Water	X	X	X	X														
3	1B		06-Jun-19	9:50	Water	X	X	X	X														
4	1C		06-Jun-19	9:15	Water	X	X	X	X														
5	2A		06-Jun-19	1:00	Water	X	X	X	X														
6	2B		06-Jun-19	10:00	Water	X	X	X	X														
7	2C		06-Jun-19	9:05	Water	X	X	X	X														
8	3A		06-Jun-19	12:50	Water	X	X	X	X														
9	3B		06-Jun-19	10:10	Water	X	X	X	X														
10	3C		06-Jun-19	9:10	Water	X	X	X	X														
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH-MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH-MM)		MAXXAM JOB # B944565											

CHAIN OF CUSTODY RE

COC #:

INCKQI
08469975

BBY FCD-00077/05
Page 0 of 0

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required			
Company Name: BMC MINERALS LTD. Contact Name: Mary Mioska, Renate Vanderhorst Address: 530-1130 WEST PENDER ST Vancouver, BC V6E 4A4 Phone: (604) 568-6463 Email: mmioska@alexcoresource.com				Company Name: ALECO ENVIRONMENTAL Contact Name: Mary Mioska, Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK V1A 2V3 Phone: (867) 568-6463 Email: Rvanderhorst@contamcostrategies.com				Quotation #: B60731 P.O. # / AFF#: BMC-18-02 Project #: Kudz Ze Kayah Site location: Kudz Ze Kayah Site #: Sampled By:				☐ Regular TAT 5 days (Most analyses) ☒ Rush TAT (Surcharges will be applied) Same Day ☐ 2 Days 1 Day ☐ 3 Days			
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485				Analysis Requested				Rush Confirmation #: CUSTODY SEAL Y COOLING TEMP. 4°C PRESENT Intact COMMENTS: 4.13.13			
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												Turnaround Time (TAT) Required			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	DISSOLVED LOW LEVEL METALS	TOTAL LOW LEVEL METALS	ANIONS (SO4), ALKALINITY	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS					
1 INFL-10		15-Apr-19	12:45	Water	X	X	X	5		Metals preserved with HNO3, dissolved					
2 1C		15-Apr-19	11:45	Water	X	X	X	5		Metals preserved with HNO3, dissolved					
3 2C		15-Apr-19	12:00	Water	X	X	X	5		Metals preserved with HNO3, dissolved					
4 3C		15-Apr-19	12:05	Water	X	X	X	5		Metals preserved with HNO3, dissolved					
5 4C		15-Apr-19	12:00	Water	X	X	X	5		Metals preserved with HNO3, dissolved					
6 5C		15-Apr-19	12:10	Water	X	X	X	5		Metals preserved with HNO3, dissolved					
7 6C		15-Apr-19	12:15	Water	X	X	X	5		Metals preserved with HNO3, dissolved					
8															
9															
10															
REINQUISHED BY: (Signature/Print) <i>Tanner Webb</i>				DATE: (YYYY/MM/DD) 2019/04/15				TIME: (HH:MM) 14:30				RECEIVED BY: (Signature/Print) <i>BRITTANY BOURGNE</i>			
												DATE: (YYYY/MM/DD) 2019/04/16			
												TIME: (HH:MM) 08:10			



B927650_COC

623



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: BBY FCD-00077/05, 2 OF 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/07/16
 Report #: R2752962
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B954277

Received: 2019/07/05, 15:30

Sample Matrix: Water
 # Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	19	N/A	2019/07/11	AB SOP-00005	SM 23 2320 B m
Low level chloride/sulphate by AC	19	N/A	2019/07/12	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1)	19	N/A	2019/07/12		Auto Calc
Hardness (calculated as CaCO ₃)	19	N/A	2019/07/12		Auto Calc
Ion Balance (as Cations/Anions Ratio)	19	N/A	2019/07/12		Auto Calc
Ion Balance	19	N/A	2019/07/12		Auto Calc
Sum of cations, anions	19	N/A	2019/07/12		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	19	N/A	2019/07/12		Auto Calc
Elements by ICPMS Low Level (dissolved)	13	N/A	2019/07/11	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (dissolved)	6	N/A	2019/07/15	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	19	N/A	2019/07/12		Auto Calc
Elements by ICPMS Low Level (total)	14	N/A	2019/07/11	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	5	N/A	2019/07/15	CAL SOP-00265	EPA 6020 m
Nitrate and Nitrite - Low Level	19	N/A	2019/07/12		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	19	N/A	2019/07/12		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	5	N/A	2019/07/07	AB SOP-00023	SM 23 4110 B m
Nitrogen (Nitrite - Nitrate) Low Level	14	N/A	2019/07/08	AB SOP-00023	SM 23 4110 B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: BBY FCD-00077/05, 2 OF 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/07/16
Report #: R2752962
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B954277

Received: 2019/07/05, 15:30

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: smaiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WA8263	WA8264	WA8265		WA8266		
Sampling Date		2019/07/05 02:00	2019/07/05 01:00	2019/07/05 11:00		2019/07/05 09:45		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	INFLUENT	1A	1B	QC Batch	1C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.2	8.5	8.7	9495707	9.3	N/A	9495835
Cation Sum	meq/L	7.9	8.3	8.7	9495707	9.2	N/A	9495835
Ion Balance	N/A	0.96	0.97	0.99	9497738	1.0	0.010	9497738
Ion Balance (% Difference)	%	2.1	1.3	0.36	9495702	0.097	N/A	9495702
Dissolved Nitrate (NO3)	mg/L	1.5	1.5	<0.013	9495662	<0.013	0.013	9495662
Nitrate plus Nitrite (N)	mg/L	0.34	0.37	<0.0042	9495665	<0.0042	0.0042	9495665
Dissolved Nitrite (NO2)	mg/L	0.019	0.080	<0.0099	9495662	<0.0099	0.0099	9495662

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	60.6	66.3	75.9	9502582	82.2	0.50	9502582
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	9502582	<0.50	0.50	9502582
Bicarbonate (HCO3)	mg/L	73.9	80.9	92.6	9502582	100	0.50	9502582
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	9502582	<0.50	0.50	9502582
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	9502582	<0.50	0.50	9502582

Anions

Dissolved Chloride (Cl)	mg/L	63	64	65	9503962	71	0.50	9503962
Dissolved Sulphate (SO4)	mg/L	250 (1)	260 (1)	260 (1)	9503962	270 (1)	1.0	9503962

Nutrients

Dissolved Nitrite (N)	mg/L	0.0058	0.024	<0.0030	9496012	<0.0030	0.0030	9496012
Dissolved Nitrate (N)	mg/L	0.33	0.35	<0.0030	9496012	<0.0030	0.0030	9496012

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WA8267	WA8268		WA8269	WA8270		
Sampling Date		2019/07/05 01:00	2019/07/05 11:00		2019/07/05 09:45	2019/07/05 01:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	2A	2B	QC Batch	2C	3A	RDL	QC Batch

Calculated Parameters								
Anion Sum	meq/L	8.5	8.7	9495835	9.4	8.3	N/A	9495835
Cation Sum	meq/L	8.4	8.6	9495835	9.2	8.2	N/A	9495835
Ion Balance	N/A	0.99	1.0	9497738	0.98	0.99	0.010	9497738
Ion Balance (% Difference)	%	0.43	0.046	9495702	0.94	0.41	N/A	9495833
Dissolved Nitrate (NO3)	mg/L	0.12	<0.013	9495662	<0.013	0.029	0.013	9495662
Nitrate plus Nitrite (N)	mg/L	0.033	<0.0042	9495665	<0.0042	0.0066	0.0042	9495665
Dissolved Nitrite (NO2)	mg/L	0.022	<0.0099	9495662	<0.0099	<0.0099	0.0099	9495662

Misc. Inorganics								
Alkalinity (Total as CaCO3)	mg/L	69.6	72.1	9502582	86.4	67.1	0.50	9502582
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	9502582	<0.50	<0.50	0.50	9502582
Bicarbonate (HCO3)	mg/L	84.9	88.0	9502582	105	81.8	0.50	9502582
Carbonate (CO3)	mg/L	<0.50	<0.50	9502582	<0.50	<0.50	0.50	9502582
Hydroxide (OH)	mg/L	<0.50	<0.50	9502582	<0.50	<0.50	0.50	9502582

Anions								
Dissolved Chloride (Cl)	mg/L	63	68	9503962	73	64	0.50	9503962
Dissolved Sulphate (SO4)	mg/L	250 (1)	250 (1)	9503962	270 (1)	250 (1)	1.0	9503962

Nutrients								
Dissolved Nitrite (N)	mg/L	0.0068	<0.0030	9496012	<0.0030	<0.0030	0.0030	9496012
Dissolved Nitrate (N)	mg/L	0.026	<0.0030	9496012	<0.0030	0.0066	0.0030	9496012

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WA8271	WA8272	WA8273	WA8274	WA8275		
Sampling Date		2019/07/05 11:00	2019/07/05 09:45	2019/07/05 01:00	2019/07/05 11:00	2019/07/05 09:45		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	2 OF 2	2 OF 2	2 OF 2		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.5	9.1	9.0	9.8	12	N/A	9495835
Cation Sum	meq/L	8.6	9.0	8.8	9.7	12	N/A	9495835
Ion Balance	N/A	1.0	0.99	0.98	1.0	0.98	0.010	9497738
Ion Balance (% Difference)	%	0.066	0.52	0.96	0.13	0.89	N/A	9495833
Dissolved Nitrate (NO3)	mg/L	<0.013	<0.013	0.015	<0.013	<0.013	0.013	9495662
Nitrate plus Nitrite (N)	mg/L	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	0.0042	9495665
Dissolved Nitrite (NO2)	mg/L	<0.0099	<0.0099	<0.0099	<0.0099	<0.0099	0.0099	9495662

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	73.0	82.0	74.6	90.7	116	0.50	9502582
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9502582
Bicarbonate (HCO3)	mg/L	89.0	100	91.0	111	142	0.50	9502582
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9502582
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9502582

Anions

Dissolved Chloride (Cl)	mg/L	64	69	67	74	86	0.50	9503962
Dissolved Sulphate (SO4)	mg/L	250 (1)	260 (1)	270 (1)	280 (1)	330 (1)	1.0	9503962

Nutrients

Dissolved Nitrite (N)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	9496012
Dissolved Nitrate (N)	mg/L	<0.0030	<0.0030	0.0033	<0.0030	<0.0030	0.0030	9496012

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WA8276	WA8277	WA8278	WA8279	WA8280	WA8281		
Sampling Date		2019/07/05 01:00	2019/07/05 11:00	2019/07/05 09:45	2019/07/05 01:00	2019/07/05 11:00	2019/07/05 09:45		
COC Number		2 OF 2	2 OF 2	2 OF 2	2 OF 2	2 OF 2	2 OF 2		
	UNITS	5A	5B	5C	6A	6B	6C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	9.2	10	11	8.3	8.8	9.3	N/A	9495835
Cation Sum	meq/L	9.5	9.9	11	8.3	8.7	9.1	N/A	9495835
Ion Balance	N/A	1.0	0.99	0.96	0.99	0.99	0.98	0.010	9497738
Ion Balance (% Difference)	%	1.9	0.35	1.8	0.32	0.74	1.3	N/A	9495833
Dissolved Nitrate (NO3)	mg/L	0.018	<0.013	<0.013	0.030	0.014	<0.013	0.013	9495662
Nitrate plus Nitrite (N)	mg/L	<0.0042	<0.0042	<0.0042	0.0067	<0.0042	<0.0042	0.0042	9495665
Dissolved Nitrite (NO2)	mg/L	<0.0099	<0.0099	<0.0099	<0.0099	<0.0099	<0.0099	0.0099	9495662

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	85.3	103	142	67.5	76.9	91.5	0.50	9502582
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9502582
Bicarbonate (HCO3)	mg/L	104	125	173	82.3	93.9	112	0.50	9502582
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9502582
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9502582

Anions

Dissolved Chloride (Cl)	mg/L	68	73	85	62	66	71	0.50	9503962
Dissolved Sulphate (SO4)	mg/L	270 (1)	280 (1)	300 (1)	250 (1)	260 (1)	260 (1)	1.0	9503962

Nutrients

Dissolved Nitrite (N)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	9496012
Dissolved Nitrate (N)	mg/L	0.0041	<0.0030	<0.0030	0.0067	0.0033	<0.0030	0.0030	9496012

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

BUREAU
VERITASBV Labs Job #: B954277
Report Date: 2019/07/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8263		WA8264		WA8265		
Sampling Date		2019/07/05 02:00		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	334	9495090	353	9495090	370	0.50	9495090
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0196	9496677	0.00173	9496677	0.00266	0.00050	9496677
Dissolved Antimony (Sb)	mg/L	0.0222	9496677	0.0175	9496677	0.0151	0.000020	9496677
Dissolved Arsenic (As)	mg/L	0.0633	9496677	0.0284	9496677	0.0234	0.000020	9496677
Dissolved Barium (Ba)	mg/L	0.0607	9496677	0.0625	9496677	0.0647	0.000020	9496677
Dissolved Beryllium (Be)	mg/L	<0.000010	9496677	<0.000010	9496677	<0.000010	0.000010	9496677
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9496677	<0.0000050	9496677	<0.0000050	0.0000050	9496677
Dissolved Boron (B)	mg/L	0.039	9496677	0.042	9496677	0.038	0.010	9496677
Dissolved Cadmium (Cd)	mg/L	0.00201	9496677	0.000149	9496677	0.0000418	0.0000050	9496677
Dissolved Chromium (Cr)	mg/L	0.00017	9496677	<0.00010	9496677	<0.00010	0.00010	9496677
Dissolved Cobalt (Co)	mg/L	0.00262	9496677	0.0000462	9496677	0.0000247	0.0000050	9496677
Dissolved Copper (Cu)	mg/L	0.0134	9496677	0.00236	9496677	0.00150	0.000050	9496677
Dissolved Iron (Fe)	mg/L	0.0030	9496677	0.0050	9499873	0.0211	0.0010	9496677
Dissolved Lead (Pb)	mg/L	0.0156	9496677	0.0000624	9496677	0.0000376	0.0000050	9496677
Dissolved Lithium (Li)	mg/L	0.0118	9496677	0.0123	9496677	0.0134	0.00050	9496677
Dissolved Manganese (Mn)	mg/L	0.0526	9496677	0.00272	9496677	0.00222	0.000050	9496677
Dissolved Molybdenum (Mo)	mg/L	0.00162	9496677	0.00160	9496677	0.00138	0.000050	9496677
Dissolved Nickel (Ni)	mg/L	0.00804	9496677	0.00343	9496677	0.00197	0.000020	9496677
Dissolved Selenium (Se)	mg/L	0.00744	9496677	0.00544	9496677	0.00363	0.000040	9496677
Dissolved Silicon (Si)	mg/L	0.749	9496677	0.307	9499873	0.568	0.050	9496677
Dissolved Silver (Ag)	mg/L	<0.0000050	9496677	<0.0000050	9496677	<0.0000050	0.0000050	9496677
Dissolved Strontium (Sr)	mg/L	0.676	9496677	0.704	9496677	0.754	0.000050	9496677
Dissolved Thallium (Tl)	mg/L	0.0000038	9496677	0.0000025	9496677	<0.0000020	0.0000020	9496677
Dissolved Tin (Sn)	mg/L	<0.00020	9496677	<0.00020	9496677	<0.00020	0.00020	9496677
Dissolved Titanium (Ti)	mg/L	<0.00050	9496677	<0.00050	9496677	<0.00050	0.00050	9496677
Dissolved Uranium (U)	mg/L	0.0308	9496677	0.0231	9496677	0.0207	0.0000020	9496677
Dissolved Vanadium (V)	mg/L	<0.00020	9496677	<0.00020	9496677	<0.00020	0.00020	9496677
Dissolved Zinc (Zn)	mg/L	0.155	9496677	0.0508	9496677	0.0155	0.00010	9496677
Dissolved Zirconium (Zr)	mg/L	<0.00010	9496677	<0.00010	9496677	<0.00010	0.00010	9496677
Dissolved Calcium (Ca)	mg/L	105	9495091	111	9495091	117	0.050	9495091
Dissolved Magnesium (Mg)	mg/L	17.3	9495091	18.3	9495091	18.9	0.050	9495091

RDL = Reportable Detection Limit



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8263		WA8264		WA8265		
Sampling Date		2019/07/05 02:00		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.87	9495091	4.00	9495091	4.05	0.050	9495091
Dissolved Sodium (Na)	mg/L	25.4	9495091	26.2	9495091	26.9	0.050	9495091
Dissolved Sulphur (S)	mg/L	95.1	9495091	97.7	9495091	101	3.0	9495091
RDL = Reportable Detection Limit								



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8266		WA8267		WA8268		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	1C	QC Batch	2A	QC Batch	2B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	389	9495090	357	9495090	368	0.50	9495090
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00133	9499873	0.00151	9496677	0.00202	0.00050	9496677
Dissolved Antimony (Sb)	mg/L	0.0152	9499873	0.0156	9496677	0.0137	0.000020	9496677
Dissolved Arsenic (As)	mg/L	0.0237	9499873	0.0200	9496677	0.0124	0.000020	9496677
Dissolved Barium (Ba)	mg/L	0.0639	9499873	0.0632	9496677	0.0674	0.000020	9496677
Dissolved Beryllium (Be)	mg/L	<0.000010	9499873	<0.000010	9496677	<0.000010	0.000010	9496677
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9499873	<0.0000050	9496677	<0.0000050	0.0000050	9496677
Dissolved Boron (B)	mg/L	0.040	9499873	0.033	9496677	0.030	0.010	9496677
Dissolved Cadmium (Cd)	mg/L	0.0000445	9499873	0.000153	9496677	0.0000632	0.0000050	9496677
Dissolved Chromium (Cr)	mg/L	<0.00010	9499873	<0.00010	9496677	<0.00010	0.00010	9496677
Dissolved Cobalt (Co)	mg/L	0.0000265	9499873	0.0000378	9496677	0.0000352	0.0000050	9496677
Dissolved Copper (Cu)	mg/L	0.00155	9499873	0.00204	9496677	0.00167	0.000050	9496677
Dissolved Iron (Fe)	mg/L	0.0211	9499873	0.0164	9496677	0.0206	0.0010	9496677
Dissolved Lead (Pb)	mg/L	0.0000399	9499873	0.0000283	9496677	0.0000143	0.0000050	9496677
Dissolved Lithium (Li)	mg/L	0.0199	9499873	0.0105	9496677	0.0127	0.00050	9496677
Dissolved Manganese (Mn)	mg/L	0.00234	9499873	0.00512	9496677	0.00509	0.000050	9496677
Dissolved Molybdenum (Mo)	mg/L	0.00135	9499873	0.000718	9496677	0.000823	0.000050	9496677
Dissolved Nickel (Ni)	mg/L	0.00192	9499873	0.00303	9496677	0.00226	0.000020	9496677
Dissolved Selenium (Se)	mg/L	0.00387	9499873	0.00421	9496677	0.00312	0.000040	9496677
Dissolved Silicon (Si)	mg/L	0.513	9499873	0.171	9499873	0.748	0.050	9496677
Dissolved Silver (Ag)	mg/L	<0.0000050	9499873	<0.0000050	9496677	<0.0000050	0.0000050	9496677
Dissolved Strontium (Sr)	mg/L	0.681	9499873	0.693	9496677	0.743	0.000050	9496677
Dissolved Thallium (Tl)	mg/L	<0.0000020	9499873	<0.0000020	9496677	<0.0000020	0.0000020	9496677
Dissolved Tin (Sn)	mg/L	<0.00020	9499873	<0.00020	9496677	<0.00020	0.00020	9496677
Dissolved Titanium (Ti)	mg/L	<0.00050	9499873	<0.00050	9496677	<0.00050	0.00050	9496677
Dissolved Uranium (U)	mg/L	0.0222	9499873	0.0173	9496677	0.0125	0.0000020	9496677
Dissolved Vanadium (V)	mg/L	<0.00020	9499873	<0.00020	9496677	<0.00020	0.00020	9496677
Dissolved Zinc (Zn)	mg/L	0.0157	9499873	0.0368	9496677	0.0173	0.00010	9496677
Dissolved Zirconium (Zr)	mg/L	<0.00010	9499873	<0.00010	9496677	<0.00010	0.00010	9496677
Dissolved Calcium (Ca)	mg/L	124	9495091	113	9495091	116	0.050	9495091
Dissolved Magnesium (Mg)	mg/L	19.2	9495091	18.5	9495091	19.0	0.050	9495091

RDL = Reportable Detection Limit



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8266		WA8267		WA8268		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	1C	QC Batch	2A	QC Batch	2B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.17	9495091	4.05	9495091	3.60	0.050	9495091
Dissolved Sodium (Na)	mg/L	31.3	9495091	26.5	9495091	27.4	0.050	9495091
Dissolved Sulphur (S)	mg/L	102	9495091	97.0	9495091	98.4	3.0	9495091
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B954277
Report Date: 2019/07/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WA8269		WA8270		WA8271		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	389	9495090	350	9495090	365	0.50	9495090
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00153	9499873	0.00139	9496677	<0.00050	0.00050	9496677
Dissolved Antimony (Sb)	mg/L	0.0140	9499873	0.0145	9496677	0.0121	0.000020	9496677
Dissolved Arsenic (As)	mg/L	0.0126	9499873	0.0271	9496677	0.0204	0.000020	9496677
Dissolved Barium (Ba)	mg/L	0.0659	9499873	0.0598	9496677	0.0616	0.000020	9496677
Dissolved Beryllium (Be)	mg/L	<0.000010	9499873	<0.000010	9496677	<0.000010	0.000010	9496677
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9499873	<0.0000050	9496677	<0.0000050	0.0000050	9496677
Dissolved Boron (B)	mg/L	0.037	9499873	0.014	9496677	<0.010	0.010	9496677
Dissolved Cadmium (Cd)	mg/L	0.0000464	9499873	0.0000862	9496677	0.0000292	0.0000050	9496677
Dissolved Chromium (Cr)	mg/L	<0.00010	9499873	<0.00010	9496677	<0.00010	0.00010	9496677
Dissolved Cobalt (Co)	mg/L	0.0000351	9499873	0.0000250	9496677	0.0000204	0.0000050	9496677
Dissolved Copper (Cu)	mg/L	0.00169	9499873	0.00184	9496677	0.00146	0.000050	9496677
Dissolved Iron (Fe)	mg/L	0.0248	9499873	0.0061	9496677	0.0080	0.0010	9496677
Dissolved Lead (Pb)	mg/L	0.0000135	9499873	0.0000284	9496677	0.0000140	0.0000050	9496677
Dissolved Lithium (Li)	mg/L	0.0182	9499873	0.0127	9496677	0.0107	0.00050	9496677
Dissolved Manganese (Mn)	mg/L	0.00486	9499873	0.00132	9496677	0.00147	0.000050	9499873
Dissolved Molybdenum (Mo)	mg/L	0.000786	9499873	0.000893	9496677	0.000683	0.000050	9496677
Dissolved Nickel (Ni)	mg/L	0.00225	9499873	0.00284	9496677	0.00173	0.000020	9496677
Dissolved Selenium (Se)	mg/L	0.00321	9499873	0.00368	9496677	0.00300	0.000040	9496677
Dissolved Silicon (Si)	mg/L	0.685	9499873	0.951	9496677	0.953	0.050	9496677
Dissolved Silver (Ag)	mg/L	<0.0000050	9499873	<0.0000050	9496677	<0.0000050	0.0000050	9496677
Dissolved Strontium (Sr)	mg/L	0.691	9499873	0.707	9496677	0.727	0.000050	9496677
Dissolved Thallium (Tl)	mg/L	<0.0000020	9499873	<0.0000020	9496677	<0.0000020	0.0000020	9496677
Dissolved Tin (Sn)	mg/L	<0.00020	9499873	<0.00020	9496677	<0.00020	0.00020	9496677
Dissolved Titanium (Ti)	mg/L	<0.00050	9499873	<0.00050	9496677	<0.00050	0.00050	9496677
Dissolved Uranium (U)	mg/L	0.0130	9499873	0.0117	9496677	0.00698	0.0000020	9496677
Dissolved Vanadium (V)	mg/L	<0.00020	9499873	<0.00020	9496677	<0.00020	0.00020	9496677
Dissolved Zinc (Zn)	mg/L	0.0174	9499873	0.0289	9496677	0.0121	0.00010	9496677
Dissolved Zirconium (Zr)	mg/L	<0.00010	9499873	<0.00010	9496677	<0.00010	0.00010	9496677
Dissolved Calcium (Ca)	mg/L	124	9495091	111	9495091	116	0.050	9495091
Dissolved Magnesium (Mg)	mg/L	19.4	9495091	18.0	9495091	18.5	0.050	9495091

RDL = Reportable Detection Limit



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8269		WA8270		WA8271		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.79	9495091	3.56	9495091	3.59	0.050	9495091
Dissolved Sodium (Na)	mg/L	31.6	9495091	26.1	9495091	26.8	0.050	9495091
Dissolved Sulphur (S)	mg/L	103	9495091	96.7	9495091	98.3	3.0	9495091
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8272		WA8273		WA8274		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		2 OF 2		2 OF 2		
	UNITS	3C	QC Batch	4A	QC Batch	4B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	378	9495090	376	9495090	413	0.50	9495090
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00172	9499873	0.00109	9496677	0.00552	0.00050	9499873
Dissolved Antimony (Sb)	mg/L	0.0122	9499873	0.00287	9496677	0.00290	0.000020	9499873
Dissolved Arsenic (As)	mg/L	0.0210	9499873	0.00522	9496677	0.00536	0.000020	9499873
Dissolved Barium (Ba)	mg/L	0.0614	9499873	0.0656	9496677	0.0650	0.000020	9499873
Dissolved Beryllium (Be)	mg/L	<0.000010	9499873	<0.000010	9496677	<0.000010	0.000010	9499873
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9499873	<0.0000050	9496677	<0.0000050	0.0000050	9499873
Dissolved Boron (B)	mg/L	0.010	9499873	<0.010	9496677	<0.010	0.010	9499873
Dissolved Cadmium (Cd)	mg/L	0.0000231	9499873	0.0000073	9496677	0.0000086	0.0000050	9499873
Dissolved Chromium (Cr)	mg/L	<0.00010	9499873	<0.00010	9496677	<0.00010	0.00010	9499873
Dissolved Cobalt (Co)	mg/L	0.0000220	9499873	0.0000349	9496677	0.0000378	0.0000050	9499873
Dissolved Copper (Cu)	mg/L	0.00147	9499873	0.000686	9496677	0.000699	0.000050	9499873
Dissolved Iron (Fe)	mg/L	0.0080	9499873	0.0131	9496677	0.0129	0.0010	9499873
Dissolved Lead (Pb)	mg/L	0.0000166	9499873	0.0000280	9496677	0.0000324	0.0000050	9499873
Dissolved Lithium (Li)	mg/L	0.0103	9499873	0.0126	9496677	0.0190	0.00050	9499873
Dissolved Manganese (Mn)	mg/L	0.00289	9499873	0.0123	9496677	0.0117	0.000050	9499873
Dissolved Molybdenum (Mo)	mg/L	0.000599	9499873	0.000189	9496677	0.000181	0.000050	9499873
Dissolved Nickel (Ni)	mg/L	0.00176	9499873	0.00227	9496677	0.00238	0.000020	9499873
Dissolved Selenium (Se)	mg/L	0.00299	9499873	0.000490	9496677	0.000542	0.000040	9499873
Dissolved Silicon (Si)	mg/L	0.863	9499873	1.42	9496677	1.29	0.050	9499873
Dissolved Silver (Ag)	mg/L	<0.0000050	9499873	<0.0000050	9496677	<0.0000050	0.0000050	9499873
Dissolved Strontium (Sr)	mg/L	0.672	9499873	0.759	9496677	0.711	0.000050	9499873
Dissolved Thallium (Tl)	mg/L	<0.0000020	9499873	<0.0000020	9496677	<0.0000020	0.0000020	9499873
Dissolved Tin (Sn)	mg/L	<0.00020	9499873	<0.00020	9496677	<0.00020	0.00020	9499873
Dissolved Titanium (Ti)	mg/L	<0.00050	9499873	<0.00050	9496677	<0.00050	0.00050	9499873
Dissolved Uranium (U)	mg/L	0.00749	9499873	0.00191	9496677	0.00203	0.0000020	9499873
Dissolved Vanadium (V)	mg/L	<0.00020	9499873	<0.00020	9496677	<0.00020	0.00020	9499873
Dissolved Zinc (Zn)	mg/L	0.0121	9499873	0.00413	9496677	0.00408	0.00010	9499873
Dissolved Zirconium (Zr)	mg/L	<0.00010	9499873	<0.00010	9496677	<0.00010	0.00010	9499873
Dissolved Calcium (Ca)	mg/L	121	9495091	118	9495091	131	0.050	9495091
Dissolved Magnesium (Mg)	mg/L	18.7	9495091	19.8	9495091	21.1	0.050	9495091

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8272		WA8273		WA8274		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		2 OF 2		2 OF 2		
	UNITS	3C	QC Batch	4A	QC Batch	4B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.67	9495091	2.91	9495091	2.00	0.050	9495091
Dissolved Sodium (Na)	mg/L	30.5	9495091	27.6	9495091	33.0	0.050	9495091
Dissolved Sulphur (S)	mg/L	99.1	9495091	101	9495091	107	3.0	9495091
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B954277
Report Date: 2019/07/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WA8275		WA8276		WA8277		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	4C	QC Batch	5A	QC Batch	5B	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	491	9495090	410	9495090	424	0.50	9495090
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00872	9499873	0.00265	9496677	0.00171	0.00050	9499873
Dissolved Antimony (Sb)	mg/L	0.00107	9499873	0.00125	9496677	0.00129	0.000020	9496677
Dissolved Arsenic (As)	mg/L	0.00216	9499873	0.00619	9496677	0.00591	0.000020	9496677
Dissolved Barium (Ba)	mg/L	0.0675	9499873	0.0676	9496677	0.0679	0.000020	9496677
Dissolved Beryllium (Be)	mg/L	<0.000010	9499873	<0.000010	9496677	<0.000010	0.000010	9499873
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9499873	<0.0000050	9496677	<0.0000050	0.0000050	9496677
Dissolved Boron (B)	mg/L	<0.010	9499873	<0.010	9496677	<0.010	0.010	9496677
Dissolved Cadmium (Cd)	mg/L	0.0000068	9499873	0.0000051	9496677	0.0000085	0.0000050	9496677
Dissolved Chromium (Cr)	mg/L	<0.00010	9499873	<0.00010	9496677	<0.00010	0.00010	9496677
Dissolved Cobalt (Co)	mg/L	0.0000617	9499873	0.000298	9496677	0.000372	0.0000050	9496677
Dissolved Copper (Cu)	mg/L	0.000959	9499873	0.000375	9496677	0.000368	0.000050	9496677
Dissolved Iron (Fe)	mg/L	0.0276	9499873	0.0316	9496677	0.0312	0.0010	9496677
Dissolved Lead (Pb)	mg/L	0.0000195	9499873	0.0000363	9496677	0.0000340	0.0000050	9496677
Dissolved Lithium (Li)	mg/L	0.0219	9499873	0.0141	9496677	0.0137	0.00050	9496677
Dissolved Manganese (Mn)	mg/L	0.0283	9499873	0.0876	9496677	0.0868	0.000050	9496677
Dissolved Molybdenum (Mo)	mg/L	0.000121	9499873	0.000182	9496677	0.000166	0.000050	9496677
Dissolved Nickel (Ni)	mg/L	0.00129	9499873	0.00215	9496677	0.00208	0.000020	9496677
Dissolved Selenium (Se)	mg/L	0.000267	9499873	0.000259	9496677	0.000309	0.000040	9496677
Dissolved Silicon (Si)	mg/L	1.72	9499873	1.70	9496677	1.71	0.050	9496677
Dissolved Silver (Ag)	mg/L	<0.0000050	9499873	<0.0000050	9496677	<0.0000050	0.0000050	9496677
Dissolved Strontium (Sr)	mg/L	0.812	9499873	0.770	9496677	0.771	0.000050	9496677
Dissolved Thallium (Tl)	mg/L	<0.0000020	9499873	<0.0000020	9496677	<0.0000020	0.0000020	9496677
Dissolved Tin (Sn)	mg/L	<0.00020	9499873	<0.00020	9496677	<0.00020	0.00020	9496677
Dissolved Titanium (Ti)	mg/L	<0.00050	9499873	<0.00050	9496677	<0.00050	0.00050	9496677
Dissolved Uranium (U)	mg/L	0.000525	9499873	0.000918	9496677	0.000934	0.0000020	9496677
Dissolved Vanadium (V)	mg/L	<0.00020	9499873	<0.00020	9496677	<0.00020	0.00020	9496677
Dissolved Zinc (Zn)	mg/L	0.00135	9499873	0.00250	9496677	0.00256	0.00010	9496677
Dissolved Zirconium (Zr)	mg/L	<0.00010	9499873	<0.00010	9496677	<0.00010	0.00010	9496677
Dissolved Calcium (Ca)	mg/L	155	9495091	130	9495091	132	0.050	9495091
Dissolved Magnesium (Mg)	mg/L	25.2	9495091	20.6	9495091	22.8	0.050	9495091
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8275		WA8276		WA8277		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	4C	QC Batch	5A	QC Batch	5B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	0.918	9495091	2.96	9495091	2.53	0.050	9495091
Dissolved Sodium (Na)	mg/L	38.8	9495091	28.2	9495091	30.8	0.050	9495091
Dissolved Sulphur (S)	mg/L	125	9495091	102	9495091	110	3.0	9495091
RDL = Reportable Detection Limit								



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8278		WA8279		WA8280		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5C	QC Batch	6A	QC Batch	6B	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	474	9495090	352	9495090	366	0.50	9495090
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00225	9499873	0.00365	9496677	0.00413	0.00050	9499873
Dissolved Antimony (Sb)	mg/L	0.00106	9496677	0.00925	9496677	0.00621	0.000020	9499873
Dissolved Arsenic (As)	mg/L	0.00406	9496677	0.0253	9496677	0.0115	0.000020	9499873
Dissolved Barium (Ba)	mg/L	0.0835	9496677	0.0639	9496677	0.0634	0.000020	9499873
Dissolved Beryllium (Be)	mg/L	<0.000010	9496677	<0.000010	9496677	<0.000010	0.000010	9499873
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9496677	<0.0000050	9496677	<0.0000050	0.0000050	9499873
Dissolved Boron (B)	mg/L	<0.010	9496677	0.020	9496677	0.015	0.010	9499873
Dissolved Cadmium (Cd)	mg/L	0.0000052	9496677	0.000249	9496677	0.0000454	0.0000050	9499873
Dissolved Chromium (Cr)	mg/L	<0.00010	9496677	<0.00010	9496677	<0.00010	0.00010	9499873
Dissolved Cobalt (Co)	mg/L	0.000309	9496677	0.000899	9496677	0.000158	0.0000050	9499873
Dissolved Copper (Cu)	mg/L	0.000621	9499873	0.00181	9496677	0.000903	0.000050	9499873
Dissolved Iron (Fe)	mg/L	0.0939	9496677	0.0230	9496677	0.0201	0.0010	9499873
Dissolved Lead (Pb)	mg/L	0.0000326	9496677	0.000491	9496677	0.0000877	0.0000050	9499873
Dissolved Lithium (Li)	mg/L	0.0158	9496677	0.0114	9496677	0.0139	0.00050	9499873
Dissolved Manganese (Mn)	mg/L	0.182	9496677	0.0580	9496677	0.0289	0.000050	9499873
Dissolved Molybdenum (Mo)	mg/L	0.000207	9496677	0.000949	9496677	0.000482	0.000050	9499873
Dissolved Nickel (Ni)	mg/L	0.00110	9496677	0.00523	9496677	0.00307	0.000020	9499873
Dissolved Selenium (Se)	mg/L	0.000277	9496677	0.00218	9496677	0.00104	0.000040	9499873
Dissolved Silicon (Si)	mg/L	2.74	9496677	1.03	9496677	1.15	0.050	9499873
Dissolved Silver (Ag)	mg/L	<0.0000050	9496677	<0.0000050	9496677	<0.0000050	0.0000050	9499873
Dissolved Strontium (Sr)	mg/L	0.858	9496677	0.686	9496677	0.658	0.000050	9499873
Dissolved Thallium (Tl)	mg/L	<0.0000020	9496677	<0.0000020	9496677	<0.0000020	0.0000020	9499873
Dissolved Tin (Sn)	mg/L	<0.00020	9496677	<0.00020	9496677	<0.00020	0.00020	9499873
Dissolved Titanium (Ti)	mg/L	<0.00050	9496677	<0.00050	9496677	<0.00050	0.00050	9499873
Dissolved Uranium (U)	mg/L	0.000151	9496677	0.0109	9496677	0.00323	0.0000020	9499873
Dissolved Vanadium (V)	mg/L	<0.00020	9496677	<0.00020	9496677	<0.00020	0.00020	9499873
Dissolved Zinc (Zn)	mg/L	0.00278	9499873	0.0327	9496677	0.0103	0.00010	9499873
Dissolved Zirconium (Zr)	mg/L	<0.00010	9496677	<0.00010	9496677	<0.00010	0.00010	9499873
Dissolved Calcium (Ca)	mg/L	150	9495091	110	9495091	115	0.050	9495091
Dissolved Magnesium (Mg)	mg/L	24.3	9495091	19.0	9495091	18.9	0.050	9495091
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8278		WA8279		WA8280		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5C	QC Batch	6A	QC Batch	6B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	2.56	9495091	2.84	9495091	2.05	0.050	9495091
Dissolved Sodium (Na)	mg/L	35.3	9495091	26.9	9495091	29.9	0.050	9495091
Dissolved Sulphur (S)	mg/L	116	9495091	98.1	9495091	97.7	3.0	9495091
RDL = Reportable Detection Limit								

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VERITASBV Labs Job #: B954277
Report Date: 2019/07/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WA8281		
Sampling Date		2019/07/05 09:45		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	390	0.50	9495090
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.00073	0.00050	9496677
Dissolved Antimony (Sb)	mg/L	0.00447	0.000020	9496677
Dissolved Arsenic (As)	mg/L	0.00723	0.000020	9496677
Dissolved Barium (Ba)	mg/L	0.0707	0.000020	9496677
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	9496677
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9496677
Dissolved Boron (B)	mg/L	<0.010	0.010	9496677
Dissolved Cadmium (Cd)	mg/L	0.0000113	0.0000050	9496677
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	9496677
Dissolved Cobalt (Co)	mg/L	0.0000503	0.0000050	9496677
Dissolved Copper (Cu)	mg/L	0.000533	0.000050	9496677
Dissolved Iron (Fe)	mg/L	0.0172	0.0010	9496677
Dissolved Lead (Pb)	mg/L	0.0000223	0.0000050	9496677
Dissolved Lithium (Li)	mg/L	0.0121	0.00050	9496677
Dissolved Manganese (Mn)	mg/L	0.0183	0.000050	9496677
Dissolved Molybdenum (Mo)	mg/L	0.000304	0.000050	9496677
Dissolved Nickel (Ni)	mg/L	0.00142	0.000020	9496677
Dissolved Selenium (Se)	mg/L	0.000531	0.000040	9496677
Dissolved Silicon (Si)	mg/L	1.57	0.050	9496677
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9496677
Dissolved Strontium (Sr)	mg/L	0.746	0.000050	9496677
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000020	9496677
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9496677
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9496677
Dissolved Uranium (U)	mg/L	0.00133	0.0000020	9496677
Dissolved Vanadium (V)	mg/L	<0.00020	0.00020	9496677
Dissolved Zinc (Zn)	mg/L	0.00182	0.00010	9496677
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	9496677
Dissolved Calcium (Ca)	mg/L	122	0.050	9495091
Dissolved Magnesium (Mg)	mg/L	20.5	0.050	9495091
RDL = Reportable Detection Limit				



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WA8281		
Sampling Date		2019/07/05 09:45		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	1.22	0.050	9495091
Dissolved Sodium (Na)	mg/L	29.1	0.050	9495091
Dissolved Sulphur (S)	mg/L	101	3.0	9495091
RDL = Reportable Detection Limit				

BUREAU
VERITASBV Labs Job #: B954277
Report Date: 2019/07/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WA8263		WA8264		WA8265		
Sampling Date		2019/07/05 02:00		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	335	9495658	355	9495658	372	0.50	9495658
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0466	9496663	0.00337	9496663	0.00720	0.00050	9496663
Total Antimony (Sb)	mg/L	0.0229	9496663	0.0211	9496663	0.0177	0.000020	9496663
Total Arsenic (As)	mg/L	0.0668	9496663	0.0481	9496663	0.0307	0.000020	9496663
Total Barium (Ba)	mg/L	0.0621	9496663	0.0619	9496663	0.0627	0.000020	9496663
Total Beryllium (Be)	mg/L	<0.000010	9496663	<0.000010	9496663	<0.000010	0.000010	9496663
Total Bismuth (Bi)	mg/L	<0.0000050	9496663	<0.0000050	9496663	<0.0000050	0.0000050	9496663
Total Boron (B)	mg/L	0.041	9496663	0.034	9496663	0.031	0.010	9496663
Total Cadmium (Cd)	mg/L	0.00205	9496663	0.000654	9496663	0.000235	0.0000050	9496663
Total Chromium (Cr)	mg/L	0.00022	9496663	<0.00010	9496663	<0.00010	0.00010	9496663
Total Cobalt (Co)	mg/L	0.00281	9496663	0.000155	9496663	0.0000617	0.0000050	9496663
Total Copper (Cu)	mg/L	0.0185	9496663	0.00454	9496663	0.00430	0.000050	9496663
Total Iron (Fe)	mg/L	0.0332	9496663	0.0100	9502692	0.0319	0.0010	9496663
Total Lead (Pb)	mg/L	0.0314	9496663	0.000701	9496663	0.000174	0.0000050	9496663
Total Lithium (Li)	mg/L	0.0111	9496663	0.0113	9496663	0.0102	0.00050	9496663
Total Manganese (Mn)	mg/L	0.0626	9496663	0.00652	9496663	0.00365	0.000050	9496663
Total Molybdenum (Mo)	mg/L	0.00162	9496663	0.00151	9496663	0.00162	0.000050	9496663
Total Nickel (Ni)	mg/L	0.00834	9496663	0.00554	9496663	0.00398	0.000020	9496663
Total Selenium (Se)	mg/L	0.00728	9496663	0.00645	9496663	0.00467	0.000040	9496663
Total Silicon (Si)	mg/L	0.816	9496663	0.313	9502692	0.503	0.050	9496663
Total Silver (Ag)	mg/L	<0.0000050	9496663	<0.0000050	9496663	<0.0000050	0.0000050	9496663
Total Strontium (Sr)	mg/L	0.675	9496663	0.696	9496663	0.758	0.000050	9496663
Total Thallium (Tl)	mg/L	0.0000038	9496663	0.0000026	9496663	<0.0000020	0.0000020	9496663
Total Tin (Sn)	mg/L	<0.00020	9496663	<0.00020	9496663	0.00021	0.00020	9496663
Total Titanium (Ti)	mg/L	<0.00050	9496663	<0.00050	9496663	<0.00050	0.00050	9496663
Total Uranium (U)	mg/L	0.0312	9496663	0.0286	9496663	0.0230	0.0000020	9496663
Total Vanadium (V)	mg/L	<0.00020	9496663	<0.00020	9496663	<0.00020	0.00020	9496663
Total Zinc (Zn)	mg/L	0.172	9496663	0.0963	9496663	0.0565	0.00010	9496663
Total Zirconium (Zr)	mg/L	<0.00010	9496663	<0.00010	9496663	<0.00010	0.00010	9496663
Total Calcium (Ca)	mg/L	105	9495659	112	9495659	118	0.050	9495659
Total Magnesium (Mg)	mg/L	17.6	9495659	18.5	9495659	19.0	0.050	9495659

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8263		WA8264		WA8265		
Sampling Date		2019/07/05 02:00		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Total Potassium (K)	mg/L	3.91	9495659	4.05	9495659	4.06	0.050	9495659
Total Sodium (Na)	mg/L	25.8	9495659	26.2	9495659	26.7	0.050	9495659
Total Sulphur (S)	mg/L	96.5	9495659	99.9	9495659	101	3.0	9495659
RDL = Reportable Detection Limit								



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8266		WA8267		WA8268		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	1C	QC Batch	2A	QC Batch	2B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	387	9495658	354	9495658	365	0.50	9495658
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00396	9502692	0.00322	9496663	0.00130	0.00050	9496663
Total Antimony (Sb)	mg/L	0.0151	9502692	0.0191	9496663	0.0157	0.000020	9496663
Total Arsenic (As)	mg/L	0.0234	9502692	0.0311	9496663	0.0203	0.000020	9496663
Total Barium (Ba)	mg/L	0.0635	9502692	0.0634	9496663	0.0630	0.000020	9496663
Total Beryllium (Be)	mg/L	<0.000010	9502692	<0.000010	9496663	<0.000010	0.000010	9496663
Total Bismuth (Bi)	mg/L	<0.0000050	9502692	<0.0000050	9496663	<0.0000050	0.0000050	9496663
Total Boron (B)	mg/L	0.033	9502692	0.034	9496663	0.025	0.010	9496663
Total Cadmium (Cd)	mg/L	0.0000537	9502692	0.000598	9496663	0.000228	0.0000050	9496663
Total Chromium (Cr)	mg/L	<0.00010	9502692	<0.00010	9496663	<0.00010	0.00010	9496663
Total Cobalt (Co)	mg/L	0.0000206	9502692	0.000109	9496663	0.0000410	0.0000050	9496663
Total Copper (Cu)	mg/L	0.00164	9502692	0.00481	9496663	0.00242	0.000050	9496663
Total Iron (Fe)	mg/L	0.0264	9502692	0.0186	9496663	0.0233	0.0010	9496663
Total Lead (Pb)	mg/L	0.0000319	9502692	0.000384	9496663	0.0000392	0.0000050	9496663
Total Lithium (Li)	mg/L	0.0144	9502692	0.0102	9496663	0.00911	0.00050	9496663
Total Manganese (Mn)	mg/L	0.00258	9502692	0.00690	9496663	0.00568	0.000050	9496663
Total Molybdenum (Mo)	mg/L	0.00151	9502692	0.000997	9496663	0.000754	0.000050	9496663
Total Nickel (Ni)	mg/L	0.00197	9502692	0.00540	9496663	0.00314	0.000020	9496663
Total Selenium (Se)	mg/L	0.00368	9502692	0.00537	9496663	0.00410	0.000040	9496663
Total Silicon (Si)	mg/L	0.527	9502692	0.176	9502692	0.599	0.050	9496663
Total Silver (Ag)	mg/L	<0.0000050	9502692	<0.0000050	9496663	<0.0000050	0.0000050	9496663
Total Strontium (Sr)	mg/L	0.700	9502692	0.700	9496663	0.717	0.000050	9496663
Total Thallium (Tl)	mg/L	<0.0000020	9502692	0.0000024	9496663	<0.0000020	0.0000020	9496663
Total Tin (Sn)	mg/L	<0.00020	9502692	<0.00020	9496663	<0.00020	0.00020	9496663
Total Titanium (Ti)	mg/L	<0.00050	9502692	<0.00050	9496663	<0.00050	0.00050	9496663
Total Uranium (U)	mg/L	0.0220	9502692	0.0216	9496663	0.0175	0.0000020	9496663
Total Vanadium (V)	mg/L	<0.00020	9502692	<0.00020	9496663	<0.00020	0.00020	9496663
Total Zinc (Zn)	mg/L	0.0154	9502692	0.0939	9496663	0.0391	0.00010	9496663
Total Zirconium (Zr)	mg/L	<0.00010	9502692	<0.00010	9496663	<0.00010	0.00010	9496663
Total Calcium (Ca)	mg/L	123	9495659	112	9495659	116	0.050	9495659
Total Magnesium (Mg)	mg/L	19.3	9495659	18.0	9495659	18.4	0.050	9495659

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8266		WA8267		WA8268		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	1C	QC Batch	2A	QC Batch	2B	RDL	QC Batch
Total Potassium (K)	mg/L	4.15	9495659	4.04	9495659	3.61	0.050	9495659
Total Sodium (Na)	mg/L	31.0	9495659	25.8	9495659	26.7	0.050	9495659
Total Sulphur (S)	mg/L	103	9495659	99.8	9495659	101	3.0	9495659
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8269		WA8270		WA8271		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	394	9495658	352	9495658	363	0.50	9495658
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00507	9502692	0.00267	9496663	0.00811	0.00050	9496663
Total Antimony (Sb)	mg/L	0.0139	9502692	0.0165	9496663	0.0144	0.000020	9496663
Total Arsenic (As)	mg/L	0.0129	9502692	0.0428	9496663	0.0276	0.000020	9496663
Total Barium (Ba)	mg/L	0.0662	9502692	0.0609	9496663	0.0610	0.000020	9496663
Total Beryllium (Be)	mg/L	<0.000010	9502692	<0.000010	9496663	<0.000010	0.000010	9496663
Total Bismuth (Bi)	mg/L	<0.0000050	9502692	<0.0000050	9496663	<0.0000050	0.0000050	9496663
Total Boron (B)	mg/L	0.026	9502692	0.017	9496663	<0.010	0.010	9496663
Total Cadmium (Cd)	mg/L	0.0000707	9502692	0.000328	9496663	0.0000881	0.0000050	9496663
Total Chromium (Cr)	mg/L	<0.00010	9502692	<0.00010	9496663	<0.00010	0.00010	9496663
Total Cobalt (Co)	mg/L	0.0000323	9502692	0.000171	9496663	0.0000364	0.0000050	9496663
Total Copper (Cu)	mg/L	0.00219	9502692	0.00422	9496663	0.00208	0.000050	9496663
Total Iron (Fe)	mg/L	0.0288	9502692	0.0120	9496663	0.0236	0.0010	9496663
Total Lead (Pb)	mg/L	0.0000252	9502692	0.000274	9496663	0.0000513	0.0000050	9496663
Total Lithium (Li)	mg/L	0.0180	9502692	0.0104	9496663	0.00905	0.00050	9496663
Total Manganese (Mn)	mg/L	0.00496	9502692	0.0137	9496663	0.00165	0.000050	9502692
Total Molybdenum (Mo)	mg/L	0.000884	9502692	0.00119	9496663	0.000848	0.000050	9496663
Total Nickel (Ni)	mg/L	0.00221	9502692	0.00571	9496663	0.00299	0.000020	9496663
Total Selenium (Se)	mg/L	0.00328	9502692	0.00473	9496663	0.00371	0.000040	9496663
Total Silicon (Si)	mg/L	0.710	9502692	0.913	9496663	0.985	0.050	9496663
Total Silver (Ag)	mg/L	<0.0000050	9502692	<0.0000050	9496663	<0.0000050	0.0000050	9496663
Total Strontium (Sr)	mg/L	0.706	9502692	0.705	9496663	0.718	0.000050	9496663
Total Thallium (Tl)	mg/L	<0.0000020	9502692	<0.0000020	9496663	0.0000193	0.0000020	9496663
Total Tin (Sn)	mg/L	<0.00020	9502692	<0.00020	9496663	<0.00020	0.00020	9496663
Total Titanium (Ti)	mg/L	<0.00050	9502692	<0.00050	9496663	0.00094	0.00050	9496663
Total Uranium (U)	mg/L	0.0131	9502692	0.0201	9496663	0.0119	0.0000020	9496663
Total Vanadium (V)	mg/L	<0.00020	9502692	<0.00020	9496663	<0.00020	0.00020	9496663
Total Zinc (Zn)	mg/L	0.0181	9502692	0.0620	9496663	0.0300	0.00010	9496663
Total Zirconium (Zr)	mg/L	<0.00010	9502692	<0.00010	9496663	<0.00010	0.00010	9496663
Total Calcium (Ca)	mg/L	125	9495659	111	9495659	115	0.050	9495659
Total Magnesium (Mg)	mg/L	19.7	9495659	18.0	9495659	18.3	0.050	9495659

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8269		WA8270		WA8271		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch
Total Potassium (K)	mg/L	3.78	9495659	3.60	9495659	3.56	0.050	9495659
Total Sodium (Na)	mg/L	31.6	9495659	26.2	9495659	26.2	0.050	9495659
Total Sulphur (S)	mg/L	105	9495659	98.2	9495659	98.0	3.0	9495659
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B954277
Report Date: 2019/07/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WA8272		WA8273		WA8274		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		2 OF 2		2 OF 2		
	UNITS	3C	QC Batch	4A	QC Batch	4B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	392	9495658	375	9495658	411	0.50	9495658
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00223	9502692	0.00138	9496663	0.00108	0.00050	9502692
Total Antimony (Sb)	mg/L	0.0124	9502692	0.00503	9496663	0.00282	0.000020	9502692
Total Arsenic (As)	mg/L	0.0240	9502692	0.0220	9496663	0.00536	0.000020	9502692
Total Barium (Ba)	mg/L	0.0615	9502692	0.0638	9496663	0.0639	0.000020	9502692
Total Beryllium (Be)	mg/L	<0.000010	9502692	<0.000010	9496663	<0.000010	0.000010	9502692
Total Bismuth (Bi)	mg/L	<0.0000050	9502692	<0.0000050	9496663	<0.0000050	0.0000050	9502692
Total Boron (B)	mg/L	0.011	9502692	0.015	9496663	<0.010	0.010	9502692
Total Cadmium (Cd)	mg/L	0.0000243	9502692	0.0000825	9496663	<0.0000050	0.0000050	9502692
Total Chromium (Cr)	mg/L	<0.00010	9502692	<0.00010	9496663	<0.00010	0.00010	9502692
Total Cobalt (Co)	mg/L	0.0000289	9502692	0.000223	9496663	0.0000351	0.0000050	9502692
Total Copper (Cu)	mg/L	0.00184	9502692	0.00152	9496663	0.000746	0.000050	9502692
Total Iron (Fe)	mg/L	0.0149	9502692	0.0555	9496663	0.0199	0.0010	9502692
Total Lead (Pb)	mg/L	0.0000251	9502692	0.000176	9496663	0.0000306	0.0000050	9502692
Total Lithium (Li)	mg/L	0.0133	9502692	0.00933	9496663	0.0160	0.00050	9502692
Total Manganese (Mn)	mg/L	0.00366	9502692	0.0309	9496663	0.0129	0.000050	9502692
Total Molybdenum (Mo)	mg/L	0.000729	9502692	0.000474	9496663	0.000188	0.000050	9502692
Total Nickel (Ni)	mg/L	0.00210	9502692	0.00449	9496663	0.00234	0.000020	9502692
Total Selenium (Se)	mg/L	0.00306	9502692	0.00118	9496663	0.000515	0.000040	9502692
Total Silicon (Si)	mg/L	0.897	9502692	1.17	9496663	1.33	0.050	9502692
Total Silver (Ag)	mg/L	<0.0000050	9502692	<0.0000050	9496663	<0.0000050	0.0000050	9502692
Total Strontium (Sr)	mg/L	0.811	9502692	0.722	9496663	0.718	0.000050	9502692
Total Thallium (Tl)	mg/L	<0.0000020	9502692	<0.0000020	9496663	<0.0000020	0.0000020	9502692
Total Tin (Sn)	mg/L	<0.00020	9502692	<0.00020	9496663	<0.00020	0.00020	9502692
Total Titanium (Ti)	mg/L	<0.00050	9502692	<0.00050	9496663	<0.00050	0.00050	9502692
Total Uranium (U)	mg/L	0.00742	9502692	0.00676	9496663	0.00198	0.0000020	9502692
Total Vanadium (V)	mg/L	<0.00020	9502692	<0.00020	9496663	<0.00020	0.00020	9502692
Total Zinc (Zn)	mg/L	0.0150	9502692	0.0168	9496663	0.00396	0.00010	9502692
Total Zirconium (Zr)	mg/L	<0.00010	9502692	<0.00010	9496663	<0.00010	0.00010	9502692
Total Calcium (Ca)	mg/L	120	9495659	118	9495659	129	0.050	9495659
Total Magnesium (Mg)	mg/L	22.2	9495659	19.7	9495659	21.2	0.050	9495659

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8272		WA8273		WA8274		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		BBY FCD-00077/05		2 OF 2		2 OF 2		
	UNITS	3C	QC Batch	4A	QC Batch	4B	RDL	QC Batch
Total Potassium (K)	mg/L	4.38	9495659	2.91	9495659	2.00	0.050	9495659
Total Sodium (Na)	mg/L	35.8	9495659	27.7	9495659	33.0	0.050	9495659
Total Sulphur (S)	mg/L	120	9495659	103	9495659	109	3.0	9495659
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B954277
Report Date: 2019/07/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WA8275		WA8276		WA8277		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	4C	QC Batch	5A	QC Batch	5B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	490	9495658	382	9495658	415	0.50	9495658
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00297	9502692	0.00219	9496663	0.00115	0.00050	9502692
Total Antimony (Sb)	mg/L	0.00108	9502692	0.00381	9496663	0.00127	0.000020	9496663
Total Arsenic (As)	mg/L	0.00205	9502692	0.0191	9496663	0.00657	0.000020	9496663
Total Barium (Ba)	mg/L	0.0683	9502692	0.0655	9496663	0.0673	0.000020	9496663
Total Beryllium (Be)	mg/L	<0.000010	9502692	<0.000010	9496663	<0.000010	0.000010	9502692
Total Bismuth (Bi)	mg/L	<0.0000050	9502692	<0.0000050	9496663	<0.0000050	0.0000050	9496663
Total Boron (B)	mg/L	<0.010	9502692	0.016	9496663	<0.010	0.010	9496663
Total Cadmium (Cd)	mg/L	0.0000123	9502692	0.0000337	9496663	0.0000071	0.0000050	9496663
Total Chromium (Cr)	mg/L	<0.00010	9502692	<0.00010	9496663	<0.00010	0.00010	9496663
Total Cobalt (Co)	mg/L	0.0000699	9502692	0.000876	9496663	0.000341	0.0000050	9496663
Total Copper (Cu)	mg/L	0.00110	9502692	0.00119	9496663	0.000601	0.000050	9496663
Total Iron (Fe)	mg/L	0.0528	9502692	0.0615	9496663	0.0570	0.0010	9496663
Total Lead (Pb)	mg/L	0.0000459	9502692	0.000296	9496663	0.0000596	0.0000050	9496663
Total Lithium (Li)	mg/L	0.0203	9502692	0.0114	9496663	0.0121	0.00050	9496663
Total Manganese (Mn)	mg/L	0.0298	9502692	0.101	9496663	0.0882	0.000050	9496663
Total Molybdenum (Mo)	mg/L	0.000091	9502692	0.000480	9496663	0.000149	0.000050	9496663
Total Nickel (Ni)	mg/L	0.00127	9502692	0.00445	9496663	0.00201	0.000020	9496663
Total Selenium (Se)	mg/L	0.000324	9502692	0.000679	9496663	0.000284	0.000040	9496663
Total Silicon (Si)	mg/L	1.80	9502692	1.41	9496663	1.70	0.050	9496663
Total Silver (Ag)	mg/L	<0.0000050	9502692	<0.0000050	9496663	<0.0000050	0.0000050	9496663
Total Strontium (Sr)	mg/L	0.831	9502692	0.729	9496663	0.783	0.000050	9496663
Total Thallium (Tl)	mg/L	<0.0000020	9502692	<0.0000020	9496663	<0.0000020	0.0000020	9496663
Total Tin (Sn)	mg/L	<0.00020	9502692	<0.00020	9496663	<0.00020	0.00020	9496663
Total Titanium (Ti)	mg/L	<0.00050	9502692	<0.00050	9496663	<0.00050	0.00050	9496663
Total Uranium (U)	mg/L	0.000523	9502692	0.00509	9496663	0.000901	0.0000020	9496663
Total Vanadium (V)	mg/L	<0.00020	9502692	<0.00020	9496663	<0.00020	0.00020	9496663
Total Zinc (Zn)	mg/L	0.00224	9502692	0.150	9496663	0.00272	0.00010	9496663
Total Zirconium (Zr)	mg/L	<0.00010	9502692	<0.00010	9496663	<0.00010	0.00010	9496663
Total Calcium (Ca)	mg/L	155	9495659	120	9495659	130	0.050	9495659
Total Magnesium (Mg)	mg/L	25.3	9495659	20.0	9495659	22.2	0.050	9495659
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8275		WA8276		WA8277		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	4C	QC Batch	5A	QC Batch	5B	RDL	QC Batch
Total Potassium (K)	mg/L	0.980	9495659	2.92	9495659	2.29	0.050	9495659
Total Sodium (Na)	mg/L	38.4	9495659	27.3	9495659	30.0	0.050	9495659
Total Sulphur (S)	mg/L	126	9495659	103	9495659	110	3.0	9495659
RDL = Reportable Detection Limit								

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BV Labs Job #: B954277

Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8278		WA8279		WA8280		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5C	QC Batch	6A	QC Batch	6B	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	473	9495658	353	9495658	368	0.50	9495658
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00201	9502692	0.00312	9496663	<0.00050	0.00050	9502692
Total Antimony (Sb)	mg/L	0.00101	9496663	0.00934	9496663	0.00622	0.000020	9502692
Total Arsenic (As)	mg/L	0.00458	9496663	0.0259	9496663	0.0117	0.000020	9502692
Total Barium (Ba)	mg/L	0.0805	9496663	0.0642	9496663	0.0640	0.000020	9502692
Total Beryllium (Be)	mg/L	<0.000010	9496663	<0.000010	9496663	<0.000010	0.000010	9502692
Total Bismuth (Bi)	mg/L	<0.0000050	9496663	<0.0000050	9496663	<0.0000050	0.0000050	9502692
Total Boron (B)	mg/L	<0.010	9496663	0.016	9496663	<0.010	0.010	9502692
Total Cadmium (Cd)	mg/L	0.0000053	9496663	0.000357	9496663	0.0000619	0.0000050	9502692
Total Chromium (Cr)	mg/L	<0.00010	9496663	<0.00010	9496663	<0.00010	0.00010	9502692
Total Cobalt (Co)	mg/L	0.000327	9496663	0.000934	9496663	0.000175	0.0000050	9502692
Total Copper (Cu)	mg/L	0.000621	9502692	0.00278	9496663	0.00123	0.000050	9502692
Total Iron (Fe)	mg/L	0.191	9496663	0.0336	9496663	0.0308	0.0010	9502692
Total Lead (Pb)	mg/L	0.0000759	9496663	0.000874	9496663	0.000162	0.0000050	9502692
Total Lithium (Li)	mg/L	0.0149	9496663	0.0100	9496663	0.0135	0.00050	9502692
Total Manganese (Mn)	mg/L	0.186	9496663	0.0591	9496663	0.0319	0.000050	9502692
Total Molybdenum (Mo)	mg/L	0.000168	9496663	0.000946	9496663	0.000264	0.000050	9496663
Total Nickel (Ni)	mg/L	0.00117	9496663	0.00525	9496663	0.00303	0.000020	9502692
Total Selenium (Se)	mg/L	0.000288	9496663	0.00206	9496663	0.000615	0.000040	9496663
Total Silicon (Si)	mg/L	2.75	9496663	1.05	9496663	1.19	0.050	9502692
Total Silver (Ag)	mg/L	<0.0000050	9496663	<0.0000050	9496663	<0.0000050	0.0000050	9502692
Total Strontium (Sr)	mg/L	0.866	9496663	0.705	9496663	0.668	0.000050	9502692
Total Thallium (Tl)	mg/L	<0.0000020	9496663	<0.0000020	9496663	<0.0000020	0.0000020	9502692
Total Tin (Sn)	mg/L	<0.00020	9496663	<0.00020	9496663	<0.00020	0.00020	9502692
Total Titanium (Ti)	mg/L	<0.00050	9496663	<0.00050	9496663	<0.00050	0.00050	9502692
Total Uranium (U)	mg/L	0.000157	9496663	0.0109	9496663	0.00323	0.0000020	9502692
Total Vanadium (V)	mg/L	<0.00020	9496663	<0.00020	9496663	<0.00020	0.00020	9502692
Total Zinc (Zn)	mg/L	0.00096	9502692	0.0356	9496663	0.0109	0.00010	9502692
Total Zirconium (Zr)	mg/L	<0.00010	9496663	<0.00010	9496663	<0.00010	0.00010	9502692
Total Calcium (Ca)	mg/L	147	9495659	111	9495659	116	0.050	9495659
Total Magnesium (Mg)	mg/L	25.6	9495659	18.3	9495659	19.0	0.050	9495659
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8278		WA8279		WA8280		
Sampling Date		2019/07/05 09:45		2019/07/05 01:00		2019/07/05 11:00		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5C	QC Batch	6A	QC Batch	6B	RDL	QC Batch
Total Potassium (K)	mg/L	2.50	9495659	2.85	9495659	2.05	0.050	9495659
Total Sodium (Na)	mg/L	34.5	9495659	25.8	9495659	29.6	0.050	9495659
Total Sulphur (S)	mg/L	114	9495659	94.6	9495659	100	3.0	9495659
RDL = Reportable Detection Limit								



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8281		
Sampling Date		2019/07/05 09:45		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	391	0.50	9495658
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.00118	0.00050	9496663
Total Antimony (Sb)	mg/L	0.00456	0.000020	9496663
Total Arsenic (As)	mg/L	0.00769	0.000020	9496663
Total Barium (Ba)	mg/L	0.0702	0.000020	9496663
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9496663
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9496663
Total Boron (B)	mg/L	<0.010	0.010	9496663
Total Cadmium (Cd)	mg/L	0.0000148	0.0000050	9496663
Total Chromium (Cr)	mg/L	<0.00010	0.00010	9496663
Total Cobalt (Co)	mg/L	0.0000434	0.0000050	9496663
Total Copper (Cu)	mg/L	0.000678	0.000050	9496663
Total Iron (Fe)	mg/L	0.0247	0.0010	9496663
Total Lead (Pb)	mg/L	0.0000397	0.0000050	9496663
Total Lithium (Li)	mg/L	0.0107	0.00050	9496663
Total Manganese (Mn)	mg/L	0.0179	0.000050	9496663
Total Molybdenum (Mo)	mg/L	0.000272	0.000050	9496663
Total Nickel (Ni)	mg/L	0.00147	0.000020	9496663
Total Selenium (Se)	mg/L	0.000645	0.000040	9496663
Total Silicon (Si)	mg/L	1.60	0.050	9496663
Total Silver (Ag)	mg/L	<0.0000050	0.0000050	9496663
Total Strontium (Sr)	mg/L	0.765	0.000050	9496663
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	9496663
Total Tin (Sn)	mg/L	<0.00020	0.00020	9496663
Total Titanium (Ti)	mg/L	<0.00050	0.00050	9496663
Total Uranium (U)	mg/L	0.00134	0.0000020	9496663
Total Vanadium (V)	mg/L	<0.00020	0.00020	9496663
Total Zinc (Zn)	mg/L	0.00234	0.00010	9496663
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	9496663
Total Calcium (Ca)	mg/L	123	0.050	9495659
Total Magnesium (Mg)	mg/L	20.3	0.050	9495659
RDL = Reportable Detection Limit				



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WA8281		
Sampling Date		2019/07/05 09:45		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Total Potassium (K)	mg/L	1.22	0.050	9495659
Total Sodium (Na)	mg/L	28.4	0.050	9495659
Total Sulphur (S)	mg/L	102	3.0	9495659
RDL = Reportable Detection Limit				



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8263
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495702	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495707	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/07	Kathleen Dalton

BV Labs ID: WA8263 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada

BV Labs ID: WA8264
Sample ID: 1A
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9495658	N/A	2019/07/12	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9495090	N/A	2019/07/12	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495702	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495707	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8265
Sample ID: 1B
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495702	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495707	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8266
Sample ID: 1C
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495702	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9499873	N/A	2019/07/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9502692	N/A	2019/07/15	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8267
Sample ID: 2A
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Report Automation Engine
Ion Balance	CALC	9495702	N/A	2019/07/12	Report Automation Engine



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8267
Sample ID: 2A
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/07	Kathleen Dalton

BV Labs ID: WA8268
Sample ID: 2B
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495702	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8269
Sample ID: 2C
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9499873	N/A	2019/07/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9502692	N/A	2019/07/15	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8269
Sample ID: 2C
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8270
Sample ID: 3A
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8271
Sample ID: 3B
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton



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BV Labs Job #: B954277

Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8272

Sample ID: 3C

Matrix: Water

Collected: 2019/07/05

Shipped:

Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9495658	N/A	2019/07/12	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Report Automation Engine
Ion Balance	CALC	9495833	N/A	2019/07/12	Report Automation Engine
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9499873	N/A	2019/07/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9502692	N/A	2019/07/15	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8273

Sample ID: 4A

Matrix: Water

Collected: 2019/07/05

Shipped:

Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/07	Kathleen Dalton

BV Labs ID: WA8273 Dup

Sample ID: 4A

Matrix: Water

Collected: 2019/07/05

Shipped:

Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/07	Kathleen Dalton



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VERITAS

BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8274
Sample ID: 4B
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Report Automation Engine
Ion Balance	CALC	9495833	N/A	2019/07/12	Report Automation Engine
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9499873	N/A	2019/07/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9502692	N/A	2019/07/15	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8275
Sample ID: 4C
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9499873	N/A	2019/07/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9502692	N/A	2019/07/15	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8276
Sample ID: 5A
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Report Automation Engine
Ion Balance	CALC	9495833	N/A	2019/07/12	Report Automation Engine



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8276
Sample ID: 5A
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8277
Sample ID: 5B
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9499873	N/A	2019/07/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9502692	N/A	2019/07/15	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/07	Kathleen Dalton

BV Labs ID: WA8278
Sample ID: 5C
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9499873	N/A	2019/07/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9502692	N/A	2019/07/15	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8278
Sample ID: 5C
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8279
Sample ID: 6A
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/07	Kathleen Dalton

BV Labs ID: WA8280
Sample ID: 6B
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9495090	N/A	2019/07/12	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9499873	N/A	2019/07/15	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9502692	N/A	2019/07/15	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton



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BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WA8280 Dup
Sample ID: 6B
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal

BV Labs ID: WA8281
Sample ID: 6C
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9503962	N/A	2019/07/12	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9495658	N/A	2019/07/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9495090	N/A	2019/07/12	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9497738	N/A	2019/07/12	Automated Statchk
Ion Balance	CALC	9495833	N/A	2019/07/12	Automated Statchk
Sum of cations, anions	CALC	9495835	N/A	2019/07/12	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9495091	N/A	2019/07/12	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9496677	N/A	2019/07/11	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9495659	N/A	2019/07/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9496663	N/A	2019/07/11	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9495662	N/A	2019/07/12	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9495665	N/A	2019/07/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9496012	N/A	2019/07/08	Kathleen Dalton

BV Labs ID: WA8281 Dup
Sample ID: 6C
Matrix: Water

Collected: 2019/07/05
Shipped:
Received: 2019/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9502582	N/A	2019/07/11	Ilonka Kovac



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.1°C
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Sample WA8264, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WA8267, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WA8271, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WA8277, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WA8278, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WA8264, Elements by ICPMS Low Level (total): Test repeated.
Sample WA8267, Elements by ICPMS Low Level (total): Test repeated.
Sample WA8271, Elements by ICPMS Low Level (total): Test repeated.
Sample WA8277, Elements by ICPMS Low Level (total): Test repeated.
Sample WA8278, Elements by ICPMS Low Level (total): Test repeated.
Sample WA8280, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B954277
Report Date: 2019/07/16

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9496012	Dissolved Nitrate (N)	2019/07/07	101	80 - 120	101	80 - 120	<0.0030	mg/L	9.7	20
9496012	Dissolved Nitrite (N)	2019/07/07	101	80 - 120	100	80 - 120	<0.0030	mg/L	NC	20
9496663	Total Aluminum (Al)	2019/07/11	110	80 - 120	111	80 - 120	<0.00050	mg/L	4.6	20
9496663	Total Antimony (Sb)	2019/07/11	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.67	20
9496663	Total Arsenic (As)	2019/07/11	101	80 - 120	96	80 - 120	<0.000020	mg/L	0.54	20
9496663	Total Barium (Ba)	2019/07/11	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.46	20
9496663	Total Beryllium (Be)	2019/07/11	104	80 - 120	107	80 - 120	<0.000010	mg/L	NC	20
9496663	Total Bismuth (Bi)	2019/07/11	99	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9496663	Total Boron (B)	2019/07/11	124 (1)	80 - 120	120	80 - 120	<0.010	mg/L	NC	20
9496663	Total Cadmium (Cd)	2019/07/11	99	80 - 120	98	80 - 120	<0.0000050	mg/L	0.41	20
9496663	Total Chromium (Cr)	2019/07/11	99	80 - 120	101	80 - 120	<0.00010	mg/L	18	20
9496663	Total Cobalt (Co)	2019/07/11	98	80 - 120	101	80 - 120	<0.0000050	mg/L	0.57	20
9496663	Total Copper (Cu)	2019/07/11	96	80 - 120	101	80 - 120	<0.000050	mg/L	0.34	20
9496663	Total Iron (Fe)	2019/07/11	103	80 - 120	109	80 - 120	<0.0010	mg/L	2.2	20
9496663	Total Lead (Pb)	2019/07/11	98	80 - 120	100	80 - 120	<0.0000050	mg/L	0.59	20
9496663	Total Lithium (Li)	2019/07/11	112	80 - 120	107	80 - 120	<0.00050	mg/L	1.4	20
9496663	Total Manganese (Mn)	2019/07/11	99	80 - 120	98	80 - 120	<0.000050	mg/L	2.6	20
9496663	Total Molybdenum (Mo)	2019/07/11	111	80 - 120	105	80 - 120	<0.000050	mg/L	0.35	20
9496663	Total Nickel (Ni)	2019/07/11	97	80 - 120	102	80 - 120	<0.000020	mg/L	0.27	20
9496663	Total Selenium (Se)	2019/07/11	102	80 - 120	89	80 - 120	<0.000040	mg/L	1.2	20
9496663	Total Silicon (Si)	2019/07/11	83	80 - 120	82	80 - 120	<0.050	mg/L	0.29	20
9496663	Total Silver (Ag)	2019/07/11	94	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9496663	Total Strontium (Sr)	2019/07/11	NC	80 - 120	103	80 - 120	<0.000050	mg/L	0.26	20
9496663	Total Thallium (Tl)	2019/07/11	102	80 - 120	103	80 - 120	<0.0000020	mg/L	9.8	20
9496663	Total Tin (Sn)	2019/07/11	101	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9496663	Total Titanium (Ti)	2019/07/11	101	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
9496663	Total Uranium (U)	2019/07/11	99	80 - 120	109	80 - 120	<0.0000020	mg/L	0.15	20
9496663	Total Vanadium (V)	2019/07/11	102	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9496663	Total Zinc (Zn)	2019/07/11	NC	80 - 120	97	80 - 120	<0.00010	mg/L	0.91	20
9496663	Total Zirconium (Zr)	2019/07/11	104	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9496677	Dissolved Aluminum (Al)	2019/07/11	120	80 - 120	102	80 - 120	<0.00050	mg/L	7.5	20
9496677	Dissolved Antimony (Sb)	2019/07/11	NC	80 - 120	95	80 - 120	<0.000020	mg/L	0.97	20



BV Labs Job #: B954277
Report Date: 2019/07/16

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9496677	Dissolved Arsenic (As)	2019/07/11	123 (1)	80 - 120	94	80 - 120	<0.000020	mg/L	0.90	20
9496677	Dissolved Barium (Ba)	2019/07/11	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.73	20
9496677	Dissolved Beryllium (Be)	2019/07/11	100	80 - 120	112	80 - 120	<0.000010	mg/L	NC	20
9496677	Dissolved Bismuth (Bi)	2019/07/11	106	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9496677	Dissolved Boron (B)	2019/07/11	123 (1)	80 - 120	123 (1)	80 - 120	<0.010	mg/L	7.6	20
9496677	Dissolved Cadmium (Cd)	2019/07/11	106	80 - 120	94	80 - 120	<0.0000050	mg/L	0.87	20
9496677	Dissolved Chromium (Cr)	2019/07/11	106	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9496677	Dissolved Cobalt (Co)	2019/07/11	104	80 - 120	100	80 - 120	<0.0000050	mg/L	0.62	20
9496677	Dissolved Copper (Cu)	2019/07/11	106	80 - 120	101	80 - 120	<0.000050	mg/L	1.2	20
9496677	Dissolved Iron (Fe)	2019/07/11	109	80 - 120	109	80 - 120	<0.0010	mg/L	NC	20
9496677	Dissolved Lead (Pb)	2019/07/11	106	80 - 120	99	80 - 120	<0.0000050	mg/L	1.1	20
9496677	Dissolved Lithium (Li)	2019/07/11	119	80 - 120	96	80 - 120	<0.00050	mg/L	5.0	20
9496677	Dissolved Manganese (Mn)	2019/07/11	109	80 - 120	100	80 - 120	<0.000050	mg/L	1.3	20
9496677	Dissolved Molybdenum (Mo)	2019/07/11	110	80 - 120	105	80 - 120	<0.000050	mg/L	2.4	20
9496677	Dissolved Nickel (Ni)	2019/07/11	108	80 - 120	101	80 - 120	<0.000020	mg/L	0.19	20
9496677	Dissolved Selenium (Se)	2019/07/11	110	80 - 120	89	80 - 120	<0.000040	mg/L	0.77	20
9496677	Dissolved Silicon (Si)	2019/07/11	87	80 - 120	80	80 - 120	<0.050	mg/L	0.27	20
9496677	Dissolved Silver (Ag)	2019/07/11	101	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9496677	Dissolved Strontium (Sr)	2019/07/11	NC	80 - 120	105	80 - 120	<0.000050	mg/L	0.42	20
9496677	Dissolved Thallium (Tl)	2019/07/11	108	80 - 120	102	80 - 120	<0.0000020	mg/L	13	20
9496677	Dissolved Tin (Sn)	2019/07/11	106	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9496677	Dissolved Titanium (Ti)	2019/07/11	105	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
9496677	Dissolved Uranium (U)	2019/07/11	118	80 - 120	107	80 - 120	<0.0000020	mg/L	0.78	20
9496677	Dissolved Vanadium (V)	2019/07/11	110	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9496677	Dissolved Zinc (Zn)	2019/07/11	NC	80 - 120	96	80 - 120	<0.00010	mg/L	1.4	20
9496677	Dissolved Zirconium (Zr)	2019/07/11	115	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9499873	Dissolved Aluminum (Al)	2019/07/11	115	80 - 120	115	80 - 120	<0.00050	mg/L	NC	20
9499873	Dissolved Antimony (Sb)	2019/07/11	98	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9499873	Dissolved Arsenic (As)	2019/07/11	100	80 - 120	105	80 - 120	<0.000020	mg/L	19	20
9499873	Dissolved Barium (Ba)	2019/07/11	99	80 - 120	102	80 - 120	<0.000020	mg/L	1.4	20
9499873	Dissolved Beryllium (Be)	2019/07/11	106	80 - 120	108	80 - 120	<0.000010	mg/L	NC	20
9499873	Dissolved Bismuth (Bi)	2019/07/11	101	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9499873	Dissolved Boron (B)	2019/07/11	122 (1)	80 - 120	123 (1)	80 - 120	<0.010	mg/L	18	20
9499873	Dissolved Cadmium (Cd)	2019/07/11	97	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9499873	Dissolved Chromium (Cr)	2019/07/10	103	80 - 120	111	80 - 120	<0.00010	mg/L		
9499873	Dissolved Cobalt (Co)	2019/07/11	101	80 - 120	110	80 - 120	<0.0000050	mg/L	4.8	20
9499873	Dissolved Copper (Cu)	2019/07/11	100	80 - 120	111	80 - 120	<0.000050	mg/L	NC	20
9499873	Dissolved Iron (Fe)	2019/07/11	NC	80 - 120	113	80 - 120	<0.0010	mg/L	3.5	20
9499873	Dissolved Lead (Pb)	2019/07/11	99	80 - 120	104	80 - 120	<0.0000050	mg/L	1.2	20
9499873	Dissolved Lithium (Li)	2019/07/11	115	80 - 120	112	80 - 120	<0.00050	mg/L	10	20
9499873	Dissolved Manganese (Mn)	2019/07/11	104	80 - 120	110	80 - 120	<0.000050	mg/L	3.2	20
9499873	Dissolved Molybdenum (Mo)	2019/07/10	101	80 - 120	110	80 - 120	<0.000050	mg/L		
9499873	Dissolved Nickel (Ni)	2019/07/11	101	80 - 120	111	80 - 120	<0.000020	mg/L	4.9	20
9499873	Dissolved Selenium (Se)	2019/07/11	99	80 - 120	97	80 - 120	<0.000040	mg/L	NC	20
9499873	Dissolved Silicon (Si)	2019/07/11	79 (1)	80 - 120	88	80 - 120	<0.050	mg/L	1.9	20
9499873	Dissolved Silver (Ag)	2019/07/11	94	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9499873	Dissolved Strontium (Sr)	2019/07/11	NC	80 - 120	111	80 - 120	<0.000050	mg/L	0.59	20
9499873	Dissolved Thallium (Tl)	2019/07/11	103	80 - 120	107	80 - 120	<0.0000020	mg/L	20	20
9499873	Dissolved Tin (Sn)	2019/07/11	98	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9499873	Dissolved Titanium (Ti)	2019/07/11	104	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9499873	Dissolved Uranium (U)	2019/07/11	112	80 - 120	115	80 - 120	<0.0000020	mg/L	4.4	20
9499873	Dissolved Vanadium (V)	2019/07/11	102	80 - 120	111	80 - 120	<0.00020	mg/L	NC	20
9499873	Dissolved Zinc (Zn)	2019/07/11	NC	80 - 120	106	80 - 120	<0.00010	mg/L	13	20
9499873	Dissolved Zirconium (Zr)	2019/07/11	100	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9502582	Alkalinity (PP as CaCO3)	2019/07/11					<0.50	mg/L	NC	20
9502582	Alkalinity (Total as CaCO3)	2019/07/11			93	80 - 120	<0.50	mg/L	0.12	20
9502582	Bicarbonate (HCO3)	2019/07/11					<0.50	mg/L	0.12	20
9502582	Carbonate (CO3)	2019/07/11					<0.50	mg/L	NC	20
9502582	Hydioxide (OH)	2019/07/11					<0.50	mg/L	NC	20
9502692	Total Aluminum (Al)	2019/07/15	105	80 - 120	118	80 - 120	<0.00050	mg/L	4.0	20
9502692	Total Antimony (Sb)	2019/07/15	101	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9502692	Total Arsenic (As)	2019/07/15	101	80 - 120	93	80 - 120	<0.000020	mg/L	13	20
9502692	Total Barium (Ba)	2019/07/15	99	80 - 120	100	80 - 120	<0.000020	mg/L	0.23	20
9502692	Total Beryllium (Be)	2019/07/15	101	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20



BV Labs Job #: B954277
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QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9502692	Total Bismuth (Bi)	2019/07/15	102	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9502692	Total Boron (B)	2019/07/15	109	80 - 120	119	80 - 120	<0.010	mg/L	NC	20
9502692	Total Cadmium (Cd)	2019/07/15	101	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9502692	Total Chromium (Cr)	2019/07/15	98	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9502692	Total Cobalt (Co)	2019/07/15	98	80 - 120	98	80 - 120	<0.0000050	mg/L	8.9	20
9502692	Total Copper (Cu)	2019/07/15	98	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9502692	Total Iron (Fe)	2019/07/15	113	80 - 120	113	80 - 120	<0.0010	mg/L	1.5	20
9502692	Total Lead (Pb)	2019/07/15	100	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9502692	Total Lithium (Li)	2019/07/15	90	80 - 120	109	80 - 120	<0.00050	mg/L	NC	20
9502692	Total Manganese (Mn)	2019/07/15	100	80 - 120	96	80 - 120	<0.000050	mg/L	1.4	20
9502692	Total Molybdenum (Mo)	2019/07/15	103	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9502692	Total Nickel (Ni)	2019/07/15	98	80 - 120	98	80 - 120	<0.000020	mg/L	2.4	20
9502692	Total Selenium (Se)	2019/07/15	101	80 - 120	89	80 - 120	<0.000040	mg/L	NC	20
9502692	Total Silicon (Si)	2019/07/15	83	80 - 120	81	80 - 120	<0.050	mg/L	1.4	20
9502692	Total Silver (Ag)	2019/07/15	95	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9502692	Total Strontium (Sr)	2019/07/15	102	80 - 120	101	80 - 120	<0.000050	mg/L	2.5	20
9502692	Total Thallium (Tl)	2019/07/15	102	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9502692	Total Tin (Sn)	2019/07/15	98	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9502692	Total Titanium (Ti)	2019/07/15	106	80 - 120	114	80 - 120	<0.00050	mg/L	NC	20
9502692	Total Uranium (U)	2019/07/15	102	80 - 120	104	80 - 120	<0.0000020	mg/L	18	20
9502692	Total Vanadium (V)	2019/07/15	100	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9502692	Total Zinc (Zn)	2019/07/15	106	80 - 120	93	80 - 120	<0.00010	mg/L	NC	20
9502692	Total Zirconium (Zr)	2019/07/15	98	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9503962	Dissolved Chloride (Cl)	2019/07/12	NC	80 - 120	106	80 - 120	<0.50	mg/L	0.50	20



BV Labs Job #: B954277
Report Date: 2019/07/16

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9503962	Dissolved Sulphate (SO4)	2019/07/12	NC	80 - 120	102	80 - 120	<0.50	mg/L	0.076	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.										
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.										
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.										
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.										
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)										
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).										
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.										



BUREAU
VERITAS

BV Labs Job #: B954277
Report Date: 2019/07/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

COC #:

BBY FCD-00077/05

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Invoice Information Company Name: BMC MINERALS LTD. Contact Name: _____ Address: 530-1130 WEST PENDER ST Vancouver, BC V6E 4A4 Phone: _____ Email: _____		Report Information (if differs from invoice) Company Name: ALEXCO ENVIRONMENTAL Contact Name: Mary Moska, Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK Y1A 2V3 Phone: (867) 668-6463 Email: mmoska@alexcoenvy.com		Project Information (where applicable) Quotation #: 860751 P.O. # / A/E #: _____ Project #: BMC-18-02 Site Location: Kud Ze Kayah Site #: _____ Sampled By: _____		Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analyses) Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days					
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ COME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 1285		Analysis Requested Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity		Rush Confirmation #: CUSTOMER USE ONLY CUSTODY SEAL: _____ COOLER TEMPERATURES: _____ PRESENT: _____ INFILTR: _____ COOLING MEDIA PRESENT: _____ COMMENTS: _____					
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM											
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1 Influent		05-Jul-19	8:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved
2 1A		05-Jul-19	1:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved
3 1B		05-Jul-19	11:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved
4 1C		05-Jul-19	9:45	Water	X	X	X	X			Metals preserved with HNO3, dissolved
5 2A		05-Jul-19	1:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved
6 2B		05-Jul-19	11:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved
7 2C		05-Jul-19	9:45	Water	X	X	X	X			Metals preserved with HNO3, dissolved
8 3A		05-Jul-19	1:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved
9 3B		05-Jul-19	11:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved
10 3C		05-Jul-19	9:45	Water	X	X	X	X			Metals preserved with HNO3, dissolved
RECEIVED BY: (Signature/Print) Sara Bischoff		DATE: (YYYY/MM/DD) 2019/07/06		TIME: (HH:MM) 9:00		RECEIVED BY: (Signature/Print) Sara Bischoff			DATE: (YYYY/MM/DD) 2019/07/06		

Satiann Maiter
B954277

SBZ INS-0227

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5, Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05

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Invoice Information				Report Information (if differs from Invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required			
Company Name: BMC MINERALS LTD.				Company Name: ALEKCO ENVIRONMENTAL				Quotation #: B60751				☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS			
Contact Name:				Contact Name: Mary Mioska; Renate Vanderhorst				P.O. #/ A/E/F: BMC-18-02				Rush TAT (Surcharges will be applied)			
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02				☐ Same Day ☐ 1 Day ☐ 2 Days ☐ 3 Days			
Vancouver, BC PC: V6E 4A4				Whitehorse, YK PC: V1A 2V3				Site location: Kudze Kayah				Date Required:			
Phone:				Phone: (607) 668-6463				Site #: mnderhorst@alexcoenv.com				Rush Confirmation #:			
Email:				Email: mmioska@alexcoenv.com				Sampled By:				Rush Confirmation #:			
Regulatory Criteria				Special Instructions				Analysis Requested				Rush Confirmation #:			
☐ BC CSR Soil ☐ CCME (Specify) ☐ Drinking Water				☐ BC CSR Water ☐ Other (Specify) ☐ BC Water Quality USE SCENARIO # 12485				☐ Return Cooler ☐ Ship Sample Bottles (Please Specify)				☐ Low Level Dissolved Metals ☐ Low Level Total Metals ☐ Anions (SO4, NO2, NO3, Cl) ☐ Alkalinity			
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM															
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS				
1 4A		05-Jul-19	1:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
2 4B		05-Jul-19	11:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
3 4C		05-Jul-19	9:45	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
4 4A		05-Jul-19	1:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
5 5B		05-Jul-19	11:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
6 5C		05-Jul-19	9:45	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
7 6A		05-Jul-19	1:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
8 6B		05-Jul-19	11:00	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
9 6C		05-Jul-19	9:45	Water	X	X	X	X			Metals preserved with HNO3, dissolved				
RELIQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)				RECEIVED BY: (Signature/Print)			

05-Jul-19 15:30
 Safiam Maier
 B954277
 SBZ INS-0227



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: BBY FCD-00077/05, 2 of 2

Attention: KAI WOLOSHYN
 ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/07/31
 Report #: R2760862
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B960531

Received: 2019/07/24, 14:57

Sample Matrix: Water
 # Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	7	N/A	2019/07/26	AB SOP-00005	SM 23 2310 B m
Alkalinity - Low Level	19	N/A	2019/07/26	AB SOP-00005	SM 23 2320 B m
Biochemical Oxygen Demand	7	2019/07/25	2019/07/30	AB SOP-00017	SM 23 5210B m
Low level chloride/sulphate by AC	19	N/A	2019/07/29	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
COD by Colorimeter	7	N/A	2019/07/26	AB SOP-00016	SM 23 5220D m
Carbon (DOC) (2)	7	N/A	2019/07/27	AB SOP-00087	MMCW 119 1996 m
Hardness Total (calculated as CaCO ₃) (3)	2	N/A	2019/07/27	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (3)	17	N/A	2019/07/28	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	19	N/A	2019/07/29	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	19	N/A	2019/07/29		Auto Calc
Ion Balance	7	N/A	2019/07/26		Auto Calc
Ion Balance	1	N/A	2019/07/27		Auto Calc
Ion Balance	11	N/A	2019/07/28		Auto Calc
Sum of cations, anions	19	N/A	2019/07/29		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	19	N/A	2019/07/29	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	19	N/A	2019/07/27	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	2	2019/07/26	2019/07/27	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	N/A	2019/07/27	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total)	17	N/A	2019/07/28	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	17	N/A	2019/07/28	BBY7SOP-00002	EPA 6020b R2 m
Nitrate and Nitrite - Low Level	19	N/A	2019/07/29		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	19	N/A	2019/07/29		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	6	N/A	2019/07/26	AB SOP-00023	SM 23 4110 B m
Nitrogen (Nitrite - Nitrate) Low Level	13	N/A	2019/07/27	AB SOP-00023	SM 23 4110 B m
Filter and HNO ₃ Preserve for Metals (1)	19	N/A	2019/07/29	BBY7 WI-00004	SM 23 3030B m
Carbon (Total Organic) (4)	7	N/A	2019/07/27	AB SOP-00087	MMCW 119 1996 m
Total Suspended Solids (NFR)	7	2019/07/29	2019/07/29	AB SOP-00061	SM 23 2540 D m

Remarks:



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: BBY FCD-00077/05, 2 of 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/07/31
Report #: R2760862
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B960531

Received: 2019/07/24, 14:57

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by BV Labs Vancouver
- (2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
- (4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlab.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BUREAU
VERITASBV Labs Job #: B960531
Report Date: 2019/07/31ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WE0912			WE0913	WE0914		
Sampling Date		2019/07/24 14:10			2019/07/24 13:30	2019/07/24 12:00		
COC Number		BBY FCD-00077/05			BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT	RDL	QC Batch	1A	1B	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	8.1	N/A	9521761	8.4	8.7	N/A	9521761
Cation Sum	meq/L	7.9	N/A	9521761	8.3	8.7	N/A	9521761
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE
Ion Balance	N/A	0.98	0.010	9526886	0.99	0.99	0.010	9526886
Ion Balance (% Difference)	%	1.1	N/A	9521759	0.56	0.50	N/A	9521759
Dissolved Nitrate (NO ₃)	mg/L	1.4	0.013	9522351	1.3	0.039	0.013	9522351
Nitrate plus Nitrite (N)	mg/L	0.35	0.0042	9522354	0.30	0.0087	0.0042	9522354
Dissolved Nitrite (NO ₂)	mg/L	0.15	0.0099	9522351	0.059	<0.0099	0.0099	9522351
Demand Parameters								
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9522611				
Chemical Oxygen Demand	mg/L	13	10	9523619				
Misc. Inorganics								
Dissolved Organic Carbon (C)	mg/L	2.4	0.50	9524339				
Acidity (pH 4.5)	mg/L	<1.0	1.0	9523799				
Alkalinity (Total as CaCO ₃)	mg/L	59.6	0.50	9523717	69.0	77.3	0.50	9523717
Total Organic Carbon (C)	mg/L	2.4	0.50	9524242				
Acidity (pH 8.3)	mg/L	1.5	1.0	9523799				
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Bicarbonate (HCO ₃)	mg/L	72.8	0.50	9523717	84.1	94.3	0.50	9523717
Carbonate (CO ₃)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Hydroxide (OH)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Total Suspended Solids	mg/L	2.6	1.0	9525774				
Anions								
Dissolved Chloride (Cl)	mg/L	63	0.50	9525688	64	67	0.50	9525688
Dissolved Sulphate (SO ₄)	mg/L	240 (1)	1.0	9525688	250 (1)	250 (1)	1.0	9525688
Nutrients								
Dissolved Nitrite (N)	mg/L	0.047	0.0030	9524020	0.018	<0.0030	0.0030	9524015
Dissolved Nitrate (N)	mg/L	0.31	0.0030	9524020	0.29	0.0087	0.0030	9524015
RDL = Reportable Detection Limit								
N/A = Not Applicable								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WE0915			WE0916	WE0917		
Sampling Date		2019/07/24 15:30			2019/07/24 13:30	2019/07/24 12:00		
COC Number		BBY FCD-00077/05			BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	1C	RDL	QC Batch	2A	2B	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	9.0	N/A	9521761	8.4	8.6	N/A	9521761
Cation Sum	meq/L	9.0	N/A	9521761	8.3	8.7	N/A	9521761
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9526886	0.99	1.0	0.010	9526886
Ion Balance (% Difference)	%	0.028	N/A	9521759	0.56	0.49	N/A	9521759
Dissolved Nitrate (NO ₃)	mg/L	<0.013	0.013	9522351	0.096	<0.013	0.013	9522351
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	9522354	0.025	<0.0042	0.0042	9522354
Dissolved Nitrite (NO ₂)	mg/L	<0.0099	0.0099	9522351	0.011	<0.0099	0.0099	9522351
Demand Parameters								
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9522611				
Chemical Oxygen Demand	mg/L	<10	10	9523619				
Misc. Inorganics								
Dissolved Organic Carbon (C)	mg/L	3.6	0.50	9524339				
Acidity (pH 4.5)	mg/L	<1.0	1.0	9523799				
Alkalinity (Total as CaCO ₃)	mg/L	81.5	0.50	9523717	71.4	73.9	0.50	9523717
Total Organic Carbon (C)	mg/L	3.5	0.50	9524242				
Acidity (pH 8.3)	mg/L	1.7	1.0	9523799				
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Bicarbonate (HCO ₃)	mg/L	99.5	0.50	9523717	87.1	90.1	0.50	9523717
Carbonate (CO ₃)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Hydroxide (OH)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Total Suspended Solids	mg/L	2.4	1.0	9525774				
Anions								
Dissolved Chloride (Cl)	mg/L	69	0.50	9525688	66	67	0.50	9525688
Dissolved Sulphate (SO ₄)	mg/L	260 (1)	1.0	9525688	250 (1)	250 (1)	1.0	9525688
Nutrients								
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9524020	0.0034	<0.0030	0.0030	9524015
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	9524020	0.022	<0.0030	0.0030	9524015
RDL = Reportable Detection Limit								
N/A = Not Applicable								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WE0918			WE0919		WE0920		
Sampling Date		2019/07/24 08:30			2019/07/24 13:30		2019/07/24 12:00		
COC Number		BBY FCD-00077/05			BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2C	RDL	QC Batch	3A	QC Batch	3B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	9.1	N/A	9521761	8.4	9521761	8.7	N/A	9521761
Cation Sum	meq/L	9.0	N/A	9521761	8.4	9521761	9.0	N/A	9521761
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.99	0.010	9526886	0.99	9526886	1.0	0.010	9526886
Ion Balance (% Difference)	%	0.73	N/A	9521759	0.42	9521759	1.4	N/A	9521759
Dissolved Nitrate (NO3)	mg/L	<0.013	0.013	9522351	<0.013	9522351	<0.013	0.013	9522351
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	9522354	<0.0042	9522354	<0.0042	0.0042	9522354
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9522351	<0.0099	9522351	<0.0099	0.0099	9522351

Demand Parameters

Biochemical Oxygen Demand	mg/L	<2.0	2.0	9522611					
Chemical Oxygen Demand	mg/L	<10	10	9523619					

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L	3.6	0.50	9524339					
Acidity (pH 4.5)	mg/L	<1.0	1.0	9523799					
Alkalinity (Total as CaCO3)	mg/L	88.1	0.50	9523717	74.7	9523717	79.0	0.50	9523717
Total Organic Carbon (C)	mg/L	3.4	0.50	9524242					
Acidity (pH 8.3)	mg/L	2.6	1.0	9523799					
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9523717	<0.50	9523717	<0.50	0.50	9523717
Bicarbonate (HCO3)	mg/L	108	0.50	9523717	91.1	9523717	96.3	0.50	9523717
Carbonate (CO3)	mg/L	<0.50	0.50	9523717	<0.50	9523717	<0.50	0.50	9523717
Hydroxide (OH)	mg/L	<0.50	0.50	9523717	<0.50	9523717	<0.50	0.50	9523717
Total Suspended Solids	mg/L	1.7	1.0	9525774					

Anions

Dissolved Chloride (Cl)	mg/L	70	0.50	9525688	65	9525688	67	0.50	9525688
Dissolved Sulphate (SO4)	mg/L	260 (1)	1.0	9525688	250 (1)	9525688	250 (1)	1.0	9525688

Nutrients

Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9524015	<0.0030	9524015	<0.0030	0.0030	9524020
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	9524015	<0.0030	9524015	<0.0030	0.0030	9524020

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WE0921			WE0953	WE0954		
Sampling Date		2019/07/24 08:30			2019/07/24 13:30	2019/07/24 12:00		
COC Number		BBY FCD-00077/05			2 of 2	2 of 2		
	UNITS	3C	RDL	QC Batch	4A	4B	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	9.0	N/A	9521761	9.1	9.9	N/A	9521761
Cation Sum	meq/L	9.3	N/A	9521761	9.3	10	N/A	9521761
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9526886	1.0	1.0	0.010	9526886
Ion Balance (% Difference)	%	1.5	N/A	9521759	1.3	1.0	N/A	9521759
Dissolved Nitrate (NO ₃)	mg/L	<0.013	0.013	9522351	0.021	<0.013	0.013	9522351
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	9522354	0.0048	<0.0042	0.0042	9522354
Dissolved Nitrite (NO ₂)	mg/L	<0.0099	0.0099	9522351	<0.0099	<0.0099	0.0099	9522351
Demand Parameters								
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9522611				
Chemical Oxygen Demand	mg/L	11	10	9523619				
Misc. Inorganics								
Dissolved Organic Carbon (C)	mg/L	3.0	0.50	9524339				
Acidity (pH 4.5)	mg/L	<1.0	1.0	9523799				
Alkalinity (Total as CaCO ₃)	mg/L	85.2	0.50	9523717	86.9	104	0.50	9523717
Total Organic Carbon (C)	mg/L	2.8	0.50	9524242				
Acidity (pH 8.3)	mg/L	2.4	1.0	9523799				
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Bicarbonate (HCO ₃)	mg/L	104	0.50	9523717	106	127	0.50	9523717
Carbonate (CO ₃)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Hydroxide (OH)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717
Total Suspended Solids	mg/L	1.3	1.0	9525774				
Anions								
Dissolved Chloride (Cl)	mg/L	69	0.50	9525688	69	74	0.50	9525688
Dissolved Sulphate (SO ₄)	mg/L	260 (1)	1.0	9525688	260 (1)	280 (1)	1.0	9525688
Nutrients								
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9524020	<0.0030	<0.0030	0.0030	9524015
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	9524020	0.0047	<0.0030	0.0030	9524015
RDL = Reportable Detection Limit								
N/A = Not Applicable								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								



BUREAU
VERITAS

BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WE0955			WE0956	WE0957			WE0958		
Sampling Date		2019/07/24 08:30			2019/07/24 13:30	2019/07/24 12:00			2019/07/24 08:30		
COC Number		2 of 2			2 of 2	2 of 2			2 of 2		
	UNITS	4C	RDL	QC Batch	5A	5B	RDL	QC Batch	5C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	12	N/A	9521761	9.5	9.6	N/A	9521761	11	N/A	9521761
Cation Sum	meq/L	12	N/A	9521761	9.0	9.5	N/A	9521761	11	N/A	9521761
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9526886	0.95	1.0	0.010	9526886	0.99	0.010	9526886
Ion Balance (% Difference)	%	0.25	N/A	9521759	2.5	0.21	N/A	9521759	0.39	N/A	9521759
Dissolved Nitrate (NO3)	mg/L	<0.013	0.013	9522351	<0.013	<0.013	0.013	9522351	<0.013	0.013	9522351
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	9522354	<0.0042	<0.0042	0.0042	9522354	<0.0042	0.0042	9522354
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9522351	<0.0099	<0.0099	0.0099	9522351	<0.0099	0.0099	9522351

Demand Parameters

Biochemical Oxygen Demand	mg/L	<2.0	2.0	9522611					<2.0	2.0	9522611
Chemical Oxygen Demand	mg/L	16	10	9523619					25	10	9523619

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L	4.4	0.50	9524339					4.6	0.50	9524339
Acidity (pH 4.5)	mg/L	<1.0	1.0	9523799					<1.0	1.0	9523799
Alkalinity (Total as CaCO3)	mg/L	127	0.50	9523717	113	98.0	0.50	9523717	134	0.50	9523717
Total Organic Carbon (C)	mg/L	4.6	0.50	9524242					5.2	0.50	9524242
Acidity (pH 8.3)	mg/L	6.8	1.0	9523799					6.5	1.0	9523799
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717	<0.50	0.50	9523717
Bicarbonate (HCO3)	mg/L	155	0.50	9523717	138	120	0.50	9523717	164	0.50	9523717
Carbonate (CO3)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717	<0.50	0.50	9523717
Hydroxide (OH)	mg/L	<0.50	0.50	9523717	<0.50	<0.50	0.50	9523717	<0.50	0.50	9523717
Total Suspended Solids	mg/L	2.1	1.0	9525774					2.3	1.0	9525774

Anions

Dissolved Chloride (Cl)	mg/L	87	0.50	9525688	67	72	0.50	9525688	79	0.50	9525688
Dissolved Sulphate (SO4)	mg/L	320 (1)	1.0	9525688	260 (1)	270 (1)	1.0	9525688	280 (1)	1.0	9525688

Nutrients

Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9524015	<0.0030	<0.0030	0.0030	9524015	<0.0030	0.0030	9524015
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	9524015	<0.0030	<0.0030	0.0030	9524015	<0.0030	0.0030	9524015

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WE0960		WE0961			WE0962		
Sampling Date		2019/07/24 13:30		2019/07/24 12:00			2019/07/24 08:30		
COC Number		2 of 2		2 of 2			2 of 2		
	UNITS	6A	QC Batch	6B	RDL	QC Batch	6C	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.6	9521761	9.2	N/A	9521761	10	N/A	9521761
Cation Sum	meq/L	8.7	9521761	9.3	N/A	9521761	10	N/A	9521761
Filter and HNO ₃ Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.0	9526886	1.0	0.010	9526886	0.98	0.010	9526886
Ion Balance (% Difference)	%	0.89	9521759	0.52	N/A	9521759	1.1	N/A	9521759
Dissolved Nitrate (NO ₃)	mg/L	0.043	9522351	0.014	0.013	9522351	<0.013	0.013	9522351
Nitrate plus Nitrite (N)	mg/L	0.0096	9522354	<0.0042	0.0042	9522354	<0.0042	0.0042	9522354
Dissolved Nitrite (NO ₂)	mg/L	<0.0099	9522351	<0.0099	0.0099	9522351	<0.0099	0.0099	9522351
Demand Parameters									
Biochemical Oxygen Demand	mg/L						<2.0	2.0	9522611
Chemical Oxygen Demand	mg/L						15	10	9523619
Misc. Inorganics									
Dissolved Organic Carbon (C)	mg/L						4.0	0.50	9524339
Acidity (pH 4.5)	mg/L						<1.0	1.0	9523799
Alkalinity (Total as CaCO ₃)	mg/L	76.5	9523717	91.1	0.50	9523717	112	0.50	9523717
Total Organic Carbon (C)	mg/L						4.1	0.50	9524242
Acidity (pH 8.3)	mg/L						4.5	1.0	9523799
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	9523717	<0.50	0.50	9523717	<0.50	0.50	9523717
Bicarbonate (HCO ₃)	mg/L	93.4	9523717	111	0.50	9523717	136	0.50	9523717
Carbonate (CO ₃)	mg/L	<0.50	9523717	<0.50	0.50	9523717	<0.50	0.50	9523717
Hydroxide (OH)	mg/L	<0.50	9523717	<0.50	0.50	9523717	<0.50	0.50	9523717
Total Suspended Solids	mg/L						1.9	1.0	9525774
Anions									
Dissolved Chloride (Cl)	mg/L	65	9525688	70	0.50	9525688	76	0.50	9525688
Dissolved Sulphate (SO ₄)	mg/L	250 (1)	9525688	260 (1)	1.0	9525688	290 (1)	1.0	9525688
Nutrients									
Dissolved Nitrite (N)	mg/L	<0.0030	9524015	<0.0030	0.0030	9524020	<0.0030	0.0030	9524020
Dissolved Nitrate (N)	mg/L	0.0096	9524015	0.0032	0.0030	9524020	<0.0030	0.0030	9524020
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



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BV Labs Job #: B960531

Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0912	WE0913	WE0914	WE0915		
Sampling Date		2019/07/24 14:10	2019/07/24 13:30	2019/07/24 12:00	2019/07/24 15:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT	1A	1B	1C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	331	351	365	382	0.50	9522108
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0156	0.00268	0.00143	0.00130	0.00050	9524358
Dissolved Antimony (Sb)	mg/L	0.0194	0.0180	0.0149	0.0126	0.000020	9524358
Dissolved Arsenic (As)	mg/L	0.0580	0.0479	0.0267	0.0206	0.000020	9524358
Dissolved Barium (Ba)	mg/L	0.0579	0.0594	0.0609	0.0616	0.000020	9524358
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9524358
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524358
Dissolved Boron (B)	mg/L	0.037	0.037	0.036	0.031	0.010	9524358
Dissolved Cadmium (Cd)	mg/L	0.00188	0.000827	0.000215	0.0000523	0.0000050	9524358
Dissolved Chromium (Cr)	mg/L	0.00019	<0.00010	<0.00010	<0.00010	0.00010	9524358
Dissolved Cobalt (Co)	mg/L	0.00261	0.000194	0.0000396	0.0000235	0.0000050	9524358
Dissolved Copper (Cu)	mg/L	0.0118	0.00387	0.00189	0.000831	0.000050	9524358
Dissolved Iron (Fe)	mg/L	0.0072	0.0036	0.0112	0.0131	0.0010	9524358
Dissolved Lead (Pb)	mg/L	0.0165	0.000770	0.0000439	0.0000272	0.0000050	9524358
Dissolved Lithium (Li)	mg/L	0.0117	0.0124	0.0127	0.0133	0.00050	9524358
Dissolved Manganese (Mn)	mg/L	0.0526	0.00830	0.00477	0.00141	0.000050	9524358
Dissolved Molybdenum (Mo)	mg/L	0.00155	0.00152	0.00143	0.00139	0.000050	9524358
Dissolved Nickel (Ni)	mg/L	0.00751	0.00522	0.00356	0.00199	0.000020	9524358
Dissolved Selenium (Se)	mg/L	0.00709	0.00633	0.00474	0.00334	0.000040	9524358
Dissolved Silicon (Si)	mg/L	0.598	0.170	0.163	0.357	0.050	9524358
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524358
Dissolved Strontium (Sr)	mg/L	0.610	0.650	0.663	0.692	0.000050	9524358
Dissolved Thallium (Tl)	mg/L	0.0000048	0.0000040	0.0000026	<0.0000020	0.0000020	9524358
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524358
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9524358
Dissolved Uranium (U)	mg/L	0.0292	0.0254	0.0179	0.0196	0.0000020	9524358
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524358
Dissolved Zinc (Zn)	mg/L	0.149	0.105	0.0547	0.0159	0.00010	9524358
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524358
Dissolved Calcium (Ca)	mg/L	104	110	116	121	0.050	9522109
Dissolved Magnesium (Mg)	mg/L	17.1	18.3	18.2	19.1	0.050	9522109

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0912	WE0913	WE0914	WE0915		
Sampling Date		2019/07/24 14:10	2019/07/24 13:30	2019/07/24 12:00	2019/07/24 15:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT	1A	1B	1C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.74	4.09	3.95	3.80	0.050	9522109
Dissolved Sodium (Na)	mg/L	26.9	28.2	28.7	30.1	0.050	9522109
Dissolved Sulphur (S)	mg/L	81.7	87.2	84.0	86.6	3.0	9522109
RDL = Reportable Detection Limit							



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0916	WE0917		WE0918		
Sampling Date		2019/07/24 13:30	2019/07/24 12:00		2019/07/24 08:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2A	2B	QC Batch	2C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	348	366	9522108	380	0.50	9522108
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00206	0.00113	9524358	0.00529 (1)	0.00050	9528242
Dissolved Antimony (Sb)	mg/L	0.0153	0.0128	9524358	0.0114	0.000020	9524358
Dissolved Arsenic (As)	mg/L	0.0334	0.0253	9524358	0.0159	0.000020	9524358
Dissolved Barium (Ba)	mg/L	0.0599	0.0591	9524358	0.0610	0.000020	9524358
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9524358	<0.000010	0.000010	9524358
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9524358	<0.0000050	0.0000050	9524358
Dissolved Boron (B)	mg/L	0.036	0.023	9524358	0.022	0.010	9524358
Dissolved Cadmium (Cd)	mg/L	0.000798	0.000191	9524358	0.0000508	0.0000050	9524358
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9524358	<0.00010	0.00010	9524358
Dissolved Cobalt (Co)	mg/L	0.000303	0.0000427	9524358	0.0000226	0.0000050	9524358
Dissolved Copper (Cu)	mg/L	0.00385	0.00179	9524358	0.00105	0.000050	9524358
Dissolved Iron (Fe)	mg/L	0.0259	0.0186	9524358	0.0168	0.0010	9524358
Dissolved Lead (Pb)	mg/L	0.000113	0.0000151	9524358	0.0000095	0.0000050	9524358
Dissolved Lithium (Li)	mg/L	0.0120	0.0125	9524358	0.0133	0.00050	9524358
Dissolved Manganese (Mn)	mg/L	0.0301	0.0116	9524358	0.00370	0.000050	9524358
Dissolved Molybdenum (Mo)	mg/L	0.00114	0.000846	9524358	0.000740	0.000050	9524358
Dissolved Nickel (Ni)	mg/L	0.00584	0.00333	9524358	0.00218	0.000020	9524358
Dissolved Selenium (Se)	mg/L	0.00482	0.00353	9524358	0.00261	0.000040	9524358
Dissolved Silicon (Si)	mg/L	0.152	0.437	9524358	0.482	0.050	9524358
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9524358	<0.0000050	0.0000050	9524358
Dissolved Strontium (Sr)	mg/L	0.628	0.651	9524358	0.682	0.000050	9524358
Dissolved Thallium (Tl)	mg/L	0.0000023	<0.0000020	9524358	<0.0000020	0.0000020	9524358
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9524358	<0.00020	0.00020	9524358
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9524358	<0.00050	0.00050	9524358
Dissolved Uranium (U)	mg/L	0.0163	0.0106	9524358	0.00869	0.0000020	9524358
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9524358	<0.00020	0.00020	9524358
Dissolved Zinc (Zn)	mg/L	0.0970	0.0432	9524358	0.0227	0.00010	9524358
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9524358	<0.00010	0.00010	9524358
Dissolved Calcium (Ca)	mg/L	110	116	9522109	121	0.050	9522109

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0916	WE0917		WE0918		
Sampling Date		2019/07/24 13:30	2019/07/24 12:00		2019/07/24 08:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2A	2B	QC Batch	2C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.9	18.5	9522109	19.1	0.050	9522109
Dissolved Potassium (K)	mg/L	3.98	3.53	9522109	3.32	0.050	9522109
Dissolved Sodium (Na)	mg/L	28.4	29.3	9522109	30.3	0.050	9522109
Dissolved Sulphur (S)	mg/L	82.4	86.5	9522109	89.4	3.0	9522109
RDL = Reportable Detection Limit							



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0919	WE0920	WE0921	WE0953		
Sampling Date		2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30	2019/07/24 13:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	2 of 2		
	UNITS	3A	3B	3C	4A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	353	379	392	396	0.50	9522108
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00203	0.00126	0.00163	0.00136	0.00050	9524358
Dissolved Antimony (Sb)	mg/L	0.0126	0.0118	0.0109	0.00287	0.000020	9524358
Dissolved Arsenic (As)	mg/L	0.0385	0.0262	0.0197	0.0192	0.000020	9524358
Dissolved Barium (Ba)	mg/L	0.0604	0.0609	0.0620	0.0665	0.000020	9524358
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9524358
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524358
Dissolved Boron (B)	mg/L	0.025	0.016	<0.010	0.022	0.010	9524358
Dissolved Cadmium (Cd)	mg/L	0.000449	0.000125	0.0000233	0.0000530	0.0000050	9524358
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524358
Dissolved Cobalt (Co)	mg/L	0.000457	0.0000308	0.0000205	0.000240	0.0000050	9524358
Dissolved Copper (Cu)	mg/L	0.00300	0.00184	0.00112	0.000883	0.000050	9524358
Dissolved Iron (Fe)	mg/L	0.0310	0.0096	0.0075	0.0147	0.0010	9524358
Dissolved Lead (Pb)	mg/L	0.000384	0.000153 (1)	0.0000061	0.0000640	0.0000050	9524358
Dissolved Lithium (Li)	mg/L	0.0121	0.0130	0.0136	0.0140	0.00050	9524358
Dissolved Manganese (Mn)	mg/L	0.0447	0.00666	0.00116	0.0401	0.000050	9524358
Dissolved Molybdenum (Mo)	mg/L	0.00101	0.000823	0.000579	0.000332	0.000050	9524358
Dissolved Nickel (Ni)	mg/L	0.00572	0.00347	0.00171	0.00466	0.000020	9524358
Dissolved Selenium (Se)	mg/L	0.00350	0.00297	0.00231	0.000832	0.000040	9524358
Dissolved Silicon (Si)	mg/L	0.704	0.628	0.412	1.13	0.050	9524358
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524358
Dissolved Strontium (Sr)	mg/L	0.633	0.663	0.710	0.701	0.000050	9524358
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9524358
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524358
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9524358
Dissolved Uranium (U)	mg/L	0.0168	0.00799	0.00830	0.00628	0.0000020	9524358
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524358
Dissolved Zinc (Zn)	mg/L	0.0617	0.0420	0.0155	0.0136	0.00010	9524358
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524358
Dissolved Calcium (Ca)	mg/L	112	121	125	125	0.050	9522109

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0919	WE0920	WE0921	WE0953		
Sampling Date		2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30	2019/07/24 13:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	2 of 2		
	UNITS	3A	3B	3C	4A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.9	18.9	19.4	20.4	0.050	9522109
Dissolved Potassium (K)	mg/L	3.59	3.51	3.43	3.07	0.050	9522109
Dissolved Sodium (Na)	mg/L	27.9	30.0	31.5	31.1	0.050	9522109
Dissolved Sulphur (S)	mg/L	83.1	88.3	92.5	94.3	3.0	9522109
RDL = Reportable Detection Limit							



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0954	WE0955	WE0956	WE0957	WE0958		
Sampling Date		2019/07/24 12:00	2019/07/24 08:30	2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4B	4C	5A	5B	5C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	431	495	381	405	456	0.50	9522108
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00102	0.00104	0.00167	0.00083	0.00076	0.00050	9524358
Dissolved Antimony (Sb)	mg/L	0.00158	0.000773	0.00331	0.00131	0.000898	0.000020	9524358
Dissolved Arsenic (As)	mg/L	0.00625	0.00209	0.0186	0.00689	0.00367	0.000020	9524358
Dissolved Barium (Ba)	mg/L	0.0672	0.0624	0.0632	0.0642	0.0750	0.000020	9524358
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9524358
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524358
Dissolved Boron (B)	mg/L	<0.010	<0.010	0.020	<0.010	<0.010	0.010	9524358
Dissolved Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	0.0000384	0.0000063	<0.0000050	0.0000050	9524358
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524358
Dissolved Cobalt (Co)	mg/L	0.0000457	0.0000529	0.00101	0.000385	0.000260	0.0000050	9524358
Dissolved Copper (Cu)	mg/L	0.000431	0.000090	0.000757	0.000216	<0.000050	0.000050	9524358
Dissolved Iron (Fe)	mg/L	0.0134	0.0322	0.0346	0.0313	0.163	0.0010	9524358
Dissolved Lead (Pb)	mg/L	0.0000114	0.0000080	0.000166	0.0000241	0.0000085	0.0000050	9524358
Dissolved Lithium (Li)	mg/L	0.0150	0.0171	0.0129	0.0139	0.0155	0.00050	9524358
Dissolved Manganese (Mn)	mg/L	0.0160	0.0324	0.127	0.128	0.149	0.000050	9524358
Dissolved Molybdenum (Mo)	mg/L	0.000120	<0.000050	0.000504	0.000199	0.000056	0.000050	9524358
Dissolved Nickel (Ni)	mg/L	0.00255	0.00125	0.00459	0.00242	0.00104	0.000020	9524358
Dissolved Selenium (Se)	mg/L	0.000360	0.000219	0.000690	0.000271	0.000201	0.000040	9524358
Dissolved Silicon (Si)	mg/L	1.39	1.51	1.03	1.29	1.89	0.050	9524358
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524358
Dissolved Strontium (Sr)	mg/L	0.735	0.806	0.668	0.702	0.762	0.000050	9524358
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9524358
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524358
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9524358
Dissolved Uranium (U)	mg/L	0.00189	0.000333	0.00526	0.000875	0.000122	0.0000020	9524358
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524358
Dissolved Zinc (Zn)	mg/L	0.00467 (1)	0.00137	0.00922	0.00213	0.00084	0.00010	9524358
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524358
Dissolved Calcium (Ca)	mg/L	136	156	120	127	142	0.050	9522109

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0954	WE0955	WE0956	WE0957	WE0958		
Sampling Date		2019/07/24 12:00	2019/07/24 08:30	2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4B	4C	5A	5B	5C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	22.1	25.3	19.6	21.3	24.4	0.050	9522109
Dissolved Potassium (K)	mg/L	1.86	0.822	3.08	2.18	1.52	0.050	9522109
Dissolved Sodium (Na)	mg/L	33.9	38.1	30.0	31.4	35.0	0.050	9522109
Dissolved Sulphur (S)	mg/L	101	104	85.9	92.7	94.7	3.0	9522109
RDL = Reportable Detection Limit								



BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0960	WE0961	WE0962		
Sampling Date		2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30		
COC Number		2 of 2	2 of 2	2 of 2		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	369	396	433	0.50	9522108
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00163	0.00084	0.00082	0.00050	9524358
Dissolved Antimony (Sb)	mg/L	0.00506	0.00300	0.00235	0.000020	9524358
Dissolved Arsenic (As)	mg/L	0.0185	0.00989	0.00657	0.000020	9524358
Dissolved Barium (Ba)	mg/L	0.0654	0.0672	0.0723	0.000020	9524358
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9524358
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524358
Dissolved Boron (B)	mg/L	0.017	<0.010	<0.010	0.010	9524358
Dissolved Cadmium (Cd)	mg/L	0.000185	0.0000292	<0.0000050	0.0000050	9524358
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9524358
Dissolved Cobalt (Co)	mg/L	0.000820	0.000219	0.0000397	0.0000050	9524358
Dissolved Copper (Cu)	mg/L	0.00149	0.000517	0.000168	0.000050	9524358
Dissolved Iron (Fe)	mg/L	0.0632	0.0293	0.0150	0.0010	9524358
Dissolved Lead (Pb)	mg/L	0.000445	0.0000486	<0.0000050	0.0000050	9524358
Dissolved Lithium (Li)	mg/L	0.0126	0.0135	0.0150	0.00050	9524358
Dissolved Manganese (Mn)	mg/L	0.0751	0.0523	0.0206	0.000050	9524358
Dissolved Molybdenum (Mo)	mg/L	0.000564	0.000253	0.000136	0.000050	9524358
Dissolved Nickel (Ni)	mg/L	0.00442	0.00262	0.00139	0.000020	9524358
Dissolved Selenium (Se)	mg/L	0.00150	0.000557	0.000321	0.000040	9524358
Dissolved Silicon (Si)	mg/L	1.11	1.39	1.49	0.050	9524358
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524358
Dissolved Strontium (Sr)	mg/L	0.666	0.688	0.752	0.000050	9524358
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9524358
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9524358
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9524358
Dissolved Uranium (U)	mg/L	0.00840	0.00290	0.00126	0.0000020	9524358
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9524358
Dissolved Zinc (Zn)	mg/L	0.0190	0.00723	0.00191	0.00010	9524358
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9524358
Dissolved Calcium (Ca)	mg/L	117	124	136	0.050	9522109
Dissolved Magnesium (Mg)	mg/L	18.8	20.6	22.4	0.050	9522109
RDL = Reportable Detection Limit						



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WE0960	WE0961	WE0962		
Sampling Date		2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30		
COC Number		2 of 2	2 of 2	2 of 2		
	UNITS	6A	6B	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	2.65	1.98	0.907	0.050	9522109
Dissolved Sodium (Na)	mg/L	29.0	31.5	34.0	0.050	9522109
Dissolved Sulphur (S)	mg/L	83.0	91.6	98.1	3.0	9522109
RDL = Reportable Detection Limit						

BUREAU
VERITASBV Labs Job #: B960531
Report Date: 2019/07/31ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WE0912	WE0913	WE0914	WE0915		
Sampling Date		2019/07/24 14:10	2019/07/24 13:30	2019/07/24 12:00	2019/07/24 15:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT	1A	1B	1C	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	332	346	364	378	0.50	9522346
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0457	0.00334	0.00181	0.00216	0.00050	9524700
Total Antimony (Sb)	mg/L	0.0213	0.0186	0.0155	0.0129	0.000020	9524700
Total Arsenic (As)	mg/L	0.0630	0.0476	0.0275	0.0209	0.000020	9524700
Total Barium (Ba)	mg/L	0.0619	0.0613	0.0636	0.0634	0.000020	9524700
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9524700
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524700
Total Boron (B)	mg/L	0.035	0.035	0.034	0.028	0.010	9524700
Total Cadmium (Cd)	mg/L	0.00195	0.000823	0.000227	0.0000721	0.0000050	9524700
Total Chromium (Cr)	mg/L	0.00031	0.00015	0.00015	<0.00010	0.00010	9524700
Total Cobalt (Co)	mg/L	0.00274	0.000215	0.0000652	0.0000500	0.0000050	9524700
Total Copper (Cu)	mg/L	0.0142	0.00425	0.00199	0.000967	0.000050	9524700
Total Iron (Fe)	mg/L	0.0280	0.0050	0.0218	0.0200	0.0010	9524700
Total Lead (Pb)	mg/L	0.0263	0.000932	0.0000845	0.0000346	0.0000050	9524700
Total Lithium (Li)	mg/L	0.0134	0.0133	0.0135	0.0140	0.00050	9524700
Total Manganese (Mn)	mg/L	0.0596	0.00851	0.00559	0.00160	0.000050	9524700
Total Molybdenum (Mo)	mg/L	0.00160	0.00149	0.00150	0.00137	0.000050	9524700
Total Nickel (Ni)	mg/L	0.00775	0.00488	0.00336	0.00184	0.000020	9524700
Total Selenium (Se)	mg/L	0.00725	0.00612	0.00486	0.00336	0.000040	9524700
Total Silicon (Si)	mg/L	0.762	0.189	0.189	0.398	0.050	9524700
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524700
Total Strontium (Sr)	mg/L	0.675	0.678	0.705	0.736	0.000050	9524700
Total Thallium (Tl)	mg/L	0.0000044	0.0000036	0.0000026	<0.0000020	0.0000020	9524700
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524700
Total Titanium (Ti)	mg/L	0.00087	<0.00050	<0.00050	<0.00050	0.00050	9524700
Total Uranium (U)	mg/L	0.0286	0.0242	0.0174	0.0184	0.0000020	9524700
Total Vanadium (V)	mg/L	0.00029	<0.00020	<0.00020	<0.00020	0.00020	9524700
Total Zinc (Zn)	mg/L	0.157	0.0964	0.0507	0.0166	0.00010	9524700
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524700
Total Calcium (Ca)	mg/L	105	110	117	121	0.050	9522348
Total Magnesium (Mg)	mg/L	16.9	17.2	17.6	18.1	0.050	9522348

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WE0912	WE0913	WE0914	WE0915		
Sampling Date		2019/07/24 14:10	2019/07/24 13:30	2019/07/24 12:00	2019/07/24 15:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT	1A	1B	1C	RDL	QC Batch
Total Potassium (K)	mg/L	3.83	3.99	3.97	3.77	0.050	9522348
Total Sodium (Na)	mg/L	25.7	26.7	26.9	28.1	0.050	9522348
Total Sulphur (S)	mg/L	87.8	88.3	89.6	93.0	3.0	9522348
RDL = Reportable Detection Limit							



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WE0916	WE0917	WE0918	WE0919		
Sampling Date		2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30	2019/07/24 13:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	2A	2B	2C	3A	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	346	357	376	348	0.50	9522346
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00538	0.00142	0.00071	0.00294	0.00050	9524700
Total Antimony (Sb)	mg/L	0.0157	0.0130	0.0117	0.0128	0.000020	9524700
Total Arsenic (As)	mg/L	0.0374	0.0255	0.0159	0.0402	0.000020	9524700
Total Barium (Ba)	mg/L	0.0621	0.0619	0.0631	0.0618	0.000020	9524700
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9524700
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524700
Total Boron (B)	mg/L	0.034	0.022	0.021	0.023	0.010	9524700
Total Cadmium (Cd)	mg/L	0.000902	0.000240	0.0000591	0.000569	0.0000050	9524700
Total Chromium (Cr)	mg/L	0.00011	<0.00010	<0.00010	0.00013	0.00010	9524700
Total Cobalt (Co)	mg/L	0.000322	0.0000693	0.0000474	0.000482	0.0000050	9524700
Total Copper (Cu)	mg/L	0.00433	0.00459	0.00108	0.00389	0.000050	9524700
Total Iron (Fe)	mg/L	0.0747	0.0246	0.0180	0.0534	0.0010	9524700
Total Lead (Pb)	mg/L	0.000265	0.0000217	<0.0000050	0.000803	0.0000050	9524700
Total Lithium (Li)	mg/L	0.0130	0.0139	0.0142	0.0130	0.00050	9524700
Total Manganese (Mn)	mg/L	0.0302	0.0113	0.00372	0.0445	0.000050	9524700
Total Molybdenum (Mo)	mg/L	0.00117	0.000862	0.000723	0.00104	0.000050	9524700
Total Nickel (Ni)	mg/L	0.00561	0.00315	0.00211	0.00538	0.000020	9524700
Total Selenium (Se)	mg/L	0.00477	0.00347	0.00261	0.00358	0.000040	9524700
Total Silicon (Si)	mg/L	0.180	0.492	0.524	0.775	0.050	9524700
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524700
Total Strontium (Sr)	mg/L	0.669	0.693	0.720	0.679	0.000050	9524700
Total Thallium (Tl)	mg/L	0.0000024	<0.0000020	<0.0000020	<0.0000020	0.0000020	9524700
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524700
Total Titanium (Ti)	mg/L	0.00064	<0.00050	0.00058	<0.00050	0.00050	9524700
Total Uranium (U)	mg/L	0.0155	0.0109	0.00897	0.0160	0.0000020	9524700
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	0.00020	9524700
Total Zinc (Zn)	mg/L	0.0878	0.0409	0.0195	0.0591	0.00010	9524700
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524700
Total Calcium (Ca)	mg/L	110	114	120	111	0.050	9522348
Total Magnesium (Mg)	mg/L	17.2	17.8	18.3	17.0	0.050	9522348

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WE0916	WE0917	WE0918	WE0919		
Sampling Date		2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30	2019/07/24 13:30		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	2A	2B	2C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.98	3.49	3.27	3.61	0.050	9522348
Total Sodium (Na)	mg/L	26.2	27.2	28.4	26.3	0.050	9522348
Total Sulphur (S)	mg/L	87.9	89.1	91.4	86.9	3.0	9522348
RDL = Reportable Detection Limit							



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VERITAS

BV Labs Job #: B960531

Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WE0920	WE0921	WE0953	WE0954		
Sampling Date		2019/07/24 12:00	2019/07/24 08:30	2019/07/24 13:30	2019/07/24 12:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	2 of 2	2 of 2		
	UNITS	3B	3C	4A	4B	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	360	380	373	415	0.50	9522346
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00195	0.00152	0.00187	0.00073	0.00050	9524700
Total Antimony (Sb)	mg/L	0.0117	0.0106	0.00285	0.00153	0.000020	9524700
Total Arsenic (As)	mg/L	0.0257	0.0189	0.0195	0.00601	0.000020	9524700
Total Barium (Ba)	mg/L	0.0611	0.0620	0.0646	0.0660	0.000020	9524700
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9524700
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524700
Total Boron (B)	mg/L	0.014	<0.010	0.018	<0.010	0.010	9524700
Total Cadmium (Cd)	mg/L	0.000122	0.0000233	0.0000535	0.0000053	0.0000050	9524700
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524700
Total Cobalt (Co)	mg/L	0.0000540	0.0000433	0.000297	0.0000659	0.0000050	9524700
Total Copper (Cu)	mg/L	0.00184	0.00115	0.00108	0.000446	0.000050	9524700
Total Iron (Fe)	mg/L	0.0163	0.0110	0.0517	0.0165	0.0010	9524700
Total Lead (Pb)	mg/L	0.0000300	0.0000117	0.000134	0.0000078	0.0000050	9524700
Total Lithium (Li)	mg/L	0.0136	0.0135	0.0136	0.0152	0.00050	9524700
Total Manganese (Mn)	mg/L	0.00648	0.00134	0.0425	0.0163	0.000050	9524700
Total Molybdenum (Mo)	mg/L	0.000794	0.000604	0.000324	0.000100	0.000050	9524700
Total Nickel (Ni)	mg/L	0.00365	0.00168	0.00452	0.00223	0.000020	9524700
Total Selenium (Se)	mg/L	0.00293	0.00234	0.000801	0.000364	0.000040	9524700
Total Silicon (Si)	mg/L	0.654	0.410	1.05	1.34	0.050	9524700
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524700
Total Strontium (Sr)	mg/L	0.688	0.705	0.700	0.755	0.000050	9524700
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9524700
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524700
Total Titanium (Ti)	mg/L	<0.00050	0.00059	0.00062	<0.00050	0.00050	9524700
Total Uranium (U)	mg/L	0.00794	0.00816	0.00610	0.00182	0.0000020	9524700
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524700
Total Zinc (Zn)	mg/L	0.0378	0.0140	0.0125	0.00288	0.00010	9524700
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524700
Total Calcium (Ca)	mg/L	115	122	118	132	0.050	9522348
Total Magnesium (Mg)	mg/L	17.5	18.1	18.7	20.7	0.050	9522348

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WE0920	WE0921	WE0953	WE0954		
Sampling Date		2019/07/24 12:00	2019/07/24 08:30	2019/07/24 13:30	2019/07/24 12:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	2 of 2	2 of 2		
	UNITS	3B	3C	4A	4B	RDL	QC Batch
Total Potassium (K)	mg/L	3.34	3.28	2.92	1.78	0.050	9522348
Total Sodium (Na)	mg/L	27.1	29.0	28.3	31.3	0.050	9522348
Total Sulphur (S)	mg/L	87.8	90.9	91.4	98.2	3.0	9522348
RDL = Reportable Detection Limit							



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WE0955	WE0956	WE0960	WE0961	WE0962		
Sampling Date		2019/07/24 08:30	2019/07/24 13:30	2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4C	5A	6A	6B	6C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	486	368	354	385	406	0.50	952346
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00069	0.00192	0.00201	0.00125	0.00088	0.00050	9524700
Total Antimony (Sb)	mg/L	0.000786	0.00337	0.00517	0.00309	0.00227	0.000020	9524700
Total Arsenic (As)	mg/L	0.00221	0.0200	0.0194	0.0101	0.00636	0.000020	9524700
Total Barium (Ba)	mg/L	0.0637	0.0641	0.0659	0.0680	0.0709	0.000020	9524700
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9524700
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524700
Total Boron (B)	mg/L	<0.010	0.019	0.016	<0.010	<0.010	0.010	9524700
Total Cadmium (Cd)	mg/L	<0.0000050	0.0000661	0.000237	0.0000338	<0.0000050	0.0000050	9524700
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524700
Total Cobalt (Co)	mg/L	0.0000871	0.00104	0.000840	0.000241	0.0000647	0.0000050	9524700
Total Copper (Cu)	mg/L	0.000136	0.00121	0.00194	0.000610	0.000210	0.000050	9524700
Total Iron (Fe)	mg/L	0.0531	0.0946	0.0871	0.0406	0.0165	0.0010	9524700
Total Lead (Pb)	mg/L	0.0000059	0.000398	0.000722	0.0000707	0.0000092	0.0000050	9524700
Total Lithium (Li)	mg/L	0.0179	0.0135	0.0127	0.0138	0.0147	0.00050	9524700
Total Manganese (Mn)	mg/L	0.0339	0.127	0.0762	0.0513	0.0201	0.000050	9524700
Total Molybdenum (Mo)	mg/L	<0.000050	0.000552	0.000587	0.000237	0.000141	0.000050	9524700
Total Nickel (Ni)	mg/L	0.00119	0.00437	0.00421	0.00249	0.00133	0.000020	9524700
Total Selenium (Se)	mg/L	0.000232	0.000663	0.00151	0.000557	0.000305	0.000040	9524700
Total Silicon (Si)	mg/L	1.55	1.07	1.08	1.39	1.39	0.050	9524700
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9524700
Total Strontium (Sr)	mg/L	0.839	0.685	0.671	0.705	0.741	0.000050	9524700
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9524700
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524700
Total Titanium (Ti)	mg/L	0.00051	0.00057	0.00053	0.00060	0.00053	0.00050	9524700
Total Uranium (U)	mg/L	0.000331	0.00525	0.00826	0.00288	0.00123	0.0000020	9524700
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9524700
Total Zinc (Zn)	mg/L	0.00092	0.00880	0.0184	0.00517	0.00148	0.00010	9524700
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9524700
Total Calcium (Ca)	mg/L	154	116	113	123	129	0.050	9522348
Total Magnesium (Mg)	mg/L	24.8	18.9	17.6	19.1	20.4	0.050	9522348

RDL = Reportable Detection Limit



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WE0955	WE0956	WE0960	WE0961	WE0962		
Sampling Date		2019/07/24 08:30	2019/07/24 13:30	2019/07/24 13:30	2019/07/24 12:00	2019/07/24 08:30		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4C	5A	6A	6B	6C	RDL	QC Batch
Total Potassium (K)	mg/L	0.912	2.98	2.54	1.88	0.896	0.050	9522348
Total Sodium (Na)	mg/L	36.4	28.0	27.0	29.0	30.6	0.050	9522348
Total Sulphur (S)	mg/L	112	90.0	86.4	90.5	91.7	3.0	9522348
RDL = Reportable Detection Limit								

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VERITASBV Labs Job #: B960531
Report Date: 2019/07/31ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LL TOTAL METALS (DIGESTED) IN WATER**

BV Labs ID		WE0957	WE0958		
Sampling Date		2019/07/24 12:00	2019/07/24 08:30		
COC Number		2 of 2	2 of 2		
	UNITS	5B	5C	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	396	438	0.50	9522346
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	<0.0030	0.0054	0.0030	9524256
Total Antimony (Sb)	mg/L	0.00130	0.000902	0.000020	9524256
Total Arsenic (As)	mg/L	0.00771	0.00404	0.000020	9524256
Total Barium (Ba)	mg/L	0.0655	0.0762	0.000050	9524256
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9524256
Total Bismuth (Bi)	mg/L	<0.000010	<0.000010	0.000010	9524256
Total Boron (B)	mg/L	<0.010	<0.010	0.010	9524256
Total Cadmium (Cd)	mg/L	0.0000096	<0.0000050	0.0000050	9524256
Total Chromium (Cr)	mg/L	0.00012	0.00034	0.00010	9524256
Total Cobalt (Co)	mg/L	0.000465	0.000346	0.000010	9524256
Total Copper (Cu)	mg/L	0.00039	0.00023	0.00010	9524256
Total Iron (Fe)	mg/L	0.0950	0.217	0.0050	9524256
Total Lead (Pb)	mg/L	0.000067	0.000055	0.000020	9524256
Total Lithium (Li)	mg/L	0.0140	0.0158	0.00050	9524256
Total Manganese (Mn)	mg/L	0.132	0.155	0.00010	9524256
Total Molybdenum (Mo)	mg/L	0.000206	0.000088	0.000050	9524256
Total Nickel (Ni)	mg/L	0.00233	0.00321	0.00010	9524256
Total Phosphorus (P)	mg/L	0.0180	0.0220	0.0050	9524256
Total Selenium (Se)	mg/L	0.000320	0.000215	0.000040	9524256
Total Silicon (Si)	mg/L	1.28	1.83	0.050	9524256
Total Silver (Ag)	mg/L	<0.000010	<0.000010	0.000010	9524256
Total Strontium (Sr)	mg/L	0.670	0.727	0.000050	9524256
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9524256
Total Tin (Sn)	mg/L	<0.00020	0.00026	0.00020	9524256
Total Titanium (Ti)	mg/L	<0.0020	<0.0020	0.0020	9524256
Total Uranium (U)	mg/L	0.000889	0.000135	0.0000050	9524256
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9524256
Total Zinc (Zn)	mg/L	0.0027	0.0036	0.0010	9524256
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9524256
Total Calcium (Ca)	mg/L	125	137	0.25	9522348
RDL = Reportable Detection Limit					



LL TOTAL METALS (DIGESTED) IN WATER

BV Labs ID		WE0957	WE0958		
Sampling Date		2019/07/24 12:00	2019/07/24 08:30		
COC Number		2 of 2	2 of 2		
	UNITS	5B	5C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	20.4	23.1	0.25	9522348
Total Potassium (K)	mg/L	2.07	1.47	0.25	9522348
Total Sodium (Na)	mg/L	29.7	33.1	0.25	9522348
Total Sulphur (S)	mg/L	91.1	95.4	0.60	9524256
RDL = Reportable Detection Limit					



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BV Labs Job #: B960531

Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0912
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9523799	N/A	2019/07/26	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Biochemical Oxygen Demand	DO/PROB	9522611	2019/07/25	2019/07/30	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
COD by Colorimeter	M/PROB	9523619	N/A	2019/07/26	Jennifer Mee
Carbon (DOC)	TECH	9524339	N/A	2019/07/27	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/26	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524020	N/A	2019/07/26	Parniyan Roosta
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong
Carbon (Total Organic)	TECH	9524242	N/A	2019/07/27	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9525774	2019/07/29	2019/07/29	Eliza Javier Herrera

BV Labs ID: WE0912 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Total Suspended Solids (NFR)	BAL	9525774	2019/07/29	2019/07/29	Eliza Javier Herrera

BV Labs ID: WE0913
Sample ID: 1A
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada



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BV Labs Job #: B960531

Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0913

Sample ID: 1A

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0914

Sample ID: 1B

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/28	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Automated Statchk
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0915

Sample ID: 1C

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9523799	N/A	2019/07/26	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Biochemical Oxygen Demand	DO/PROB	9522611	2019/07/25	2019/07/30	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
COD by Colorimeter	M/PROB	9523619	N/A	2019/07/26	Jennifer Mee
Carbon (DOC)	TECH	9524339	N/A	2019/07/27	Kayla Ghanem
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/28	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/26	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0915
Sample ID: 1C
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524020	N/A	2019/07/26	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong
Carbon (Total Organic)	TECH	9524242	N/A	2019/07/27	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9525774	2019/07/29	2019/07/29	Eliza Javier Herrera

BV Labs ID: WE0916
Sample ID: 2A
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0917
Sample ID: 2B
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0917
Sample ID: 2B
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0918
Sample ID: 2C
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9523799	N/A	2019/07/26	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Biochemical Oxygen Demand	DO/PROB	9522611	2019/07/25	2019/07/30	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
COD by Colorimeter	M/PROB	9523619	N/A	2019/07/26	Jennifer Mee
Carbon (DOC)	TECH	9524339	N/A	2019/07/27	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/26	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9528242	N/A	2019/07/30	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong
Carbon (Total Organic)	TECH	9524242	N/A	2019/07/27	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9525774	2019/07/29	2019/07/29	Eliza Javier Herrera

BV Labs ID: WE0919
Sample ID: 3A
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada



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VERITAS

BV Labs Job #: B960531

Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0919

Sample ID: 3A

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0920

Sample ID: 3B

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524020	N/A	2019/07/26	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0920 Dup

Sample ID: 3B

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524020	N/A	2019/07/26	Parniyan Roosta

BV Labs ID: WE0921

Sample ID: 3C

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9523799	N/A	2019/07/26	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Biochemical Oxygen Demand	DO/PROB	9522611	2019/07/25	2019/07/30	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
COD by Colorimeter	M/PROB	9523619	N/A	2019/07/26	Jennifer Mee
Carbon (DOC)	TECH	9524339	N/A	2019/07/27	Kayla Ghanem
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/28	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk



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VERITAS

BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0921
Sample ID: 3C
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/26	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524020	N/A	2019/07/26	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong
Carbon (Total Organic)	TECH	9524242	N/A	2019/07/27	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9525774	2019/07/29	2019/07/29	Eliza Javier Herrera

BV Labs ID: WE0953
Sample ID: 4A
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0954
Sample ID: 4B
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk



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VERITAS

BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0954
Sample ID: 4B
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0955
Sample ID: 4C
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9523799	N/A	2019/07/26	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Biochemical Oxygen Demand	DO/PROB	9522611	2019/07/25	2019/07/30	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
COD by Colorimeter	M/PROB	9523619	N/A	2019/07/26	Jennifer Mee
Carbon (DOC)	TECH	9524339	N/A	2019/07/27	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/26	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong
Carbon (Total Organic)	TECH	9524242	N/A	2019/07/27	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9525774	2019/07/29	2019/07/29	Eliza Javier Herrera

BV Labs ID: WE0956
Sample ID: 5A
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Automated Statchk



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VERITAS

BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0956
Sample ID: 5A
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0957
Sample ID: 5B
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/27	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/27	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9524256	2019/07/26	2019/07/27	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/27	Report Automation Engine
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0958
Sample ID: 5C
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9523799	N/A	2019/07/26	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Biochemical Oxygen Demand	DO/PROB	9522611	2019/07/25	2019/07/30	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
COD by Colorimeter	M/PROB	9523619	N/A	2019/07/26	Jennifer Mee
Carbon (DOC)	TECH	9524339	N/A	2019/07/27	Kayla Ghanem
Hardness Total (calculated as CaCO3)	CALC	9522346	N/A	2019/07/27	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9522108	N/A	2019/07/29	Automated Statchk



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VERITAS

BV Labs Job #: B960531

Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0958

Sample ID: 5C

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/26	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9524256	2019/07/26	2019/07/27	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/27	Automated Statchk
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong
Carbon (Total Organic)	TECH	9524242	N/A	2019/07/27	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9525774	2019/07/29	2019/07/29	Eliza Javier Herrera

BV Labs ID: WE0958 Dup

Sample ID: 5C

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9523799	N/A	2019/07/26	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal

BV Labs ID: WE0960

Sample ID: 6A

Matrix: Water

Collected: 2019/07/24

Shipped: 2019/07/24

Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524015	N/A	2019/07/27	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0961
Sample ID: 6B
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/28	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524020	N/A	2019/07/26	Parniyan Roosta
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong

BV Labs ID: WE0962
Sample ID: 6C
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9523799	N/A	2019/07/26	Kathleen Dalton
Alkalinity - Low Level	AT/ALK	9523717	N/A	2019/07/26	Taylor Mullings
Biochemical Oxygen Demand	DO/PROB	9522611	2019/07/25	2019/07/30	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9525688	N/A	2019/07/29	Zafar Iqbal
COD by Colorimeter	M/PROB	9523619	N/A	2019/07/26	Jennifer Mee
Carbon (DOC)	TECH	9524339	N/A	2019/07/27	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9522346	N/A	2019/07/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9522108	N/A	2019/07/29	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9526886	N/A	2019/07/29	Harry (Peng) Liang
Ion Balance	CALC	9521759	N/A	2019/07/26	Automated Statchk
Sum of cations, anions	CALC	9521761	N/A	2019/07/29	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9522109	N/A	2019/07/29	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9524358	N/A	2019/07/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9522348	N/A	2019/07/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada
Nitrate and Nitrite - Low Level	CALC	9522351	N/A	2019/07/29	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9522354	N/A	2019/07/29	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9524020	N/A	2019/07/26	Parniyan Roosta
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/07/29	Kevin Chong
Carbon (Total Organic)	TECH	9524242	N/A	2019/07/27	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9525774	2019/07/29	2019/07/29	Eliza Javier Herrera



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WE0962 Dup
Sample ID: 6C
Matrix: Water

Collected: 2019/07/24
Shipped: 2019/07/24
Received: 2019/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9524700	N/A	2019/07/28	Valentina Balada



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.0°C
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Sample WE0957 [5B] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample WE0958 [5C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample WE0918, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B960531
Report Date: 2019/07/31

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9522611	Biochemical Oxygen Demand	2019/07/30			97	85 - 115	<2.0	mg/L	4.8	20
9523619	Chemical Oxygen Demand	2019/07/26	99	80 - 120	99	80 - 120	<10	mg/L	NC	20
9523717	Alkalinity (PP as CaCO3)	2019/07/26					<0.50	mg/L	NC	20
9523717	Alkalinity (Total as CaCO3)	2019/07/26			92	80 - 120	<0.50	mg/L	6.0	20
9523717	Bicarbonate (HCO3)	2019/07/26					<0.50	mg/L	6.0	20
9523717	Carbonate (CO3)	2019/07/26					<0.50	mg/L	NC	20
9523717	Hydioxide (OH)	2019/07/26					<0.50	mg/L	NC	20
9523799	Acidity (pH 4.5)	2019/07/26					<1.0	mg/L	NC	20
9523799	Acidity (pH 8.3)	2019/07/26			94	80 - 120	<1.0	mg/L	17	20
9524015	Dissolved Nitrate (N)	2019/07/27	83	80 - 120	101	80 - 120	<0.0030	mg/L	0	20
9524015	Dissolved Nitrite (N)	2019/07/27	82	80 - 120	99	80 - 120	<0.0030	mg/L	0.084	20
9524020	Dissolved Nitrate (N)	2019/07/26	100	80 - 120	100	80 - 120	<0.0030	mg/L	NC	20
9524020	Dissolved Nitrite (N)	2019/07/26	99	80 - 120	99	80 - 120	<0.0030	mg/L	NC	20
9524242	Total Organic Carbon (C)	2019/07/27	101	80 - 120	98	80 - 120	<0.50	mg/L	NC	20
9524256	Total Aluminum (Al)	2019/07/27	93	80 - 120	97	80 - 120	<0.0030	mg/L	NC	20
9524256	Total Antimony (Sb)	2019/07/27	96	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9524256	Total Arsenic (As)	2019/07/27	97	80 - 120	101	80 - 120	<0.000020	mg/L	3.9	20
9524256	Total Barium (Ba)	2019/07/27	97	80 - 120	102	80 - 120	<0.000050	mg/L	0.12	20
9524256	Total Beryllium (Be)	2019/07/27	84	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
9524256	Total Bismuth (Bi)	2019/07/27	90	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9524256	Total Boron (B)	2019/07/27	87	80 - 120	93	80 - 120	<0.010	mg/L	0.48	20
9524256	Total Cadmium (Cd)	2019/07/27	89	80 - 120	100	80 - 120	<0.0000050	mg/L	16	20
9524256	Total Chromium (Cr)	2019/07/27	95	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9524256	Total Cobalt (Co)	2019/07/27	92	80 - 120	99	80 - 120	<0.000010	mg/L	0.34	20
9524256	Total Copper (Cu)	2019/07/27	86	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9524256	Total Iron (Fe)	2019/07/27	92	80 - 120	102	80 - 120	<0.0050	mg/L	0.094	20
9524256	Total Lead (Pb)	2019/07/27	96	80 - 120	103	80 - 120	<0.000020	mg/L	NC	20
9524256	Total Lithium (Li)	2019/07/27	NC	80 - 120	95	80 - 120	<0.00050	mg/L	1.5	20
9524256	Total Manganese (Mn)	2019/07/27	93	80 - 120	101	80 - 120	<0.00010	mg/L	0.28	20
9524256	Total Molybdenum (Mo)	2019/07/27	112	80 - 120	101	80 - 120	<0.000050	mg/L	4.8	20
9524256	Total Nickel (Ni)	2019/07/27	89	80 - 120	100	80 - 120	<0.00010	mg/L	1.9	20
9524256	Total Phosphorus (P)	2019/07/27	95	80 - 120	99	80 - 120	<0.0050	mg/L	4.2	20



BV Labs Job #: B960531
Report Date: 2019/07/31

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9524256	Total Selenium (Se)	2019/07/27	94	80 - 120	99	80 - 120	<0.000040	mg/L	8.7	20
9524256	Total Silicon (Si)	2019/07/27	99	80 - 120	101	80 - 120	<0.050	mg/L	0.78	20
9524256	Total Silver (Ag)	2019/07/27	93	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9524256	Total Strontium (Sr)	2019/07/27	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.73	20
9524256	Total Sulphur (S)	2019/07/27	NC	80 - 120	98	80 - 120	<0.60	mg/L	0.57	20
9524256	Total Thallium (Tl)	2019/07/27	97	80 - 120	102	80 - 120	<0.0000020	mg/L	6.9	20
9524256	Total Tin (Sn)	2019/07/27	99	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9524256	Total Titanium (Ti)	2019/07/27	103	80 - 120	102	80 - 120	<0.0020	mg/L	NC	20
9524256	Total Uranium (U)	2019/07/27	103	80 - 120	101	80 - 120	<0.0000050	mg/L	2.0	20
9524256	Total Vanadium (V)	2019/07/27	98	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9524256	Total Zinc (Zn)	2019/07/27	78 (1)	80 - 120	100	80 - 120	<0.0010	mg/L	8.5	20
9524256	Total Zirconium (Zr)	2019/07/27	112	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9524339	Dissolved Organic Carbon (C)	2019/07/27	NC	80 - 120	98	80 - 120	<0.50	mg/L	0.23	20
9524358	Dissolved Aluminum (Al)	2019/07/27	101	80 - 120	102	80 - 120	<0.00050	mg/L	0.43	20
9524358	Dissolved Antimony (Sb)	2019/07/27	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.064	20
9524358	Dissolved Arsenic (As)	2019/07/27	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.42	20
9524358	Dissolved Barium (Ba)	2019/07/27	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.87	20
9524358	Dissolved Beryllium (Be)	2019/07/27	99	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9524358	Dissolved Bismuth (Bi)	2019/07/27	99	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9524358	Dissolved Boron (B)	2019/07/27	103	80 - 120	104	80 - 120	<0.010	mg/L	1.4	20
9524358	Dissolved Cadmium (Cd)	2019/07/27	97	80 - 120	100	80 - 120	<0.0000050	mg/L	0.15	20
9524358	Dissolved Chromium (Cr)	2019/07/27	98	80 - 120	99	80 - 120	<0.00010	mg/L	2.9	20
9524358	Dissolved Cobalt (Co)	2019/07/27	95	80 - 120	98	80 - 120	<0.0000050	mg/L	1.7	20
9524358	Dissolved Copper (Cu)	2019/07/27	92	80 - 120	99	80 - 120	<0.000050	mg/L	0.92	20
9524358	Dissolved Iron (Fe)	2019/07/27	102	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
9524358	Dissolved Lead (Pb)	2019/07/27	102	80 - 120	104	80 - 120	<0.0000050	mg/L	0.53	20
9524358	Dissolved Lithium (Li)	2019/07/27	100	80 - 120	104	80 - 120	<0.00050	mg/L	0.46	20
9524358	Dissolved Manganese (Mn)	2019/07/27	NC	80 - 120	100	80 - 120	<0.000050	mg/L	1.7	20
9524358	Dissolved Molybdenum (Mo)	2019/07/27	106	80 - 120	101	80 - 120	<0.000050	mg/L	3.5	20
9524358	Dissolved Nickel (Ni)	2019/07/27	94	80 - 120	101	80 - 120	<0.000020	mg/L	2.8	20
9524358	Dissolved Selenium (Se)	2019/07/27	97	80 - 120	99	80 - 120	<0.000040	mg/L	0.95	20
9524358	Dissolved Silicon (Si)	2019/07/27	104	80 - 120	104	80 - 120	<0.050	mg/L	0.73	20



BV Labs Job #: B960531
Report Date: 2019/07/31

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9524358	Dissolved Silver (Ag)	2019/07/27	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9524358	Dissolved Strontium (Sr)	2019/07/27	NC	80 - 120	102	80 - 120	<0.000050	mg/L	0.53	20
9524358	Dissolved Thallium (Tl)	2019/07/27	101	80 - 120	103	80 - 120	<0.0000020	mg/L	2.1	20
9524358	Dissolved Tin (Sn)	2019/07/27	100	80 - 120	108	80 - 120	<0.00020	mg/L	NC	20
9524358	Dissolved Titanium (Ti)	2019/07/27	103	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9524358	Dissolved Uranium (U)	2019/07/27	104	80 - 120	105	80 - 120	<0.0000020	mg/L	1.6	20
9524358	Dissolved Vanadium (V)	2019/07/27	101	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9524358	Dissolved Zinc (Zn)	2019/07/27	NC	80 - 120	110	80 - 120	<0.00010	mg/L	0.33	20
9524358	Dissolved Zirconium (Zr)	2019/07/27	107	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9524700	Total Aluminum (Al)	2019/07/28	96	80 - 120	99	80 - 120	<0.00050	mg/L	4.6	20
9524700	Total Antimony (Sb)	2019/07/28	97	80 - 120	101	80 - 120	<0.000020	mg/L	0.53	20
9524700	Total Arsenic (As)	2019/07/28	101	80 - 120	101	80 - 120	<0.000020	mg/L	1.5	20
9524700	Total Barium (Ba)	2019/07/28	NC	80 - 120	102	80 - 120	<0.000020	mg/L	1.2	20
9524700	Total Beryllium (Be)	2019/07/28	87	80 - 120	92	80 - 120	<0.000010	mg/L	NC	20
9524700	Total Bismuth (Bi)	2019/07/28	94	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9524700	Total Boron (B)	2019/07/28	90	80 - 120	91	80 - 120	<0.010	mg/L	NC	20
9524700	Total Cadmium (Cd)	2019/07/28	93	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9524700	Total Chromium (Cr)	2019/07/28	94	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9524700	Total Cobalt (Co)	2019/07/28	91	80 - 120	98	80 - 120	<0.0000050	mg/L	5.6	20
9524700	Total Copper (Cu)	2019/07/28	86	80 - 120	95	80 - 120	<0.000050	mg/L	0.048	20
9524700	Total Iron (Fe)	2019/07/28	97	80 - 120	103	80 - 120	<0.0010	mg/L	0.41	20
9524700	Total Lead (Pb)	2019/07/28	97	80 - 120	101	80 - 120	<0.0000050	mg/L	11	20
9524700	Total Lithium (Li)	2019/07/28	90	80 - 120	97	80 - 120	<0.00050	mg/L	0.57	20
9524700	Total Manganese (Mn)	2019/07/28	95	80 - 120	100	80 - 120	<0.000050	mg/L	0.60	20
9524700	Total Molybdenum (Mo)	2019/07/28	105	80 - 120	100	80 - 120	<0.000050	mg/L	1.5	20
9524700	Total Nickel (Ni)	2019/07/28	88	80 - 120	96	80 - 120	<0.000020	mg/L	0.29	20
9524700	Total Selenium (Se)	2019/07/28	95	80 - 120	100	80 - 120	<0.000040	mg/L	7.4	20
9524700	Total Silicon (Si)	2019/07/28	98	80 - 120	104	80 - 120	<0.050	mg/L	1.1	20
9524700	Total Silver (Ag)	2019/07/28	96	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9524700	Total Strontium (Sr)	2019/07/28	NC	80 - 120	106	80 - 120	<0.000050	mg/L	1.0	20
9524700	Total Thallium (Tl)	2019/07/28	99	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9524700	Total Tin (Sn)	2019/07/28	100	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20



BV Labs Job #: B960531
Report Date: 2019/07/31

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9524700	Total Titanium (Ti)	2019/07/28	100	80 - 120	100	80 - 120	<0.00050	mg/L	5.7	20
9524700	Total Uranium (U)	2019/07/28	99	80 - 120	99	80 - 120	<0.0000020	mg/L	1.5	20
9524700	Total Vanadium (V)	2019/07/28	99	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9524700	Total Zinc (Zn)	2019/07/28	84	80 - 120	100	80 - 120	<0.00010	mg/L	2.8	20
9524700	Total Zirconium (Zr)	2019/07/28	107	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9525688	Dissolved Chloride (Cl)	2019/07/29	NC	80 - 120	104	80 - 120	<0.50	mg/L	1.1	20
9525688	Dissolved Sulphate (SO4)	2019/07/29	NC	80 - 120	100	80 - 120	<0.50	mg/L	0.65	20
9525774	Total Suspended Solids	2019/07/29	98	80 - 120	96	80 - 120	<1.0	mg/L	16	20
9528242	Dissolved Aluminum (Al)	2019/07/30			103	80 - 120	<0.00050	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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BV Labs Job #: B960531
Report Date: 2019/07/31

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

COC #:

BBY FCD-00077/05
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Invoice Information Company Name: BMC MINERALS LTD. Contact Name: _____ Address: 530-1130 WEST PENDER ST Vancouver, BC V6E 4A4 Phone: _____ Email: _____		Report Information (if differs from invoice) Company Name: ALEKO ENVIRONMENTAL Contact Name: Mary Mioska; Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK Y1A 2V3 Phone: (867) 668-6463 Email: mmioska@alekocoeny.com		Project Information (where applicable) Quotation #: B60751 P.O. #/ A/E/F: _____ Project #: BMC-18-02 Site location: Kudz Ze Kayah Site #: _____ Sampled By: _____		Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Rush TAT (surcharges will be applied) Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days ☐ Date Required: _____	
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify)		Analysis Requested		Rush Confirmation #:	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM		Time Date Sampled (YYYY/MM/DD) Time Sampled (HH:MM) Matrix		Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity Acidity BOD TSS COD/TOC DOC		# OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE	
Sample Identification		Lab Identification		COMMENTS		COOLING MEDIA PRESENT: Y / N	
1	4A	24-Jul-19	1:30	Water	X	X	Metals preserved with HNO3, dissolved metals field filtered
2	4B	24-Jul-19	12	Water	X	X	Metals preserved with HNO3, dissolved metals field filtered
3	4C	24-Jul-19	10:30	Water	X	X	Metals preserved with HNO3, dissolved metals and DOC field filtered
4	5A	24-Jul-19	1:30	Water	X	X	Metals preserved with HNO3, dissolved metals field filtered
5	5B	24-Jul-19	12	Water	X	X	Metals preserved with HNO3, dissolved metals field filtered
6	5C	24-Jul-19	8:30	Water	X	X	Metals preserved with HNO3, dissolved metals and DOC field filtered
7	6A	24-Jul-19	1:30	Water	X	X	Metals preserved with HNO3, dissolved metals field filtered
8	6B	24-Jul-19	12	Water	X	X	Metals preserved with HNO3, dissolved metals field filtered
9	6C	24-Jul-19	8:30	Water	X	X	Metals preserved with HNO3, dissolved metals and DOC field filtered
REUNQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)	
_____		_____		_____		_____	

24-Jul-19 14:57
Safamm Maiter
B960531



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 2, 2 of 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/08/21
 Report #: R2770373
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B965831

Received: 2019/08/09, 13:30

Sample Matrix: Water
 # Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	15	N/A	2019/08/13	AB SOP-00005	SM 23 2320 B m
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	4	N/A	2019/08/14	AB SOP-00005	SM 23 2320 B m
Chloride/Sulphate by Auto Colourimetry	15	N/A	2019/08/14	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
Chloride/Sulphate by Auto Colourimetry	4	N/A	2019/08/16	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
Hardness Total (calculated as CaCO ₃) (1)	19	N/A	2019/08/16	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	19	N/A	2019/08/16	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	19	N/A	2019/08/16	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	15	N/A	2019/08/14	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (dissolved)	4	N/A	2019/08/19	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	19	N/A	2019/08/16	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	1	N/A	2019/08/14	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	14	N/A	2019/08/15	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	4	N/A	2019/08/19	CAL SOP-00265	EPA 6020 m
Nitrate and Nitrite	15	N/A	2019/08/15		Auto Calc
Nitrate and Nitrite	4	N/A	2019/08/16		Auto Calc
Nitrate + Nitrite-N (calculated)	15	N/A	2019/08/15		Auto Calc
Nitrate + Nitrite-N (calculated)	4	N/A	2019/08/16		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	19	N/A	2019/08/12	AB SOP-00023	SM 23 4110 B m
pH @25°C (2)	15	N/A	2019/08/13	AB SOP-00005	SM 23 4500-H+B m
pH @25°C (2)	4	N/A	2019/08/14	AB SOP-00005	SM 23 4500-H+B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 2, 2 of 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/08/21
Report #: R2770373
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B965831

Received: 2019/08/09, 13:30

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(2) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WG6263	WG6264	WG6265	WG6266	WG6267		WG6268		
Sampling Date		2019/08/09 10:00	2019/08/09 09:00	2019/08/09 08:30	2019/08/09 08:00	2019/08/09 09:05		2019/08/09 08:35		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	1B	1C	2A	QC Batch	2B	RDL	QC Batch
Calculated Parameters										
Dissolved Nitrate (NO3)	mg/L	1.7	1.2	0.18	<0.044	0.36	9542813	<0.044	0.044	9542813
Nitrate plus Nitrite (N)	mg/L	0.40	0.28	0.041	<0.014	0.082	9542829	<0.014	0.014	9542829
Dissolved Nitrite (NO2)	mg/L	0.055	<0.033	<0.033	<0.033	<0.033	9542813	<0.033	0.033	9542813
Misc. Inorganics										
pH	pH	7.11	7.08	7.30	7.43	7.02	9544269	7.06	N/A	9546658
Anions										
Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	9544265	<1.0	1.0	9546656
Alkalinity (Total as CaCO3)	mg/L	60	68	71	91	65	9544265	76	1.0	9546656
Bicarbonate (HCO3)	mg/L	73	83	87	110	79	9544265	93	1.0	9546656
Carbonate (CO3)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	9544265	<1.0	1.0	9546656
Hydroxide (OH)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	9544265	<1.0	1.0	9546656
Dissolved Chloride (Cl)	mg/L	58	61	63	66	61	9548465	61	1.0	9551382
Dissolved Sulphate (SO4)	mg/L	250 (1)	250 (1)	250 (1)	270 (1)	240 (1)	9548465	250 (1)	2.0	9551382
Nutrients										
Dissolved Nitrite (N)	mg/L	0.017	<0.010	<0.010	<0.010	<0.010	9544227	<0.010	0.010	9544279
Dissolved Nitrate (N)	mg/L	0.38	0.28	0.041	<0.010	0.082	9544227	<0.010	0.010	9544279
RDL = Reportable Detection Limit										
N/A = Not Applicable										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WG6269		WG6270	WG6271	WG6272		WG6274		
Sampling Date		2019/08/09 08:05		2019/08/09 09:10	2019/08/09 08:40	2019/08/09 08:10		2019/08/09 09:15		
COC Number		1 of 2		1 of 2	1 of 2	1 of 2		2 of 2		
	UNITS	2C	QC Batch	3A	3B	3C	QC Batch	4A	RDL	QC Batch

Calculated Parameters

Dissolved Nitrate (NO3)	mg/L	0.16	9542813	<0.044	<0.044	0.058	9542813	<0.044	0.044	9542813
Nitrate plus Nitrite (N)	mg/L	0.037	9542829	<0.014	<0.014	<0.014	9542829	<0.014	0.014	9542829
Dissolved Nitrite (NO2)	mg/L	<0.033	9542813	<0.033	<0.033	<0.033	9542813	<0.033	0.033	9542813

Misc. Inorganics

pH	pH	7.16	9544269	7.05	7.31	7.43	9544269	6.94	N/A	9546658
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Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	9544265	<1.0	<1.0	<1.0	9544265	<1.0	1.0	9546656
Alkalinity (Total as CaCO3)	mg/L	86	9544265	110	76	96	9544265	78	1.0	9546656
Bicarbonate (HCO3)	mg/L	110	9544265	140	92	120	9544265	95	1.0	9546656
Carbonate (CO3)	mg/L	<1.0	9544265	<1.0	<1.0	<1.0	9544265	<1.0	1.0	9546656
Hydroxide (OH)	mg/L	<1.0	9544265	<1.0	<1.0	<1.0	9544265	<1.0	1.0	9546656
Dissolved Chloride (Cl)	mg/L	65	9548215	61	63	67	9548465	66	1.0	9551382
Dissolved Sulphate (SO4)	mg/L	260 (1)	9548215	250 (1)	250 (1)	260 (1)	9548465	280 (1)	2.0	9551382

Nutrients

Dissolved Nitrite (N)	mg/L	<0.010	9544227	<0.010	<0.010	<0.010	9544227	<0.010	0.010	9544279
Dissolved Nitrate (N)	mg/L	0.037	9544227	<0.010	<0.010	0.013	9544227	<0.010	0.010	9544279

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
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BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WG6275		WG6276	WG6277		WG6278		WG6279		
Sampling Date		2019/08/09 08:45		2019/08/09 08:15	2019/08/09 09:20		2019/08/09 08:50		2019/08/09 08:20		
COC Number		2 of 2		2 of 2	2 of 2		2 of 2		2 of 2		
	UNITS	4B	QC Batch	4C	5A	QC Batch	5B	QC Batch	5C	RDL	QC Batch
Calculated Parameters											
Dissolved Nitrate (NO3)	mg/L	<0.044	9542813	<0.044	0.083	9542813	<0.044	9542813	<0.044	0.044	9542813
Nitrate plus Nitrite (N)	mg/L	<0.014	9542829	<0.014	0.019	9542829	<0.014	9542829	<0.014	0.014	9542829
Dissolved Nitrite (NO2)	mg/L	<0.033	9542813	<0.033	<0.033	9542813	<0.033	9542813	<0.033	0.033	9542813
Misc. Inorganics											
pH	pH	7.16	9546658	7.05	7.05	9544269	7.35	9546658	7.45	N/A	9544269
Anions											
Alkalinity (PP as CaCO3)	mg/L	<1.0	9546656	<1.0	<1.0	9544265	<1.0	9546656	<1.0	1.0	9544265
Alkalinity (Total as CaCO3)	mg/L	80	9546656	110	79	9544265	110	9546656	150	1.0	9544265
Bicarbonate (HCO3)	mg/L	98	9546656	140	96	9544265	130	9546656	180	1.0	9544265
Carbonate (CO3)	mg/L	<1.0	9546656	<1.0	<1.0	9544265	<1.0	9546656	<1.0	1.0	9544265
Hydroxide (OH)	mg/L	<1.0	9546656	<1.0	<1.0	9544265	<1.0	9546656	<1.0	1.0	9544265
Dissolved Chloride (Cl)	mg/L	68	9551382	74	66	9548215	76	9551382	78	1.0	9548465
Dissolved Sulphate (SO4)	mg/L	270 (1)	9551382	290 (1)	250 (1)	9548215	280 (1)	9551382	310 (1)	2.0	9548465
Nutrients											
Dissolved Nitrite (N)	mg/L	<0.010	9544279	<0.010	<0.010	9544227	<0.010	9544279	<0.010	0.010	9544227
Dissolved Nitrate (N)	mg/L	<0.010	9544279	<0.010	0.019	9544227	<0.010	9544279	<0.010	0.010	9544227
RDL = Reportable Detection Limit											
N/A = Not Applicable											
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.											



BUREAU
VERITAS

BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WG6280		WG6281	WG6282		
Sampling Date		2019/08/09 09:25		2019/08/09 08:55	2019/08/09 08:25		
COC Number		2 of 2		2 of 2	2 of 2		
	UNITS	6A	QC Batch	6B	6C	RDL	QC Batch
Calculated Parameters							
Dissolved Nitrate (NO3)	mg/L	<0.044	9542813	<0.044	<0.044	0.044	9542813
Nitrate plus Nitrite (N)	mg/L	<0.014	9542829	<0.014	<0.014	0.014	9542829
Dissolved Nitrite (NO2)	mg/L	<0.033	9542813	<0.033	<0.033	0.033	9542813
Misc. Inorganics							
pH	pH	7.08	9544269	7.17	7.19	N/A	9544269
Anions							
Alkalinity (PP as CaCO3)	mg/L	<1.0	9544265	<1.0	<1.0	1.0	9544265
Alkalinity (Total as CaCO3)	mg/L	73	9544265	94	110	1.0	9544265
Bicarbonate (HCO3)	mg/L	88	9544265	120	140	1.0	9544265
Carbonate (CO3)	mg/L	<1.0	9544265	<1.0	<1.0	1.0	9544265
Hydroxide (OH)	mg/L	<1.0	9544265	<1.0	<1.0	1.0	9544265
Dissolved Chloride (Cl)	mg/L	62	9548215	68	71	1.0	9548465
Dissolved Sulphate (SO4)	mg/L	240 (1)	9548215	260 (1)	270 (1)	2.0	9548465
Nutrients							
Dissolved Nitrite (N)	mg/L	<0.010	9544227	<0.010	<0.010	0.010	9544227
Dissolved Nitrate (N)	mg/L	<0.010	9544227	<0.010	<0.010	0.010	9544227
RDL = Reportable Detection Limit							
N/A = Not Applicable							
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.							



BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6263	WG6264	WG6265		WG6266		
Sampling Date		2019/08/09 10:00	2019/08/09 09:00	2019/08/09 08:30		2019/08/09 08:00		
COC Number		1 of 2	1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	1B	QC Batch	1C	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	323	336	351	9543985	374	0.50	9543985
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0165	0.00288	0.00231	9544218	<0.00050	0.00050	9553293
Dissolved Antimony (Sb)	mg/L	0.0210	0.0121	0.0154	9544218	0.0117	0.000020	9553293
Dissolved Arsenic (As)	mg/L	0.0601	0.0490	0.0272	9544218	0.0156	0.000020	9553293
Dissolved Barium (Ba)	mg/L	0.0601	0.0601	0.0573	9544218	0.0581	0.000020	9553293
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9544218	<0.000010	0.000010	9553293
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9544218	<0.0000050	0.0000050	9553293
Dissolved Boron (B)	mg/L	0.059	0.032	0.025	9544218	0.027	0.010	9553293
Dissolved Cadmium (Cd)	mg/L	0.00194	0.000572	0.000216	9544218	0.0000151	0.0000050	9553293
Dissolved Chromium (Cr)	mg/L	0.00012	<0.00010	<0.00010	9544218	<0.00010	0.00010	9553293
Dissolved Cobalt (Co)	mg/L	0.00247	0.000471	0.0000388	9544218	0.0000176	0.0000050	9553293
Dissolved Copper (Cu)	mg/L	0.0137	0.00499	0.00189	9544218	0.000894	0.000050	9553293
Dissolved Iron (Fe)	mg/L	<0.0010	0.0019	0.0056	9544218	0.0108	0.0010	9553293
Dissolved Lead (Pb)	mg/L	0.0135	0.00145	0.0000979	9544218	<0.0000050	0.0000050	9553293
Dissolved Lithium (Li)	mg/L	0.00242	0.00944	0.0175	9544218	0.0123	0.00050	9553293
Dissolved Manganese (Mn)	mg/L	0.0482	0.00985	0.00254	9544218	0.00127	0.000050	9553293
Dissolved Molybdenum (Mo)	mg/L	0.00165	0.00153	0.00129	9544218	0.00118	0.000050	9553293
Dissolved Nickel (Ni)	mg/L	0.00724	0.00506	0.00304	9544218	0.00192	0.000020	9553293
Dissolved Selenium (Se)	mg/L	0.00786	0.00724	0.00513	9544218	0.00312	0.000040	9553293
Dissolved Silicon (Si)	mg/L	0.705	0.236	0.127	9544218	0.534	0.050	9553293
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	9544218	<0.0000050	0.0000050	9553293
Dissolved Strontium (Sr)	mg/L	0.640	0.621	0.648	9544218	0.649	0.000050	9553293
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	9544218	<0.0000020	0.0000020	9553293
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9544218	<0.00020	0.00020	9553293
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9544218	<0.00050	0.00050	9553293
Dissolved Uranium (U)	mg/L	0.0271	0.0174	0.0236	9544218	0.0139	0.0000020	9553293
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	9544218	<0.00020	0.00020	9553293
Dissolved Zinc (Zn)	mg/L	0.158	0.103	0.0439	9544218	0.0154	0.00010	9553293
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	9544218	<0.00010	0.00010	9553293
Dissolved Calcium (Ca)	mg/L	102	106	111	9543986	119	0.050	9543986
Dissolved Magnesium (Mg)	mg/L	16.4	17.3	17.7	9543986	18.5	0.050	9543986

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6263	WG6264	WG6265		WG6266		
Sampling Date		2019/08/09 10:00	2019/08/09 09:00	2019/08/09 08:30		2019/08/09 08:00		
COC Number		1 of 2	1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	1B	QC Batch	1C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.75	3.96	3.98	9543986	3.78	0.050	9543986
Dissolved Sodium (Na)	mg/L	26.0	27.8	28.7	9543986	29.6	0.050	9543986
Dissolved Sulphur (S)	mg/L	89.5	92.6	94.9	9543986	98.6	3.0	9543986
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B965831
Report Date: 2019/08/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WG6267		WG6268		WG6269		
Sampling Date		2019/08/09 09:05		2019/08/09 08:35		2019/08/09 08:05		
COC Number		1 of 2		1 of 2		1 of 2		
	UNITS	2A	QC Batch	2B	QC Batch	2C	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	332	9543985	344	9543985	357	0.50	9543985
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00862	9544218	0.00082	9553293	0.00215	0.00050	9544218
Dissolved Antimony (Sb)	mg/L	0.0175	9544218	0.0134	9544218	0.0112	0.000020	9544218
Dissolved Arsenic (As)	mg/L	0.0446	9544218	0.0292	9544218	0.0196	0.000020	9544218
Dissolved Barium (Ba)	mg/L	0.0545	9544218	0.0544	9544218	0.0563	0.000020	9544218
Dissolved Beryllium (Be)	mg/L	<0.000010	9544218	<0.000010	9544218	<0.000010	0.000010	9544218
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9544218	<0.0000050	9544218	<0.0000050	0.0000050	9544218
Dissolved Boron (B)	mg/L	0.042	9544218	0.031	9544218	0.026	0.010	9544218
Dissolved Cadmium (Cd)	mg/L	0.000374	9544218	0.0000966	9544218	0.0000369	0.0000050	9544218
Dissolved Chromium (Cr)	mg/L	<0.00010	9544218	<0.00010	9544218	<0.00010	0.00010	9544218
Dissolved Cobalt (Co)	mg/L	0.0000922	9544218	0.0000324	9544218	0.0000220	0.0000050	9544218
Dissolved Copper (Cu)	mg/L	0.00294	9544218	0.00159	9544218	0.00102	0.000050	9544218
Dissolved Iron (Fe)	mg/L	0.0068	9544218	0.0116	9544218	0.0104	0.0010	9544218
Dissolved Lead (Pb)	mg/L	0.000211	9544218	0.0000151	9544218	0.0000086	0.0000050	9544218
Dissolved Lithium (Li)	mg/L	0.0150	9544218	0.0128	9544218	0.00904	0.00050	9544218
Dissolved Manganese (Mn)	mg/L	0.00601	9544218	0.00610	9544218	0.00157	0.000050	9544218
Dissolved Molybdenum (Mo)	mg/L	0.00120	9544218	0.000912	9544218	0.000748	0.000050	9544218
Dissolved Nickel (Ni)	mg/L	0.00453	9544218	0.00331	9544218	0.00222	0.000020	9544218
Dissolved Selenium (Se)	mg/L	0.00616	9544218	0.00402	9544218	0.00284	0.000040	9544218
Dissolved Silicon (Si)	mg/L	0.249	9544218	0.394	9544218	0.488	0.050	9544218
Dissolved Silver (Ag)	mg/L	<0.0000050	9544218	<0.0000050	9544218	<0.0000050	0.0000050	9544218
Dissolved Strontium (Sr)	mg/L	0.609	9544218	0.632	9544218	0.659	0.000050	9544218
Dissolved Thallium (Tl)	mg/L	<0.0000020	9544218	<0.0000020	9544218	<0.0000020	0.0000020	9544218
Dissolved Tin (Sn)	mg/L	<0.00020	9544218	<0.00020	9544218	<0.00020	0.00020	9544218
Dissolved Titanium (Ti)	mg/L	<0.00050	9544218	<0.00050	9544218	<0.00050	0.00050	9544218
Dissolved Uranium (U)	mg/L	0.0260	9544218	0.0100	9544218	0.00685	0.0000020	9544218
Dissolved Vanadium (V)	mg/L	<0.00020	9544218	<0.00020	9544218	<0.00020	0.00020	9544218
Dissolved Zinc (Zn)	mg/L	0.0646	9544218	0.0377	9544218	0.0220	0.00010	9544218
Dissolved Zirconium (Zr)	mg/L	<0.00010	9544218	<0.00010	9544218	<0.00010	0.00010	9544218
Dissolved Calcium (Ca)	mg/L	105	9543986	109	9543986	114	0.050	9543986
Dissolved Magnesium (Mg)	mg/L	16.9	9543986	17.4	9543986	17.9	0.050	9543986
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6267		WG6268		WG6269		
Sampling Date		2019/08/09 09:05		2019/08/09 08:35		2019/08/09 08:05		
COC Number		1 of 2		1 of 2		1 of 2		
	UNITS	2A	QC Batch	2B	QC Batch	2C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.80	9543986	3.61	9543986	3.47	0.050	9543986
Dissolved Sodium (Na)	mg/L	27.7	9543986	28.4	9543986	29.4	0.050	9543986
Dissolved Sulphur (S)	mg/L	91.2	9543986	92.9	9543986	95.7	3.0	9543986
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6270		WG6271		WG6272		
Sampling Date		2019/08/09 09:10		2019/08/09 08:40		2019/08/09 08:10		
COC Number		1 of 2		1 of 2		1 of 2		
	UNITS	3A	QC Batch	3B	QC Batch	3C	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	334	9543985	357	9543985	374	0.50	9543985
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	<0.00050	9544218	<0.00050	9553293	0.00071	0.00050	9553293
Dissolved Antimony (Sb)	mg/L	0.00302	9544218	0.0110	9553293	0.00932	0.000020	9544218
Dissolved Arsenic (As)	mg/L	0.0382	9544218	0.0242	9553293	0.0162	0.000020	9544218
Dissolved Barium (Ba)	mg/L	0.0593	9544218	0.0574	9553293	0.0582	0.000020	9544218
Dissolved Beryllium (Be)	mg/L	<0.000010	9544218	<0.000010	9553293	<0.000010	0.000010	9544218
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9544218	<0.0000050	9553293	<0.0000050	0.0000050	9544218
Dissolved Boron (B)	mg/L	<0.010	9544218	0.021	9553293	<0.010	0.010	9544218
Dissolved Cadmium (Cd)	mg/L	0.0000450	9544218	0.0000932	9553293	0.0000276	0.0000050	9544218
Dissolved Chromium (Cr)	mg/L	<0.00010	9544218	<0.00010	9553293	<0.00010	0.00010	9544218
Dissolved Cobalt (Co)	mg/L	0.000107	9544218	0.0000158	9553293	0.0000139	0.0000050	9544218
Dissolved Copper (Cu)	mg/L	0.00234	9544218	0.00166	9553293	0.00113	0.000050	9544218
Dissolved Iron (Fe)	mg/L	0.0011	9544218	0.0034	9553293	0.0044	0.0010	9544218
Dissolved Lead (Pb)	mg/L	0.0000231	9544218	0.0000059	9553293	<0.0000050	0.0000050	9544218
Dissolved Lithium (Li)	mg/L	0.00766	9544218	0.0106	9553293	0.0107	0.00050	9544218
Dissolved Manganese (Mn)	mg/L	0.00883	9544218	0.00248	9553293	0.00103	0.000050	9544218
Dissolved Molybdenum (Mo)	mg/L	0.000962	9544218	0.000728	9553293	0.000560	0.000050	9544218
Dissolved Nickel (Ni)	mg/L	0.00507	9544218	0.00328	9553293	0.00203	0.000020	9544218
Dissolved Selenium (Se)	mg/L	0.00377	9544218	0.00250	9553293	0.00194	0.000040	9544218
Dissolved Silicon (Si)	mg/L	0.163	9544218	0.608	9553293	0.445	0.050	9544218
Dissolved Silver (Ag)	mg/L	<0.0000050	9544218	<0.0000050	9553293	<0.0000050	0.0000050	9544218
Dissolved Strontium (Sr)	mg/L	0.616	9544218	0.626	9553293	0.663	0.000050	9544218
Dissolved Thallium (Tl)	mg/L	<0.0000020	9544218	<0.0000020	9553293	<0.0000020	0.0000020	9544218
Dissolved Tin (Sn)	mg/L	<0.00020	9544218	<0.00020	9553293	<0.00020	0.00020	9544218
Dissolved Titanium (Ti)	mg/L	<0.00050	9544218	<0.00050	9553293	<0.00050	0.00050	9544218
Dissolved Uranium (U)	mg/L	0.00402	9544218	0.00932	9553293	0.00587	0.0000020	9544218
Dissolved Vanadium (V)	mg/L	<0.00020	9544218	<0.00020	9553293	<0.00020	0.00020	9544218
Dissolved Zinc (Zn)	mg/L	0.0473	9544218	0.0333	9553293	0.0185	0.00010	9544218
Dissolved Zirconium (Zr)	mg/L	<0.00010	9544218	<0.00010	9553293	<0.00010	0.00010	9544218
Dissolved Calcium (Ca)	mg/L	106	9543986	114	9543986	119	0.050	9543986
Dissolved Magnesium (Mg)	mg/L	16.9	9543986	17.7	9543986	18.6	0.050	9543986
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6270		WG6271		WG6272		
Sampling Date		2019/08/09 09:10		2019/08/09 08:40		2019/08/09 08:10		
COC Number		1 of 2		1 of 2		1 of 2		
	UNITS	3A	QC Batch	3B	QC Batch	3C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.46	9543986	3.61	9543986	3.78	0.050	9543986
Dissolved Sodium (Na)	mg/L	27.8	9543986	28.5	9543986	30.5	0.050	9543986
Dissolved Sulphur (S)	mg/L	89.7	9543986	94.3	9543986	96.3	3.0	9543986
RDL = Reportable Detection Limit								



BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6274		WG6275	WG6276		
Sampling Date		2019/08/09 09:15		2019/08/09 08:45	2019/08/09 08:15		
COC Number		2 of 2		2 of 2	2 of 2		
	UNITS	4A	QC Batch	4B	4C	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	370	9543985	380	320	0.50	9543985
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	<0.00050	9553293	0.00086	<0.00050	0.00050	9544218
Dissolved Antimony (Sb)	mg/L	0.00722	9553293	0.000816	0.000302	0.000020	9544218
Dissolved Arsenic (As)	mg/L	0.0248	9553293	0.00153	0.00184	0.000020	9544218
Dissolved Barium (Ba)	mg/L	0.0585	9553293	0.0625	0.0585	0.000020	9544218
Dissolved Beryllium (Be)	mg/L	<0.000010	9553293	<0.000010	<0.000010	0.000010	9544218
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9553293	<0.0000050	<0.0000050	0.0000050	9544218
Dissolved Boron (B)	mg/L	0.012	9544218	<0.010	<0.010	0.010	9544218
Dissolved Cadmium (Cd)	mg/L	0.0000827	9553293	<0.0000050	<0.0000050	0.0000050	9544218
Dissolved Chromium (Cr)	mg/L	<0.00010	9553293	<0.00010	<0.00010	0.00010	9544218
Dissolved Cobalt (Co)	mg/L	0.0000732	9553293	<0.0000050	0.0000183	0.0000050	9544218
Dissolved Copper (Cu)	mg/L	0.00109	9553293	0.000098	0.000117	0.000050	9544218
Dissolved Iron (Fe)	mg/L	0.0043	9553293	0.0010	0.0019	0.0010	9544218
Dissolved Lead (Pb)	mg/L	0.0000762	9553293	<0.0000050	<0.0000050	0.0000050	9544218
Dissolved Lithium (Li)	mg/L	0.0102	9553293	0.0113	0.00329	0.00050	9544218
Dissolved Manganese (Mn)	mg/L	0.00982	9553293	0.000878	0.00685	0.000050	9544218
Dissolved Molybdenum (Mo)	mg/L	0.000568	9553293	<0.000050	<0.000050	0.000050	9544218
Dissolved Nickel (Ni)	mg/L	0.00501	9553293	0.000544	0.000895	0.000020	9544218
Dissolved Selenium (Se)	mg/L	0.00152	9553293	0.000097	0.000048	0.000040	9544218
Dissolved Silicon (Si)	mg/L	0.909	9553293	0.158	0.164	0.050	9544218
Dissolved Silver (Ag)	mg/L	<0.0000050	9553293	<0.0000050	<0.0000050	0.0000050	9544218
Dissolved Strontium (Sr)	mg/L	0.742	9553293	0.742	0.660	0.000050	9544218
Dissolved Thallium (Tl)	mg/L	<0.0000020	9553293	<0.0000020	<0.0000020	0.0000020	9544218
Dissolved Tin (Sn)	mg/L	<0.00020	9553293	<0.00020	<0.00020	0.00020	9544218
Dissolved Titanium (Ti)	mg/L	<0.00050	9553293	<0.00050	<0.00050	0.00050	9544218
Dissolved Uranium (U)	mg/L	0.00652	9553293	0.000396	0.000114	0.0000020	9544218
Dissolved Vanadium (V)	mg/L	<0.00020	9553293	<0.00020	<0.00020	0.00020	9544218
Dissolved Zinc (Zn)	mg/L	0.0256	9553293	0.00036	0.00036	0.00010	9544218
Dissolved Zirconium (Zr)	mg/L	<0.00010	9553293	<0.00010	<0.00010	0.00010	9544218
Dissolved Calcium (Ca)	mg/L	113	9543986	120	101	0.050	9543986
Dissolved Magnesium (Mg)	mg/L	21.2	9543986	19.5	16.4	0.050	9543986
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6274		WG6275	WG6276		
Sampling Date		2019/08/09 09:15		2019/08/09 08:45	2019/08/09 08:15		
COC Number		2 of 2		2 of 2	2 of 2		
	UNITS	4A	QC Batch	4B	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	2.72	9543986	1.58	0.575	0.050	9543986
Dissolved Sodium (Na)	mg/L	33.6	9543986	30.0	24.8	0.050	9543986
Dissolved Sulphur (S)	mg/L	113	9543986	104	79.3	3.0	9543986
RDL = Reportable Detection Limit							



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VERITAS

BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6277		WG6278	WG6279		
Sampling Date		2019/08/09 09:20		2019/08/09 08:50	2019/08/09 08:20		
COC Number		2 of 2		2 of 2	2 of 2		
	UNITS	5A	QC Batch	5B	5C	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	362	9543985	417	474	0.50	9543985
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	<0.00050	9553293	<0.00050	<0.00050	0.00050	9553293
Dissolved Antimony (Sb)	mg/L	0.00583	9544218	0.00235	0.000748	0.000020	9553293
Dissolved Arsenic (As)	mg/L	0.0212	9544218	0.00560	0.00231	0.000020	9553293
Dissolved Barium (Ba)	mg/L	0.0474	9544218	0.0614	0.0712	0.000020	9553293
Dissolved Beryllium (Be)	mg/L	<0.000010	9544218	<0.000010	<0.000010	0.000010	9553293
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9544218	<0.0000050	<0.0000050	0.0000050	9553293
Dissolved Boron (B)	mg/L	0.016	9544218	<0.010	<0.010	0.010	9553293
Dissolved Cadmium (Cd)	mg/L	0.0000382	9544218	<0.0000050	<0.0000050	0.0000050	9553293
Dissolved Chromium (Cr)	mg/L	<0.00010	9544218	<0.00010	<0.00010	0.00010	9553293
Dissolved Cobalt (Co)	mg/L	0.000237	9544218	0.000106	0.000108	0.0000050	9553293
Dissolved Copper (Cu)	mg/L	0.000905	9544218	0.000352	0.000090	0.000050	9553293
Dissolved Iron (Fe)	mg/L	0.0094	9544218	0.0117	0.0190	0.0010	9553293
Dissolved Lead (Pb)	mg/L	0.000101	9544218	0.0000372	0.0000083	0.0000050	9553293
Dissolved Lithium (Li)	mg/L	0.0121	9544218	0.0130	0.0202	0.00050	9553293
Dissolved Manganese (Mn)	mg/L	0.0313	9544218	0.0187	0.0253	0.000050	9553293
Dissolved Molybdenum (Mo)	mg/L	0.000566	9544218	0.000260	0.000106	0.000050	9553293
Dissolved Nickel (Ni)	mg/L	0.00431	9544218	0.00200	0.000998	0.000020	9553293
Dissolved Selenium (Se)	mg/L	0.00119	9544218	0.000357	0.000240	0.000040	9553293
Dissolved Silicon (Si)	mg/L	1.01	9544218	1.43	1.95	0.050	9553293
Dissolved Silver (Ag)	mg/L	<0.0000050	9544218	<0.0000050	<0.0000050	0.0000050	9553293
Dissolved Strontium (Sr)	mg/L	0.652	9544218	0.687	0.766	0.000050	9553293
Dissolved Thallium (Tl)	mg/L	<0.0000020	9544218	<0.0000020	<0.0000020	0.0000020	9553293
Dissolved Tin (Sn)	mg/L	<0.00020	9544218	<0.00020	<0.00020	0.00020	9553293
Dissolved Titanium (Ti)	mg/L	<0.00050	9544218	<0.00050	<0.00050	0.00050	9553293
Dissolved Uranium (U)	mg/L	0.00483	9544218	0.00147	0.000348	0.0000020	9553293
Dissolved Vanadium (V)	mg/L	<0.00020	9544218	<0.00020	<0.00020	0.00020	9553293
Dissolved Zinc (Zn)	mg/L	0.0137	9544218	0.00312	0.00056	0.00010	9553293
Dissolved Zirconium (Zr)	mg/L	<0.00010	9544218	<0.00010	<0.00010	0.00010	9553293
Dissolved Calcium (Ca)	mg/L	114	9543986	131	149	0.050	9543986
Dissolved Magnesium (Mg)	mg/L	18.9	9543986	21.9	25.0	0.050	9543986
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6277		WG6278	WG6279		
Sampling Date		2019/08/09 09:20		2019/08/09 08:50	2019/08/09 08:20		
COC Number		2 of 2		2 of 2	2 of 2		
	UNITS	5A	QC Batch	5B	5C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	2.45	9543986	1.50	0.671	0.050	9543986
Dissolved Sodium (Na)	mg/L	29.3	9543986	33.2	37.1	0.050	9543986
Dissolved Sulphur (S)	mg/L	95.4	9543986	107	115	3.0	9543986
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B965831
Report Date: 2019/08/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WG6280		WG6281		WG6282		
Sampling Date		2019/08/09 09:25		2019/08/09 08:55		2019/08/09 08:25		
COC Number		2 of 2		2 of 2		2 of 2		
	UNITS	6A	QC Batch	6B	QC Batch	6C	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	344	9543985	373	9543985	393	0.50	9543985
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00151	9544218	<0.00050	9553293	0.00094	0.00050	9544218
Dissolved Antimony (Sb)	mg/L	0.00113	9544218	0.00476	9544218	0.00275	0.000020	9544218
Dissolved Arsenic (As)	mg/L	0.00426	9544218	0.00981	9544218	0.00599	0.000020	9544218
Dissolved Barium (Ba)	mg/L	0.0633	9544218	0.0626	9544218	0.0654	0.000020	9544218
Dissolved Beryllium (Be)	mg/L	<0.000010	9544218	<0.000010	9544218	<0.000010	0.000010	9544218
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9544218	<0.0000050	9544218	<0.0000050	0.0000050	9544218
Dissolved Boron (B)	mg/L	<0.010	9544218	<0.010	9544218	<0.010	0.010	9544218
Dissolved Cadmium (Cd)	mg/L	0.0000155	9544218	0.0000222	9544218	<0.0000050	0.0000050	9544218
Dissolved Chromium (Cr)	mg/L	<0.00010	9544218	<0.00010	9544218	<0.00010	0.00010	9544218
Dissolved Cobalt (Co)	mg/L	0.0000545	9544218	0.0000451	9544218	0.0000291	0.0000050	9544218
Dissolved Copper (Cu)	mg/L	0.000313	9544218	0.000551	9544218	0.000193	0.000050	9544218
Dissolved Iron (Fe)	mg/L	0.0032	9544218	0.0085	9544218	0.0145	0.0010	9544218
Dissolved Lead (Pb)	mg/L	0.000138	9544218	0.0000201	9544218	0.0000056	0.0000050	9544218
Dissolved Lithium (Li)	mg/L	0.00144	9544218	0.0165	9544218	0.0138	0.00050	9544218
Dissolved Manganese (Mn)	mg/L	0.00575	9544218	0.00883	9544218	0.0110	0.000050	9544218
Dissolved Molybdenum (Mo)	mg/L	0.000105	9544218	0.000261	9544218	0.000083	0.000050	9544218
Dissolved Nickel (Ni)	mg/L	0.00427	9553293	0.00237	9544218	0.00128	0.000020	9544218
Dissolved Selenium (Se)	mg/L	0.000319	9544218	0.000616	9544218	0.000310	0.000040	9544218
Dissolved Silicon (Si)	mg/L	0.194	9544218	1.11	9544218	1.01	0.050	9544218
Dissolved Silver (Ag)	mg/L	<0.0000050	9544218	<0.0000050	9544218	<0.0000050	0.0000050	9544218
Dissolved Strontium (Sr)	mg/L	0.134	9544218	0.667	9544218	0.705	0.000050	9544218
Dissolved Thallium (Tl)	mg/L	<0.0000020	9544218	<0.0000020	9544218	<0.0000020	0.0000020	9544218
Dissolved Tin (Sn)	mg/L	<0.00020	9544218	<0.00020	9544218	<0.00020	0.00020	9544218
Dissolved Titanium (Ti)	mg/L	<0.00050	9544218	<0.00050	9544218	<0.00050	0.00050	9544218
Dissolved Uranium (U)	mg/L	0.00157	9544218	0.00254	9544218	0.00141	0.0000020	9544218
Dissolved Vanadium (V)	mg/L	<0.00020	9544218	<0.00020	9544218	<0.00020	0.00020	9544218
Dissolved Zinc (Zn)	mg/L	0.00425	9544218	0.00575	9544218	0.00089	0.00010	9544218
Dissolved Zirconium (Zr)	mg/L	<0.00010	9544218	<0.00010	9544218	<0.00010	0.00010	9544218
Dissolved Calcium (Ca)	mg/L	109	9543986	118	9543986	124	0.050	9543986
Dissolved Magnesium (Mg)	mg/L	17.3	9543986	19.0	9543986	20.3	0.050	9543986
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WG6280		WG6281		WG6282		
Sampling Date		2019/08/09 09:25		2019/08/09 08:55		2019/08/09 08:25		
COC Number		2 of 2		2 of 2		2 of 2		
	UNITS	6A	QC Batch	6B	QC Batch	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	2.55	9543986	2.07	9543986	1.14	0.050	9543986
Dissolved Sodium (Na)	mg/L	26.6	9543986	30.2	9543986	31.9	0.050	9543986
Dissolved Sulphur (S)	mg/L	93.0	9543986	98.2	9543986	100	3.0	9543986
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6263	WG6264	WG6265		WG6266		
Sampling Date		2019/08/09 10:00	2019/08/09 09:00	2019/08/09 08:30		2019/08/09 08:00		
COC Number		1 of 2	1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	1B	QC Batch	1C	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	320	333	350	9542392	375	0.50	9543984
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0347	0.00905	0.00279	9544228	<0.00050	0.00050	9553295
Total Antimony (Sb)	mg/L	0.0219	0.0193	0.0156	9544228	0.0117	0.000020	9553295
Total Arsenic (As)	mg/L	0.0614	0.0465	0.0271	9544228	0.0157	0.000020	9553295
Total Barium (Ba)	mg/L	0.0580	0.0586	0.0617	9544228	0.0585	0.000020	9553295
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9544228	<0.000010	0.000010	9553295
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9544228	<0.0000050	0.0000050	9553295
Total Boron (B)	mg/L	0.048	0.023	0.021	9544228	0.039	0.010	9553295
Total Cadmium (Cd)	mg/L	0.00206	0.000882	0.000248	9544228	0.0000338	0.0000050	9553295
Total Chromium (Cr)	mg/L	0.00018	<0.00010	<0.00010	9544228	<0.00010	0.00010	9553295
Total Cobalt (Co)	mg/L	0.00281	0.000456	0.0000540	9544228	0.0000166	0.0000050	9553295
Total Copper (Cu)	mg/L	0.0179	0.00529	0.00199	9544228	0.000949	0.000050	9553295
Total Iron (Fe)	mg/L	0.0186	0.0055	0.0110	9544228	0.0167	0.0010	9553295
Total Lead (Pb)	mg/L	0.0253	0.00290	0.000239	9544228	<0.0000050	0.0000050	9553295
Total Lithium (Li)	mg/L	0.0133	0.00740	0.0121	9544228	0.0114	0.00050	9553295
Total Manganese (Mn)	mg/L	0.0581	0.0104	0.00389	9544228	0.00147	0.000050	9553295
Total Molybdenum (Mo)	mg/L	0.00171	0.00158	0.00139	9544228	0.00118	0.000050	9553295
Total Nickel (Ni)	mg/L	0.00770	0.00513	0.00302	9544228	0.00203	0.000020	9553295
Total Selenium (Se)	mg/L	0.00767	0.00654	0.00512	9544228	0.00316	0.000040	9553295
Total Silicon (Si)	mg/L	0.703	0.242	0.134	9544228	0.533	0.050	9553295
Total Silver (Ag)	mg/L	0.0000052	<0.0000050	<0.0000050	9544228	<0.0000050	0.0000050	9553295
Total Strontium (Sr)	mg/L	0.611	0.633	0.655	9544228	0.649	0.000050	9553295
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	9544228	<0.0000020	0.0000020	9553295
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9544228	<0.00020	0.00020	9553295
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9544228	<0.00050	0.00050	9553295
Total Uranium (U)	mg/L	0.0288	0.0265	0.0236	9544228	0.0140	0.0000020	9553295
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	9544228	<0.00020	0.00020	9553295
Total Zinc (Zn)	mg/L	0.178	0.106	0.0447	9544228	0.0152	0.00010	9553295
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	9544228	<0.00010	0.00010	9553295
Total Calcium (Ca)	mg/L	101	105	111	9543991	119	0.050	9543991
Total Magnesium (Mg)	mg/L	16.4	16.9	17.7	9543991	18.8	0.050	9543991

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6263	WG6264	WG6265		WG6266		
Sampling Date		2019/08/09 10:00	2019/08/09 09:00	2019/08/09 08:30		2019/08/09 08:00		
COC Number		1 of 2	1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	1B	QC Batch	1C	RDL	QC Batch
Total Potassium (K)	mg/L	3.68	3.91	4.03	9543991	3.81	0.050	9543991
Total Sodium (Na)	mg/L	25.8	26.7	28.5	9543991	29.9	0.050	9543991
Total Sulphur (S)	mg/L	88.1	92.7	96.2	9543991	98.9	3.0	9543991
RDL = Reportable Detection Limit								



BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6267	WG6268	WG6269		WG6270		
Sampling Date		2019/08/09 09:05	2019/08/09 08:35	2019/08/09 08:05		2019/08/09 09:10		
COC Number		1 of 2	1 of 2	1 of 2		1 of 2		
	UNITS	2A	2B	2C	QC Batch	3A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	328	339	353	9543984	375	0.50	9543984
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0113	<0.00050	0.00381	9553295	0.00847	0.00050	9544228
Total Antimony (Sb)	mg/L	0.0182	0.0137	0.0120	9544228	0.0140	0.000020	9544228
Total Arsenic (As)	mg/L	0.0444	0.0282	0.0192	9544228	0.0363	0.000020	9544228
Total Barium (Ba)	mg/L	0.0561	0.0565	0.0608	9544228	0.0582	0.000020	9544228
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9544228	<0.000010	0.000010	9544228
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9544228	<0.0000050	0.0000050	9544228
Total Boron (B)	mg/L	0.033	0.027	0.026	9544228	0.014	0.010	9544228
Total Cadmium (Cd)	mg/L	0.000382	0.0000991	0.0000426	9544228	0.000180	0.0000050	9544228
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	9544228	<0.00010	0.00010	9544228
Total Cobalt (Co)	mg/L	0.000109	0.0000336	0.0000221	9544228	0.000101	0.0000050	9544228
Total Copper (Cu)	mg/L	0.00295	0.00168	0.000913	9544228	0.00265	0.000050	9544228
Total Iron (Fe)	mg/L	0.0106	0.0138	0.0108	9544228	0.0122	0.0010	9544228
Total Lead (Pb)	mg/L	0.000364	0.0000181	<0.0000050	9544228	0.000191	0.0000050	9544228
Total Lithium (Li)	mg/L	0.0158	0.0118	0.0102	9544228	0.0158	0.00050	9544228
Total Manganese (Mn)	mg/L	0.00632	0.00641	0.00173	9544228	0.0103	0.000050	9544228
Total Molybdenum (Mo)	mg/L	0.00100	0.000854	0.000823	9544228	0.000927	0.000050	9544228
Total Nickel (Ni)	mg/L	0.00452	0.00325	0.00193	9544228	0.00516	0.000020	9544228
Total Selenium (Se)	mg/L	0.00599	0.00389	0.00259	9544228	0.00470	0.000040	9544228
Total Silicon (Si)	mg/L	0.258	0.411	0.619	9544228	0.807	0.050	9544228
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	9544228	<0.0000050	0.0000050	9544228
Total Strontium (Sr)	mg/L	0.622	0.642	0.709	9544228	0.630	0.000050	9544228
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	9544228	<0.0000020	0.0000020	9544228
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9544228	<0.00020	0.00020	9544228
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9544228	0.00054	0.00050	9544228
Total Uranium (U)	mg/L	0.0249	0.00941	0.00587	9544228	0.0155	0.0000020	9544228
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	9544228	<0.00020	0.00020	9544228
Total Zinc (Zn)	mg/L	0.0642	0.0379	0.0214	9544228	0.0468	0.00010	9544228
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	9544228	<0.00010	0.00010	9544228
Total Calcium (Ca)	mg/L	104	107	112	9543991	123	0.050	9543991
Total Magnesium (Mg)	mg/L	16.6	17.2	17.5	9543991	16.7	0.050	9543991

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6267	WG6268	WG6269		WG6270		
Sampling Date		2019/08/09 09:05	2019/08/09 08:35	2019/08/09 08:05		2019/08/09 09:10		
COC Number		1 of 2	1 of 2	1 of 2		1 of 2		
	UNITS	2A	2B	2C	QC Batch	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.76	3.58	3.40	9543991	3.45	0.050	9543991
Total Sodium (Na)	mg/L	26.7	27.5	27.1	9543991	26.7	0.050	9543991
Total Sulphur (S)	mg/L	91.5	92.3	94.3	9543991	90.4	3.0	9543991
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B965831
Report Date: 2019/08/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WG6271		WG6272		WG6274		
Sampling Date		2019/08/09 08:40		2019/08/09 08:10		2019/08/09 09:15		
COC Number		1 of 2		1 of 2		2 of 2		
	UNITS	3B	QC Batch	3C	QC Batch	4A	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	352	9543984	369	9543984	356	0.50	9543984
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	<0.00050	9553295	0.00056	9553295	<0.00050	0.00050	9553295
Total Antimony (Sb)	mg/L	0.0107	9553295	0.00971	9544228	0.00724	0.000020	9553295
Total Arsenic (As)	mg/L	0.0235	9553295	0.0165	9544228	0.0226	0.000020	9553295
Total Barium (Ba)	mg/L	0.0572	9553295	0.0607	9544228	0.0582	0.000020	9553295
Total Beryllium (Be)	mg/L	<0.000010	9553295	<0.000010	9544228	<0.000010	0.000010	9553295
Total Bismuth (Bi)	mg/L	<0.0000050	9553295	<0.0000050	9544228	<0.0000050	0.0000050	9553295
Total Boron (B)	mg/L	0.013	9553295	<0.010	9544228	<0.010	0.010	9544228
Total Cadmium (Cd)	mg/L	0.0000898	9553295	0.0000338	9544228	0.000106	0.0000050	9553295
Total Chromium (Cr)	mg/L	<0.00010	9553295	<0.00010	9544228	<0.00010	0.00010	9553295
Total Cobalt (Co)	mg/L	0.0000168	9553295	0.0000119	9544228	0.0000878	0.0000050	9553295
Total Copper (Cu)	mg/L	0.00176	9553295	0.00118	9544228	0.00107	0.000050	9553295
Total Iron (Fe)	mg/L	0.0056	9553295	0.0053	9544228	0.0217	0.0010	9553295
Total Lead (Pb)	mg/L	0.0000149	9553295	<0.0000050	9544228	0.000110	0.0000050	9553295
Total Lithium (Li)	mg/L	0.0144	9553295	0.0123	9544228	0.00917	0.00050	9553295
Total Manganese (Mn)	mg/L	0.00270	9553295	0.00102	9544228	0.0112	0.000050	9553295
Total Molybdenum (Mo)	mg/L	0.000780	9553295	0.000572	9544228	0.000480	0.000050	9553295
Total Nickel (Ni)	mg/L	0.00330	9553295	0.00242	9544228	0.00442	0.000020	9553295
Total Selenium (Se)	mg/L	0.00260	9553295	0.00175	9544228	0.00152	0.000040	9553295
Total Silicon (Si)	mg/L	0.591	9553295	0.473	9544228	0.886	0.050	9553295
Total Silver (Ag)	mg/L	<0.0000050	9553295	<0.0000050	9544228	<0.0000050	0.0000050	9553295
Total Strontium (Sr)	mg/L	0.617	9553295	0.684	9544228	0.644	0.000050	9553295
Total Thallium (Tl)	mg/L	<0.0000020	9553295	<0.0000020	9544228	<0.0000020	0.0000020	9553295
Total Tin (Sn)	mg/L	<0.00020	9553295	<0.00020	9544228	<0.00020	0.00020	9553295
Total Titanium (Ti)	mg/L	<0.00050	9553295	<0.00050	9544228	<0.00050	0.00050	9553295
Total Uranium (U)	mg/L	0.00901	9553295	0.00564	9544228	0.00654	0.0000020	9553295
Total Vanadium (V)	mg/L	<0.00020	9553295	<0.00020	9544228	<0.00020	0.00020	9553295
Total Zinc (Zn)	mg/L	0.0332	9553295	0.0190	9544228	0.0218	0.00010	9553295
Total Zirconium (Zr)	mg/L	<0.00010	9553295	<0.00010	9544228	<0.00010	0.00010	9553295
Total Calcium (Ca)	mg/L	112	9543991	118	9543991	112	0.050	9543991
Total Magnesium (Mg)	mg/L	17.5	9543991	18.0	9543991	18.4	0.050	9543991
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6271		WG6272		WG6274		
Sampling Date		2019/08/09 08:40		2019/08/09 08:10		2019/08/09 09:15		
COC Number		1 of 2		1 of 2		2 of 2		
	UNITS	3B	QC Batch	3C	QC Batch	4A	RDL	QC Batch
Total Potassium (K)	mg/L	3.58	9543991	3.73	9543991	2.37	0.050	9543991
Total Sodium (Na)	mg/L	28.5	9543991	29.2	9543991	29.0	0.050	9543991
Total Sulphur (S)	mg/L	93.2	9543991	95.9	9543991	97.7	3.0	9543991
RDL = Reportable Detection Limit								



BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6275	WG6276		WG6277		
Sampling Date		2019/08/09 08:45	2019/08/09 08:15		2019/08/09 09:20		
COC Number		2 of 2	2 of 2		2 of 2		
	UNITS	4B	4C	QC Batch	5A	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	379	443	9543984	366	0.50	9543984
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00291	<0.00050	9544228	0.0138	0.00050	9553295
Total Antimony (Sb)	mg/L	0.00387	0.00142	9544228	0.00741	0.000020	9544228
Total Arsenic (As)	mg/L	0.00661	0.00274	9544228	0.0236	0.000020	9544228
Total Barium (Ba)	mg/L	0.0604	0.0634	9544228	0.0632	0.000020	9544228
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	9544228	<0.000010	0.000010	9544228
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9544228	<0.0000050	0.0000050	9544228
Total Boron (B)	mg/L	<0.010	<0.010	9544228	0.021	0.010	9544228
Total Cadmium (Cd)	mg/L	0.0000067	<0.0000050	9544228	0.0000719	0.0000050	9544228
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	9544228	<0.00010	0.00010	9544228
Total Cobalt (Co)	mg/L	0.0000189	0.0000240	9544228	0.000412	0.0000050	9544228
Total Copper (Cu)	mg/L	0.000392	0.000185	9544228	0.00129	0.000050	9544228
Total Iron (Fe)	mg/L	0.0071	0.0154	9544228	0.151	0.0010	9544228
Total Lead (Pb)	mg/L	0.0000118	0.0000063	9544228	0.000479	0.0000050	9544228
Total Lithium (Li)	mg/L	0.0163	0.0141	9544228	0.0160	0.00050	9544228
Total Manganese (Mn)	mg/L	0.00379	0.0107	9544228	0.0442	0.000050	9544228
Total Molybdenum (Mo)	mg/L	0.000151	<0.000050	9544228	0.000710	0.000050	9544228
Total Nickel (Ni)	mg/L	0.00212	0.00136	9544228	0.00441	0.000020	9544228
Total Selenium (Se)	mg/L	0.000523	0.000278	9544228	0.00105	0.000040	9544228
Total Silicon (Si)	mg/L	0.987	1.13	9544228	1.07	0.050	9544228
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	9544228	<0.0000050	0.0000050	9544228
Total Strontium (Sr)	mg/L	0.685	0.893	9544228	0.662	0.000050	9544228
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9544228	<0.0000020	0.0000020	9544228
Total Tin (Sn)	mg/L	<0.00020	<0.00020	9544228	<0.00020	0.00020	9544228
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	9544228	<0.00050	0.00050	9544228
Total Uranium (U)	mg/L	0.00167	0.000454	9544228	0.00641	0.0000020	9544228
Total Vanadium (V)	mg/L	<0.00020	<0.00020	9544228	<0.00020	0.00020	9544228
Total Zinc (Zn)	mg/L	0.00374	0.00079	9544228	0.0151	0.00010	9544228
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	9544228	<0.00010	0.00010	9544228
Total Calcium (Ca)	mg/L	120	136	9543991	115	0.050	9543991
Total Magnesium (Mg)	mg/L	19.1	25.4	9543991	19.2	0.050	9543991
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6275	WG6276		WG6277		
Sampling Date		2019/08/09 08:45	2019/08/09 08:15		2019/08/09 09:20		
COC Number		2 of 2	2 of 2		2 of 2		
	UNITS	4B	4C	QC Batch	5A	RDL	QC Batch
Total Potassium (K)	mg/L	1.53	0.927	9543991	2.47	0.050	9543991
Total Sodium (Na)	mg/L	30.0	39.3	9543991	29.3	0.050	9543991
Total Sulphur (S)	mg/L	100	132	9543991	97.2	3.0	9543991
RDL = Reportable Detection Limit							



BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6278	WG6279		WG6280		
Sampling Date		2019/08/09 08:50	2019/08/09 08:20		2019/08/09 09:25		
COC Number		2 of 2	2 of 2		2 of 2		
	UNITS	5B	5C	QC Batch	6A	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	419	468	9543984	339	0.50	9543984
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	<0.00050	<0.00050	9553295	0.00127	0.00050	9544228
Total Antimony (Sb)	mg/L	0.00232	0.000748	9553295	0.00129	0.000020	9544228
Total Arsenic (As)	mg/L	0.00583	0.00215	9553295	0.00443	0.000020	9544228
Total Barium (Ba)	mg/L	0.0615	0.0706	9553295	0.0119	0.000020	9544228
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	9553295	<0.000010	0.000010	9544228
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9553295	<0.0000050	0.0000050	9544228
Total Boron (B)	mg/L	<0.010	<0.010	9553295	<0.010	0.010	9544228
Total Cadmium (Cd)	mg/L	<0.0000050	<0.0000050	9553295	0.0000215	0.0000050	9544228
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	9553295	<0.00010	0.00010	9544228
Total Cobalt (Co)	mg/L	0.000110	0.000121	9553295	0.0000830	0.0000050	9544228
Total Copper (Cu)	mg/L	0.000361	0.000095	9553295	0.000354	0.000050	9544228
Total Iron (Fe)	mg/L	0.0145	0.0321	9553295	0.0349	0.0010	9544228
Total Lead (Pb)	mg/L	0.0000416	0.0000092	9553295	0.0000945	0.0000050	9544228
Total Lithium (Li)	mg/L	0.0123	0.0144	9553295	0.00265	0.00050	9544228
Total Manganese (Mn)	mg/L	0.0197	0.0248	9553295	0.00635	0.000050	9544228
Total Molybdenum (Mo)	mg/L	0.000183	0.000144	9553295	0.000133	0.000050	9544228
Total Nickel (Ni)	mg/L	0.00197	0.00104	9553295	0.00445	0.000020	9553295
Total Selenium (Se)	mg/L	0.000365	0.000237	9553295	0.000391	0.000040	9544228
Total Silicon (Si)	mg/L	1.45	1.92	9553295	0.222	0.050	9544228
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	9553295	<0.0000050	0.0000050	9544228
Total Strontium (Sr)	mg/L	0.690	0.736	9553295	0.716	0.000050	9544228
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9553295	<0.0000020	0.0000020	9544228
Total Tin (Sn)	mg/L	<0.00020	<0.00020	9553295	<0.00020	0.00020	9544228
Total Titanium (Ti)	mg/L	0.00050	<0.00050	9553295	<0.00050	0.00050	9544228
Total Uranium (U)	mg/L	0.00147	0.000352	9553295	0.00159	0.0000020	9544228
Total Vanadium (V)	mg/L	<0.00020	<0.00020	9553295	<0.00020	0.00020	9544228
Total Zinc (Zn)	mg/L	0.00240	0.00057	9553295	0.00354	0.00010	9544228
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	9553295	<0.00010	0.00010	9544228
Total Calcium (Ca)	mg/L	132	147	9543991	107	0.050	9543991
Total Magnesium (Mg)	mg/L	21.9	24.9	9543991	17.2	0.050	9543991
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6278	WG6279		WG6280		
Sampling Date		2019/08/09 08:50	2019/08/09 08:20		2019/08/09 09:25		
COC Number		2 of 2	2 of 2		2 of 2		
	UNITS	5B	5C	QC Batch	6A	RDL	QC Batch
Total Potassium (K)	mg/L	1.50	0.658	9543991	2.56	0.050	9543991
Total Sodium (Na)	mg/L	33.1	36.5	9543991	26.2	0.050	9543991
Total Sulphur (S)	mg/L	106	112	9543991	92.7	3.0	9543991
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B965831
Report Date: 2019/08/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WG6281		WG6282		
Sampling Date		2019/08/09 08:55		2019/08/09 08:25		
COC Number		2 of 2		2 of 2		
	UNITS	6B	QC Batch	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	369	9543984	395	0.50	9543984
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	<0.00050	9553295	0.00236	0.00050	9544228
Total Antimony (Sb)	mg/L	0.00491	9544228	0.00300	0.000020	9544228
Total Arsenic (As)	mg/L	0.00978	9544228	0.00581	0.000020	9544228
Total Barium (Ba)	mg/L	0.0640	9544228	0.0681	0.000020	9544228
Total Beryllium (Be)	mg/L	<0.000010	9544228	<0.000010	0.000010	9544228
Total Bismuth (Bi)	mg/L	<0.0000050	9544228	<0.0000050	0.0000050	9544228
Total Boron (B)	mg/L	0.012	9544228	<0.010	0.010	9544228
Total Cadmium (Cd)	mg/L	0.0000158	9544228	<0.0000050	0.0000050	9544228
Total Chromium (Cr)	mg/L	<0.00010	9544228	<0.00010	0.00010	9544228
Total Cobalt (Co)	mg/L	0.0000484	9544228	0.0000353	0.0000050	9544228
Total Copper (Cu)	mg/L	0.000578	9544228	0.000226	0.000050	9544228
Total Iron (Fe)	mg/L	0.0103	9544228	0.0168	0.0010	9544228
Total Lead (Pb)	mg/L	0.0000233	9544228	0.0000113	0.0000050	9544228
Total Lithium (Li)	mg/L	0.0156	9544228	0.0158	0.00050	9544228
Total Manganese (Mn)	mg/L	0.00886	9544228	0.0111	0.000050	9544228
Total Molybdenum (Mo)	mg/L	0.000206	9544228	0.000165	0.000050	9544228
Total Nickel (Ni)	mg/L	0.00232	9544228	0.00170	0.000020	9544228
Total Selenium (Se)	mg/L	0.000610	9544228	0.000307	0.000040	9544228
Total Silicon (Si)	mg/L	1.14	9544228	1.06	0.050	9544228
Total Silver (Ag)	mg/L	<0.0000050	9544228	<0.0000050	0.0000050	9544228
Total Strontium (Sr)	mg/L	0.680	9544228	0.714	0.000050	9544228
Total Thallium (Tl)	mg/L	<0.0000020	9544228	<0.0000020	0.0000020	9544228
Total Tin (Sn)	mg/L	<0.00020	9544228	<0.00020	0.00020	9544228
Total Titanium (Ti)	mg/L	<0.00050	9544228	<0.00050	0.00050	9544228
Total Uranium (U)	mg/L	0.00248	9544228	0.00139	0.0000020	9544228
Total Vanadium (V)	mg/L	<0.00020	9544228	<0.00020	0.00020	9544228
Total Zinc (Zn)	mg/L	0.00512	9544228	0.00146	0.00010	9544228
Total Zirconium (Zr)	mg/L	<0.00010	9544228	<0.00010	0.00010	9544228
Total Calcium (Ca)	mg/L	117	9543991	125	0.050	9543991
Total Magnesium (Mg)	mg/L	18.5	9543991	20.2	0.050	9543991
RDL = Reportable Detection Limit						



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BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WG6281		WG6282		
Sampling Date		2019/08/09 08:55		2019/08/09 08:25		
COC Number		2 of 2		2 of 2		
	UNITS	6B	QC Batch	6C	RDL	QC Batch
Total Potassium (K)	mg/L	2.04	9543991	1.14	0.050	9543991
Total Sodium (Na)	mg/L	29.2	9543991	31.2	0.050	9543991
Total Sulphur (S)	mg/L	95.5	9543991	99.3	3.0	9543991
RDL = Reportable Detection Limit						



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BV Labs Job #: B965831

Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WG6263
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9542392	N/A	2019/08/16	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/14	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6263 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/15	Paula Calzada
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta

BV Labs ID: WG6264
Sample ID: 1A
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9542392	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/15	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6265
Sample ID: 1B
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac



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BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WG6265
Sample ID: 1B
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9542392	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/15	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6266
Sample ID: 1C
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Harry (Peng) Liang
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Harry (Peng) Liang
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6267
Sample ID: 2A
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta



BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WG6267
Sample ID: 2A
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6268
Sample ID: 2B
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9546656	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551382	N/A	2019/08/16	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/16	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/16	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544279	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9546658	N/A	2019/08/14	Ilonka Kovac

BV Labs ID: WG6269
Sample ID: 2C
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548215	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6270
Sample ID: 3A
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B965831

Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WG6270

Sample ID: 3A

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/15	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6271

Sample ID: 3B

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Harry (Peng) Liang
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Harry (Peng) Liang
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6272

Sample ID: 3C

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac



BUREAU
VERITAS

BV Labs Job #: B965831

Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WG6274

Sample ID: 4A

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9546656	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551382	N/A	2019/08/16	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Harry (Peng) Liang
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Harry (Peng) Liang
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/16	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/16	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544279	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9546658	N/A	2019/08/14	Ilonka Kovac

BV Labs ID: WG6275

Sample ID: 4B

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9546656	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551382	N/A	2019/08/16	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/15	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/16	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/16	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544279	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9546658	N/A	2019/08/14	Ilonka Kovac

BV Labs ID: WG6275 Dup

Sample ID: 4B

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride/Sulphate by Auto Colourimetry	KONE	9551382	N/A	2019/08/16	Zafar Iqbal

BV Labs ID: WG6276

Sample ID: 4C

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548215	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B965831

Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WG6276

Sample ID: 4C

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/15	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6277

Sample ID: 5A

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548215	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6278

Sample ID: 5B

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9546656	N/A	2019/08/14	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9551382	N/A	2019/08/16	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Harry (Peng) Liang
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Harry (Peng) Liang
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/16	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/16	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544279	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9546658	N/A	2019/08/14	Ilonka Kovac



BUREAU
VERITAS

BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WG6279
Sample ID: 5C
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Harry (Peng) Liang
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Harry (Peng) Liang
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6280
Sample ID: 6A
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548215	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/15	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6281
Sample ID: 6B
Matrix: Water

Collected: 2019/08/09
Shipped: 2019/08/09
Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9553293	N/A	2019/08/19	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9553295	N/A	2019/08/19	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Automated Statchk



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VERITAS

BV Labs Job #: B965831

Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WG6281

Sample ID: 6B

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac

BV Labs ID: WG6282

Sample ID: 6C

Matrix: Water

Collected: 2019/08/09

Shipped: 2019/08/09

Received: 2019/08/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9544265	N/A	2019/08/13	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9548465	N/A	2019/08/14	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9543984	N/A	2019/08/16	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9543985	N/A	2019/08/16	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9543986	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9544218	N/A	2019/08/14	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9543991	N/A	2019/08/16	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9544228	N/A	2019/08/15	Paula Calzada
Nitrate and Nitrite	CALC	9542813	N/A	2019/08/15	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9542829	N/A	2019/08/15	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9544227	N/A	2019/08/12	Parniyan Roosta
pH @25°C	AT/ALK	9544269	N/A	2019/08/13	Ilonka Kovac



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	13.7°C
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Sample WG6268, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WG6272, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WG6274, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WG6277, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WG6280, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WG6281, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WG6267, Elements by ICPMS Low Level (total): Test repeated.
Sample WG6268, Elements by ICPMS Low Level (total): Test repeated.
Sample WG6269, Elements by ICPMS Low Level (total): Test repeated.
Sample WG6272, Elements by ICPMS Low Level (total): Test repeated.
Sample WG6274, Elements by ICPMS Low Level (total): Test repeated.
Sample WG6277, Elements by ICPMS Low Level (total): Test repeated.
Sample WG6280, Elements by ICPMS Low Level (total): Test repeated.
Sample WG6281, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B965831
Report Date: 2019/08/21

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9544218	Dissolved Aluminum (Al)	2019/08/14	106	80 - 120	110	80 - 120	<0.00050	mg/L	17	20
9544218	Dissolved Antimony (Sb)	2019/08/14	NC	80 - 120	95	80 - 120	<0.000020	mg/L	3.5	20
9544218	Dissolved Arsenic (As)	2019/08/14	94	80 - 120	98	80 - 120	<0.000020	mg/L	0.89	20
9544218	Dissolved Barium (Ba)	2019/08/14	NC	80 - 120	95	80 - 120	<0.000020	mg/L	0.36	20
9544218	Dissolved Beryllium (Be)	2019/08/14	86	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9544218	Dissolved Bismuth (Bi)	2019/08/14	98	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9544218	Dissolved Boron (B)	2019/08/14	90	80 - 120	91	80 - 120	<0.010	mg/L	9.4	20
9544218	Dissolved Cadmium (Cd)	2019/08/14	95	80 - 120	97	80 - 120	<0.0000050	mg/L	0.94	20
9544218	Dissolved Chromium (Cr)	2019/08/14	95	80 - 120	99	80 - 120	<0.00010	mg/L	2.3	20
9544218	Dissolved Cobalt (Co)	2019/08/14	93	80 - 120	99	80 - 120	<0.0000050	mg/L	0.020	20
9544218	Dissolved Copper (Cu)	2019/08/14	91	80 - 120	99	80 - 120	<0.000050	mg/L	0.27	20
9544218	Dissolved Iron (Fe)	2019/08/14	100	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
9544218	Dissolved Lead (Pb)	2019/08/14	102	80 - 120	101	80 - 120	<0.0000050	mg/L	0.49	20
9544218	Dissolved Lithium (Li)	2019/08/14	97	80 - 120	78 (1)	80 - 120	<0.00050	mg/L	NC	20
9544218	Dissolved Manganese (Mn)	2019/08/14	95	80 - 120	98	80 - 120	<0.000050	mg/L	0.35	20
9544218	Dissolved Molybdenum (Mo)	2019/08/14	108	80 - 120	98	80 - 120	<0.000050	mg/L	2.4	20
9544218	Dissolved Nickel (Ni)	2019/08/14	92	80 - 120	98	80 - 120	<0.000020	mg/L	1.4	20
9544218	Dissolved Selenium (Se)	2019/08/14	100	80 - 120	96	80 - 120	<0.000040	mg/L	2.1	20
9544218	Dissolved Silicon (Si)	2019/08/14	75 (1)	80 - 120	70 (1)	80 - 120	<0.050	mg/L	2.1	20
9544218	Dissolved Silver (Ag)	2019/08/14	90	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
9544218	Dissolved Strontium (Sr)	2019/08/14	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.48	20
9544218	Dissolved Thallium (Tl)	2019/08/14	103	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9544218	Dissolved Tin (Sn)	2019/08/14	99	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9544218	Dissolved Titanium (Ti)	2019/08/14	98	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9544218	Dissolved Uranium (U)	2019/08/14	110	80 - 120	110	80 - 120	<0.0000020	mg/L	0.30	20
9544218	Dissolved Vanadium (V)	2019/08/14	99	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9544218	Dissolved Zinc (Zn)	2019/08/14	NC	80 - 120	99	80 - 120	<0.00010	mg/L	0.53	20
9544218	Dissolved Zirconium (Zr)	2019/08/14	112	80 - 120	112	80 - 120	<0.00010	mg/L	NC	20
9544227	Dissolved Nitrate (N)	2019/08/12	102	80 - 120	100	80 - 120	<0.010	mg/L	4.8	20
9544227	Dissolved Nitrite (N)	2019/08/12	101	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
9544228	Total Aluminum (Al)	2019/08/15	101	80 - 120	107	80 - 120	<0.00050	mg/L	1.7	20
9544228	Total Antimony (Sb)	2019/08/15	NC	80 - 120	96	80 - 120	<0.000020	mg/L	14	20



BV Labs Job #: B965831
Report Date: 2019/08/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9544228	Total Arsenic (As)	2019/08/15	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.79	20
9544228	Total Barium (Ba)	2019/08/15	NC	80 - 120	98	80 - 120	<0.000020	mg/L	14	20
9544228	Total Beryllium (Be)	2019/08/15	96	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9544228	Total Bismuth (Bi)	2019/08/15	97	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9544228	Total Boron (B)	2019/08/15	99	80 - 120	87	80 - 120	<0.010	mg/L	3.0	20
9544228	Total Cadmium (Cd)	2019/08/15	96	80 - 120	98	80 - 120	<0.0000050	mg/L	12	20
9544228	Total Chromium (Cr)	2019/08/15	96	80 - 120	103	80 - 120	<0.00010	mg/L	4.1	20
9544228	Total Cobalt (Co)	2019/08/15	94	80 - 120	102	80 - 120	<0.0000050	mg/L	0.48	20
9544228	Total Copper (Cu)	2019/08/15	91	80 - 120	102	80 - 120	<0.000050	mg/L	1.2	20
9544228	Total Iron (Fe)	2019/08/15	102	80 - 120	106	80 - 120	<0.0010	mg/L	1.6	20
9544228	Total Lead (Pb)	2019/08/15	100	80 - 120	99	80 - 120	<0.0000050	mg/L	11	20
9544228	Total Lithium (Li)	2019/08/15	96	80 - 120	91	80 - 120	<0.00050	mg/L	9.2	20
9544228	Total Manganese (Mn)	2019/08/15	NC	80 - 120	105	80 - 120	<0.000050	mg/L	0.39	20
9544228	Total Molybdenum (Mo)	2019/08/15	99	80 - 120	101	80 - 120	<0.000050	mg/L	1.4	20
9544228	Total Nickel (Ni)	2019/08/15	93	80 - 120	102	80 - 120	<0.000020	mg/L	1.2	20
9544228	Total Selenium (Se)	2019/08/15	97	80 - 120	92	80 - 120	<0.000040	mg/L	4.8	20
9544228	Total Silicon (Si)	2019/08/15	71 (1)	80 - 120	73 (1)	80 - 120	<0.050	mg/L	3.5	20
9544228	Total Silver (Ag)	2019/08/15	90	80 - 120	96	80 - 120	<0.0000050	mg/L	4.4	20
9544228	Total Strontium (Sr)	2019/08/15	NC	80 - 120	105	80 - 120	<0.000050	mg/L	1.7	20
9544228	Total Thallium (Tl)	2019/08/15	102	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9544228	Total Tin (Sn)	2019/08/15	101	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9544228	Total Titanium (Ti)	2019/08/15	94	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9544228	Total Uranium (U)	2019/08/15	101	80 - 120	104	80 - 120	<0.0000020	mg/L	9.2	20
9544228	Total Vanadium (V)	2019/08/15	100	80 - 120	104	80 - 120	<0.00020	mg/L	NC	20
9544228	Total Zinc (Zn)	2019/08/15	NC	80 - 120	104	80 - 120	<0.00010	mg/L	0.46	20
9544228	Total Zirconium (Zr)	2019/08/15	108	80 - 120	116	80 - 120	<0.00010	mg/L	NC	20
9544265	Alkalinity (PP as CaCO3)	2019/08/12					<1.0	mg/L	NC	20
9544265	Alkalinity (Total as CaCO3)	2019/08/12			92	80 - 120	<1.0	mg/L	4.5	20
9544265	Bicarbonate (HCO3)	2019/08/12					<1.0	mg/L	4.5	20
9544265	Carbonate (CO3)	2019/08/12					<1.0	mg/L	NC	20
9544265	Hydroxide (OH)	2019/08/12					<1.0	mg/L	NC	20
9544269	pH	2019/08/12			100	97 - 103			0.49	N/A



BV Labs Job #: B965831
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QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9544279	Dissolved Nitrate (N)	2019/08/12	101	80 - 120	101	80 - 120	<0.010	mg/L	0.19	20
9544279	Dissolved Nitrite (N)	2019/08/12	101	80 - 120	100	80 - 120	<0.010	mg/L	1.0	20
9546656	Alkalinity (PP as CaCO3)	2019/08/14					<1.0	mg/L	NC	20
9546656	Alkalinity (Total as CaCO3)	2019/08/14			92	80 - 120	<1.0	mg/L	6.5	20
9546656	Bicarbonate (HCO3)	2019/08/14					<1.0	mg/L	6.5	20
9546656	Carbonate (CO3)	2019/08/14					<1.0	mg/L	NC	20
9546656	Hydroxide (OH)	2019/08/14					<1.0	mg/L	NC	20
9546658	pH	2019/08/14			100	97 - 103			0.88	N/A
9548215	Dissolved Chloride (Cl)	2019/08/14	103	80 - 120	101	80 - 120	<1.0	mg/L	17	20
9548215	Dissolved Sulphate (SO4)	2019/08/14	NC	80 - 120	102	80 - 120	<1.0	mg/L	0.79	20
9548465	Dissolved Chloride (Cl)	2019/08/14	101	80 - 120	102	80 - 120	<1.0	mg/L	3.2	20
9548465	Dissolved Sulphate (SO4)	2019/08/14	NC	80 - 120	104	80 - 120	<1.0	mg/L	0.45	20
9551382	Dissolved Chloride (Cl)	2019/08/16	NC	80 - 120	102	80 - 120	<1.0	mg/L	0.62	20
9551382	Dissolved Sulphate (SO4)	2019/08/16	NC	80 - 120	101	80 - 120	<1.0	mg/L	0.76	20
9553293	Dissolved Aluminum (Al)	2019/08/19	95	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9553293	Dissolved Antimony (Sb)	2019/08/19	97	80 - 120	93	80 - 120	<0.00020	mg/L	14	20
9553293	Dissolved Arsenic (As)	2019/08/19	98	80 - 120	93	80 - 120	<0.00020	mg/L	4.4	20
9553293	Dissolved Barium (Ba)	2019/08/19	94	80 - 120	92	80 - 120	<0.00020	mg/L	0.53	20
9553293	Dissolved Beryllium (Be)	2019/08/19	120	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9553293	Dissolved Bismuth (Bi)	2019/08/19	98	80 - 120	94	80 - 120	<0.000050	mg/L	NC	20
9553293	Dissolved Boron (B)	2019/08/19	103	80 - 120	104	80 - 120	<0.010	mg/L	NC	20
9553293	Dissolved Cadmium (Cd)	2019/08/19	101	80 - 120	91	80 - 120	<0.000050	mg/L	NC	20
9553293	Dissolved Chromium (Cr)	2019/08/19	98	80 - 120	94	80 - 120	<0.00010	mg/L	NC	20
9553293	Dissolved Cobalt (Co)	2019/08/19	97	80 - 120	93	80 - 120	<0.000050	mg/L	0.021	20
9553293	Dissolved Copper (Cu)	2019/08/19	98	80 - 120	94	80 - 120	<0.000050	mg/L	4.4	20
9553293	Dissolved Iron (Fe)	2019/08/19	101	80 - 120	98	80 - 120	<0.0010	mg/L	0.32	20
9553293	Dissolved Lead (Pb)	2019/08/19	100	80 - 120	93	80 - 120	<0.000050	mg/L	NC	20
9553293	Dissolved Lithium (Li)	2019/08/19	98	80 - 120	97	80 - 120	<0.00050	mg/L	12	20
9553293	Dissolved Manganese (Mn)	2019/08/19	98	80 - 120	92	80 - 120	<0.000050	mg/L	1.5	20
9553293	Dissolved Molybdenum (Mo)	2019/08/19	98	80 - 120	92	80 - 120	<0.000050	mg/L	NC	20
9553293	Dissolved Nickel (Ni)	2019/08/19	97	80 - 120	92	80 - 120	<0.00020	mg/L	8.0	20
9553293	Dissolved Selenium (Se)	2019/08/19	101	80 - 120	88	80 - 120	<0.000040	mg/L	8.3	20



BV Labs Job #: B965831
Report Date: 2019/08/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9553293	Dissolved Silicon (Si)	2019/08/19	77 (1)	80 - 120	72 (1)	80 - 120	<0.050	mg/L	0.83	20
9553293	Dissolved Silver (Ag)	2019/08/19	97	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
9553293	Dissolved Strontium (Sr)	2019/08/19	97	80 - 120	95	80 - 120	<0.000050	mg/L	2.6	20
9553293	Dissolved Thallium (Tl)	2019/08/19	102	80 - 120	96	80 - 120	<0.0000020	mg/L	NC	20
9553293	Dissolved Tin (Sn)	2019/08/19	95	80 - 120	90	80 - 120	<0.00020	mg/L	NC	20
9553293	Dissolved Titanium (Ti)	2019/08/19	101	80 - 120	95	80 - 120	<0.00050	mg/L	NC	20
9553293	Dissolved Uranium (U)	2019/08/19	111	80 - 120	100	80 - 120	<0.0000020	mg/L	0.65	20
9553293	Dissolved Vanadium (V)	2019/08/19	99	80 - 120	95	80 - 120	<0.00020	mg/L	NC	20
9553293	Dissolved Zinc (Zn)	2019/08/19	104	80 - 120	92	80 - 120	<0.00010	mg/L	6.8	20
9553293	Dissolved Zirconium (Zr)	2019/08/19	101	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9553295	Total Aluminum (Al)	2019/08/19	101	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
9553295	Total Antimony (Sb)	2019/08/19	94	80 - 120	93	80 - 120	<0.000020	mg/L	7.1	20
9553295	Total Arsenic (As)	2019/08/19	95	80 - 120	97	80 - 120	<0.000020	mg/L	16	20
9553295	Total Barium (Ba)	2019/08/19	91	80 - 120	94	80 - 120	<0.000020	mg/L	1.2	20
9553295	Total Beryllium (Be)	2019/08/19	102	80 - 120	112	80 - 120	<0.000010	mg/L	NC	20
9553295	Total Bismuth (Bi)	2019/08/19	98	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9553295	Total Boron (B)	2019/08/19	124 (1)	80 - 120	121 (1)	80 - 120	<0.010	mg/L	20	20
9553295	Total Cadmium (Cd)	2019/08/19	97	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9553295	Total Chromium (Cr)	2019/08/19	94	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9553295	Total Cobalt (Co)	2019/08/19	93	80 - 120	102	80 - 120	<0.0000050	mg/L	2.5	20
9553295	Total Copper (Cu)	2019/08/19	94	80 - 120	102	80 - 120	<0.000050	mg/L	3.7	20
9553295	Total Iron (Fe)	2019/08/19	100	80 - 120	106	80 - 120	<0.0010	mg/L	0.81	20
9553295	Total Lead (Pb)	2019/08/19	99	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9553295	Total Lithium (Li)	2019/08/19	89	80 - 120	101	80 - 120	<0.00050	mg/L	18	20
9553295	Total Manganese (Mn)	2019/08/19	93	80 - 120	101	80 - 120	<0.000050	mg/L	0.90	20
9553295	Total Molybdenum (Mo)	2019/08/19	93	80 - 120	93	80 - 120	<0.000050	mg/L	17	20
9553295	Total Nickel (Ni)	2019/08/19	94	80 - 120	101	80 - 120	<0.000020	mg/L	1.0	20
9553295	Total Selenium (Se)	2019/08/19	98	80 - 120	95	80 - 120	<0.000040	mg/L	8.0	20
9553295	Total Silicon (Si)	2019/08/19	75 (1)	80 - 120	79 (1)	80 - 120	<0.050	mg/L	0.26	20
9553295	Total Silver (Ag)	2019/08/19	91	80 - 120	94	80 - 120	<0.0000050	mg/L	NC	20
9553295	Total Strontium (Sr)	2019/08/19	95	80 - 120	97	80 - 120	<0.000050	mg/L	0.76	20
9553295	Total Thallium (Tl)	2019/08/19	100	80 - 120	106	80 - 120	<0.0000020	mg/L	NC	20



BV Labs Job #: B965831
Report Date: 2019/08/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9553295	Total Tin (Sn)	2019/08/19	93	80 - 120	93	80 - 120	<0.00020	mg/L	NC	20
9553295	Total Titanium (Ti)	2019/08/19	93	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9553295	Total Uranium (U)	2019/08/19	110	80 - 120	116	80 - 120	<0.0000020	mg/L	20	20
9553295	Total Vanadium (V)	2019/08/19	95	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9553295	Total Zinc (Zn)	2019/08/19	101	80 - 120	100	80 - 120	<0.00010	mg/L	4.9	20
9553295	Total Zirconium (Zr)	2019/08/19	92	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

BV Labs Job #: B965831
Report Date: 2019/08/21

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

09-Aug-19 13:30

CD-000
— of of

T-4, 7, 9 1E-4, 1S-9
13, 13, 12



BBY FCD-00077/05

KK7 INS-0187

BBY FCD-00077/05

Customer Solutions

T-4, 7, 9 ice-y, cs-y

CHAIN OF CUSTODY RECORD

BBV FCD-00077/05

maxby: 4606 Canada Way, Burnaby, BC V5G 1K5, Toll Free (800) 666-8

COC #:

Page of

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: BMC MINERALS LTD.		Company Name: ALEXCO ENVIRONMENTAL		Quotation # B60751		☒ Regular TAT 5 days (Max) ☐ Rush TAT (Surcharges will be applied)	
Contact Name: <u> </u>		Contact Name: <u>Marij Mioska; Renate Vanderhorst</u>		P.O. #/AFE#: <u> </u>		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days	
Address: <u>530-1130 WEST PENDER ST</u>		Address: <u>UNIT 3 151 INDUSTRIAL RD</u>		Project #: <u>BMC-16-02</u>		Rush TAT (Surcharges will be applied)	
Phone: <u>Vanouver, 8PCT, W6E 4A4</u>		Phone: <u>Whisper, BC, P.O. Y1A 2Y3</u>		Site Location: <u>Kudzu & Kajah</u>		Date Required: <u> </u>	
Email: <u> </u>		Email: <u>mmioska@alexcoenv.com</u>		Site #: <u> </u>		Sampled By: <u> </u>	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Sx ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 1248		☐ Low Level Dissolved Metals ☐ Low Level Total Metals ☐ Anions (SO4, NO2, NO3, Cl) ☐ Alkalinity		# OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE	
ES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM						LABORATORY USE ONLY SEAL Y / TEMPERATURE PRES. RES.	
Sample Identification		Lab Identification		Date Sampled (YYYYMMDD)		Time Sampled (HH:MM)	
Matrix						COMMENTS	
1	4A		09-Aug-19	9:15	Water	X	Metals preserved with HNO3
2	4B		09-Aug-19	8:45	Water	X	dissolved metals field filtered
3	4C		09-Aug-19	8:15	Water	X	Metals preserved with HNO3
4	5A		09-Aug-19	9:20	Water	X	dissolved metals field filtered
5	5B		09-Aug-19	8:50	Water	X	Metals preserved with HNO3
6	5C		09-Aug-19	8:20	Water	X	dissolved metals field filtered
7	6A		09-Aug-19	9:25	Water	X	Metals preserved with HNO3
8	6B		09-Aug-19	8:55	Water	X	dissolved metals field filtered
9	6C		09-Aug-19	8:25	Water	X	Metals preserved with HNO3
INQUIRED BY: (Signature/DATE: (YYYYMMDD) (ME: (HH:MM)		RECEIVED BY: (Signature/Print)		E: (YYYYMM) (ME: (HH:MM)		MAXXAM JOB #	



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 OF 2, 2 OF 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/08/23
 Report #: R2771694
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B967670

Received: 2019/08/14, 13:00

Sample Matrix: Water
 # Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	14	N/A	2019/08/20	AB SOP-00005	SM 23 2320 B m
Alkalinity - Low Level	5	N/A	2019/08/21	AB SOP-00005	SM 23 2320 B m
Low level chloride/sulphate by AC	19	N/A	2019/08/20	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1)	1	N/A	2019/08/20	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (1)	18	N/A	2019/08/21	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	4	N/A	2019/08/20	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	15	N/A	2019/08/21	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	19	N/A	2019/08/20		Auto Calc
Ion Balance	19	N/A	2019/08/19		Auto Calc
Sum of cations, anions	4	N/A	2019/08/20		Auto Calc
Sum of cations, anions	15	N/A	2019/08/21		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	4	N/A	2019/08/20	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	15	N/A	2019/08/21	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	1	N/A	2019/08/19	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (dissolved)	18	N/A	2019/08/20	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	N/A	2019/08/20	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total)	18	N/A	2019/08/21	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	19	N/A	2019/08/20	CAL SOP-00265	EPA 6020 m
Nitrate and Nitrite - Low Level	19	N/A	2019/08/19		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	19	N/A	2019/08/19		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	19	N/A	2019/08/17	AB SOP-00023	SM 23 4110 B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 OF 2, 2 OF 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/08/23
Report #: R2771694
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B967670

Received: 2019/08/14, 13:00

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WH5520	WH5521	WH5522	WH5523		WH5524	WH5525		
Sampling Date		2019/08/14 10:00	2019/08/14 09:00	2019/08/14 08:30	2019/08/14 08:00		2019/08/14 09:05	2019/08/14 08:35		
COC Number		1 OF 2	1 OF 2	1 OF 2	1 OF 2		1 OF 2	1 OF 2		
	UNITS	INFLUENT	1A	1B	1C	QC Batch	2A	2B	RDL	QC Batch

Calculated Parameters										
Anion Sum	meq/L	8.1	7.8	7.9	8.5	9549232	8.0	8.1	N/A	9550345
Cation Sum	meq/L	7.9	7.9	8.0	8.3	9549232	7.9	8.1	N/A	9550345
Ion Balance	N/A	0.98	1.0	1.0	0.99	9555997	0.99	0.99	0.010	9555997
Ion Balance (% Difference)	%	1.1	0.42	0.53	0.70	9549229	0.43	0.45	N/A	9550342
Dissolved Nitrate (NO3)	mg/L	1.7	2.0	1.3	0.039	9549235	1.2	0.069	0.013	9549235
Nitrate plus Nitrite (N)	mg/L	0.39	0.47	0.30	0.0089	9549238	0.27	0.016	0.0042	9550351
Dissolved Nitrite (NO2)	mg/L	0.011	0.014	0.014	<0.0099	9549235	0.018	<0.0099	0.0099	9549235

Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	66.1	60.4	60.3	74.0	9554401	63.9	67.0	0.50	9554401
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	9554401	<0.50	<0.50	0.50	9554401
Bicarbonate (HCO3)	mg/L	80.6	73.7	73.5	90.2	9554401	77.9	81.7	0.50	9554401
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	9554401	<0.50	<0.50	0.50	9554401
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	9554401	<0.50	<0.50	0.50	9554401

Anions										
Dissolved Chloride (Cl)	mg/L	59	59	60	64	9555240	60	60	0.50	9555240
Dissolved Sulphate (SO4)	mg/L	240 (1)	240 (1)	240 (1)	250 (1)	9555240	240 (1)	240 (1)	1.0	9555240

Nutrients										
Dissolved Nitrite (N)	mg/L	0.0033	0.0043	0.0043	<0.0030	9552908	0.0056	<0.0030	0.0030	9552908
Dissolved Nitrate (N)	mg/L	0.39	0.46	0.30	0.0089	9552908	0.27	0.016	0.0030	9552908

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WH5526	WH5527	WH5528	WH5529	WH5530	WH5531		
Sampling Date		2019/08/14 08:05	2019/08/14 09:10	2019/08/14 08:40	2019/08/14 08:10	2019/08/14 09:15	2019/08/14 08:45		
COC Number		1 OF 2	1 OF 2	1 OF 2	1 OF 2	2 OF 2	2 OF 2		
	UNITS	2C	3A	3B	3C	4A	4B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.1	7.9	8.3	8.3	8.2	8.3	N/A	9550345
Cation Sum	meq/L	8.1	7.9	8.1	8.4	8.1	8.3	N/A	9550345
Ion Balance	N/A	1.0	1.0	0.98	1.0	0.98	1.0	0.010	9555997
Ion Balance (% Difference)	%	0.018	0.33	1.0	0.54	1.1	0.20	N/A	9550342
Dissolved Nitrate (NO3)	mg/L	0.030	0.56	0.027	0.018	0.057	0.017	0.013	9549235
Nitrate plus Nitrite (N)	mg/L	0.011	0.13	0.0060	<0.0042	0.013	<0.0042	0.0042	9550351
Dissolved Nitrite (NO2)	mg/L	0.015	<0.0099	<0.0099	<0.0099	<0.0099	<0.0099	0.0099	9549235

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	61.8	65.9	76.7	70.0	75.2	68.3	0.50	9554401
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9554401
Bicarbonate (HCO3)	mg/L	75.4	80.4	93.6	85.4	91.7	83.3	0.50	9554401
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9554401
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9554401

Anions

Dissolved Chloride (Cl)	mg/L	65	59	61	65	59	61	0.50	9555240
Dissolved Sulphate (SO4)	mg/L	240 (1)	240 (1)	240 (1)	240 (1)	240 (1)	250 (1)	1.0	9555240

Nutrients

Dissolved Nitrite (N)	mg/L	0.0045	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	9552908
Dissolved Nitrate (N)	mg/L	0.0068	0.13	0.0060	0.0041	0.013	0.0039	0.0030	9552908

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WH5532	WH5533	WH5534	WH5535	WH5536	WH5537		
Sampling Date		2019/08/14 08:15	2019/08/14 09:20	2019/08/14 08:50	2019/08/14 08:20	2019/08/14 09:25	2019/08/14 08:55		
COC Number		2 OF 2	2 OF 2	2 OF 2	2 OF 2	2 OF 2	2 OF 2		
	UNITS	4C	5A	5B	5C	6A	6B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	9.0	8.3	8.4	9.2	8.0	8.3	N/A	9550345
Cation Sum	meq/L	8.7	8.1	8.3	9.2	8.0	8.3	N/A	9550345
Ion Balance	N/A	0.97	0.97	0.99	1.0	1.0	1.0	0.010	9555997
Ion Balance (% Difference)	%	1.3	1.5	0.68	0.23	0.020	0.080	N/A	9550342
Dissolved Nitrate (NO3)	mg/L	<0.013	0.11	0.021	<0.013	0.29	<0.013	0.013	9549235
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.024	0.0047	<0.0042	0.068	<0.0042	0.0042	9550351
Dissolved Nitrite (NO2)	mg/L	<0.0099	<0.0099	<0.0099	<0.0099	0.010	<0.0099	0.0099	9549235

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	77.8	73.0	76.0	81.2	65.1	72.8	0.50	9554401
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9554401
Bicarbonate (HCO3)	mg/L	95.0	89.1	92.8	99.1	79.5	88.8	0.50	9554401
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9554401
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9554401

Anions

Dissolved Chloride (Cl)	mg/L	72	59	63	71	60	62	0.50	9555240
Dissolved Sulphate (SO4)	mg/L	260 (1)	250 (1)	250 (1)	270 (1)	240 (1)	240 (1)	1.0	9555240

Nutrients

Dissolved Nitrite (N)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0031	<0.0030	0.0030	9552908
Dissolved Nitrate (N)	mg/L	<0.0030	0.024	0.0047	<0.0030	0.065	<0.0030	0.0030	9552908

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WH5538		
Sampling Date		2019/08/14 08:25		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	8.7	N/A	9550345
Cation Sum	meq/L	8.6	N/A	9550345
Ion Balance	N/A	0.99	0.010	9555997
Ion Balance (% Difference)	%	0.51	N/A	9550342
Dissolved Nitrate (NO3)	mg/L	<0.013	0.013	9549235
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	9550351
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9549235
Misc. Inorganics				
Alkalinity (Total as CaCO3)	mg/L	79.6	0.50	9554401
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9554401
Bicarbonate (HCO3)	mg/L	97.1	0.50	9554401
Carbonate (CO3)	mg/L	<0.50	0.50	9554401
Hydroxide (OH)	mg/L	<0.50	0.50	9554401
Anions				
Dissolved Chloride (Cl)	mg/L	66	0.50	9555240
Dissolved Sulphate (SO4)	mg/L	250 (1)	1.0	9555240
Nutrients				
Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9552908
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	9552908
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.				



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5520		WH5521		WH5522		
Sampling Date		2019/08/14 10:00		2019/08/14 09:00		2019/08/14 08:30		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	331	9549888	332	9549888	338	0.50	9549888
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0101	9557356	<0.00050	9557356	<0.00050	0.00050	9550975
Dissolved Antimony (Sb)	mg/L	0.0216	9550975	0.0208	9550975	0.0200	0.000020	9550975
Dissolved Arsenic (As)	mg/L	0.0612	9550975	0.0547	9550975	0.0412	0.000020	9550975
Dissolved Barium (Ba)	mg/L	0.0588	9550975	0.0577	9550975	0.0593	0.000020	9550975
Dissolved Beryllium (Be)	mg/L	<0.000010	9550975	<0.000010	9550975	<0.000010	0.000010	9550975
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9550975	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Boron (B)	mg/L	0.036	9550975	0.042	9550975	0.038	0.010	9550975
Dissolved Cadmium (Cd)	mg/L	0.00203	9550975	0.00116	9550975	0.000444	0.0000050	9550975
Dissolved Chromium (Cr)	mg/L	0.00014	9550975	0.00013	9550975	<0.00010	0.00010	9550975
Dissolved Cobalt (Co)	mg/L	0.00268	9550975	0.000334	9550975	0.0000391	0.0000050	9550975
Dissolved Copper (Cu)	mg/L	0.0232	9550975	0.00815	9550975	0.00255	0.000050	9550975
Dissolved Iron (Fe)	mg/L	0.0010	9550975	0.0035	9557356	0.0031	0.0010	9550975
Dissolved Lead (Pb)	mg/L	0.0164	9550975	0.00254	9550975	0.000103	0.0000050	9550975
Dissolved Lithium (Li)	mg/L	0.00943	9550975	0.00891	9550975	0.00921	0.00050	9557356
Dissolved Manganese (Mn)	mg/L	0.0531	9550975	0.00803	9550975	0.00243	0.000050	9550975
Dissolved Molybdenum (Mo)	mg/L	0.00160	9550975	0.00160	9550975	0.00138	0.000050	9550975
Dissolved Nickel (Ni)	mg/L	0.00773	9550975	0.00664	9550975	0.00462	0.000020	9550975
Dissolved Selenium (Se)	mg/L	0.00799	9550975	0.00742	9550975	0.00685	0.000040	9550975
Dissolved Silicon (Si)	mg/L	0.703	9550975	0.376	9550975	0.306	0.050	9550975
Dissolved Silver (Ag)	mg/L	<0.0000050	9550975	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Strontium (Sr)	mg/L	0.608	9550975	0.600	9550975	0.615	0.000050	9550975
Dissolved Thallium (Tl)	mg/L	<0.0000020	9550975	<0.0000020	9550975	<0.0000020	0.0000020	9550975
Dissolved Tin (Sn)	mg/L	<0.00020	9550975	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Titanium (Ti)	mg/L	<0.00050	9550975	<0.00050	9550975	<0.00050	0.00050	9550975
Dissolved Uranium (U)	mg/L	0.0283	9550975	0.0244	9550975	0.0188	0.0000020	9550975
Dissolved Vanadium (V)	mg/L	<0.00020	9550975	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Zinc (Zn)	mg/L	0.172	9550975	0.151	9550975	0.101	0.00010	9550975
Dissolved Zirconium (Zr)	mg/L	<0.00010	9550975	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Calcium (Ca)	mg/L	105	9549368	105	9549368	107	0.050	9549368
Dissolved Magnesium (Mg)	mg/L	17.1	9549368	16.9	9549368	17.1	0.050	9549368
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5520		WH5521		WH5522		
Sampling Date		2019/08/14 10:00		2019/08/14 09:00		2019/08/14 08:30		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.78	9549368	3.93	9549368	3.92	0.050	9549368
Dissolved Sodium (Na)	mg/L	26.8	9549368	26.8	9549368	27.0	0.050	9549368
Dissolved Sulphur (S)	mg/L	92.9	9549368	92.3	9549368	93.5	3.0	9549368
RDL = Reportable Detection Limit								



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BV Labs Job #: B967670

Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5523	WH5524		WH5525		
Sampling Date		2019/08/14 08:00	2019/08/14 09:05		2019/08/14 08:35		
COC Number		1 OF 2	1 OF 2		1 OF 2		
	UNITS	1C	2A	QC Batch	2B	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	351	332	9549888	339	0.50	9549888
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	<0.00050	0.00160	9550975	<0.00050	0.00050	9550975
Dissolved Antimony (Sb)	mg/L	0.0173	0.0212	9550975	0.0196	0.000020	9550975
Dissolved Arsenic (As)	mg/L	0.0273	0.0538	9550975	0.0443	0.000020	9550975
Dissolved Barium (Ba)	mg/L	0.0590	0.0583	9550975	0.0591	0.000020	9550975
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9550975	<0.000010	0.000010	9550975
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Boron (B)	mg/L	0.025	0.038	9550975	0.023	0.010	9550975
Dissolved Cadmium (Cd)	mg/L	0.000100	0.000968	9550975	0.000254	0.0000050	9550975
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Cobalt (Co)	mg/L	0.0000283	0.000142	9550975	0.0000385	0.0000050	9557356
Dissolved Copper (Cu)	mg/L	0.00128	0.00587	9550975	0.00231	0.000050	9550975
Dissolved Iron (Fe)	mg/L	0.0123	0.0020	9550975	0.0186	0.0010	9557356
Dissolved Lead (Pb)	mg/L	0.0000437	0.000734	9550975	0.0000532	0.0000050	9550975
Dissolved Lithium (Li)	mg/L	0.0112	0.0129	9550975	0.00818	0.00050	9550975
Dissolved Manganese (Mn)	mg/L	0.00377	0.00843	9550975	0.00545	0.000050	9550975
Dissolved Molybdenum (Mo)	mg/L	0.00143	0.00162	9550975	0.00132	0.000050	9550975
Dissolved Nickel (Ni)	mg/L	0.00292	0.00615	9550975	0.00481	0.000020	9550975
Dissolved Selenium (Se)	mg/L	0.00582	0.00761	9550975	0.00667	0.000040	9550975
Dissolved Silicon (Si)	mg/L	0.422	0.452	9550975	0.519	0.050	9550975
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Strontium (Sr)	mg/L	0.629	0.608	9550975	0.612	0.000050	9550975
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9550975	<0.0000020	0.0000020	9550975
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9550975	0.00074	0.00050	9550975
Dissolved Uranium (U)	mg/L	0.0129	0.0314	9550975	0.0146	0.0000020	9550975
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Zinc (Zn)	mg/L	0.0454	0.123	9550975	0.0937	0.00010	9550975
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Calcium (Ca)	mg/L	111	105	9549368	107	0.050	9549368
Dissolved Magnesium (Mg)	mg/L	17.8	16.8	9549368	17.2	0.050	9549368
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5523	WH5524		WH5525		
Sampling Date		2019/08/14 08:00	2019/08/14 09:05		2019/08/14 08:35		
COC Number		1 OF 2	1 OF 2		1 OF 2		
	UNITS	1C	2A	QC Batch	2B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.91	3.79	9549368	3.59	0.050	9549368
Dissolved Sodium (Na)	mg/L	28.2	26.7	9549368	27.2	0.050	9549368
Dissolved Sulphur (S)	mg/L	96.2	93.2	9549368	93.4	3.0	9549368
RDL = Reportable Detection Limit							



BUREAU
VERITAS

BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5526		WH5527	WH5528		
Sampling Date		2019/08/14 08:05		2019/08/14 09:10	2019/08/14 08:40		
COC Number		1 OF 2		1 OF 2	1 OF 2		
	UNITS	2C	QC Batch	3A	3B	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	342	9549888	334	341	0.50	9549888
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	<0.00050	9550975	0.00158	<0.00050	0.00050	9550975
Dissolved Antimony (Sb)	mg/L	0.0185	9550975	0.0213	0.0186	0.000020	9550975
Dissolved Arsenic (As)	mg/L	0.0367	9550975	0.0539	0.0424	0.000020	9550975
Dissolved Barium (Ba)	mg/L	0.0580	9550975	0.0577	0.0590	0.000020	9550975
Dissolved Beryllium (Be)	mg/L	<0.000010	9550975	<0.000010	<0.000010	0.000010	9550975
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9550975	<0.0000050	<0.0000050	0.0000050	9550975
Dissolved Boron (B)	mg/L	0.028	9550975	0.022	0.027	0.010	9550975
Dissolved Cadmium (Cd)	mg/L	0.0000844	9550975	0.000763	0.000259	0.0000050	9550975
Dissolved Chromium (Cr)	mg/L	<0.00010	9550975	<0.00010	<0.00010	0.00010	9550975
Dissolved Cobalt (Co)	mg/L	0.0000279	9550975	0.000186	0.0000334	0.0000050	9550975
Dissolved Copper (Cu)	mg/L	0.00126	9550975	0.00664	0.00266	0.000050	9550975
Dissolved Iron (Fe)	mg/L	0.0039	9557356	0.0051	0.0029	0.0010	9550975
Dissolved Lead (Pb)	mg/L	0.0000317	9550975	0.000472	0.0000535	0.0000050	9550975
Dissolved Lithium (Li)	mg/L	0.0125	9550975	0.00940	0.00840	0.00050	9550975
Dissolved Manganese (Mn)	mg/L	0.00234	9550975	0.00862	0.00328	0.000050	9550975
Dissolved Molybdenum (Mo)	mg/L	0.00120	9550975	0.00155	0.00110	0.000050	9550975
Dissolved Nickel (Ni)	mg/L	0.00321	9550975	0.00689	0.00491	0.000020	9550975
Dissolved Selenium (Se)	mg/L	0.00582	9550975	0.00671	0.00584	0.000040	9550975
Dissolved Silicon (Si)	mg/L	0.496	9550975	0.662	0.625	0.050	9550975
Dissolved Silver (Ag)	mg/L	<0.0000050	9550975	<0.0000050	<0.0000050	0.0000050	9550975
Dissolved Strontium (Sr)	mg/L	0.615	9550975	0.608	0.612	0.000050	9550975
Dissolved Thallium (Tl)	mg/L	<0.0000020	9550975	<0.0000020	<0.0000020	0.0000020	9550975
Dissolved Tin (Sn)	mg/L	<0.00020	9550975	<0.00020	<0.00020	0.00020	9550975
Dissolved Titanium (Ti)	mg/L	<0.00050	9550975	<0.00050	<0.00050	0.00050	9550975
Dissolved Uranium (U)	mg/L	0.00931	9550975	0.0247	0.0124	0.0000020	9550975
Dissolved Vanadium (V)	mg/L	<0.00020	9550975	<0.00020	<0.00020	0.00020	9550975
Dissolved Zinc (Zn)	mg/L	0.0496	9550975	0.120	0.0786	0.00010	9550975
Dissolved Zirconium (Zr)	mg/L	<0.00010	9550975	<0.00010	<0.00010	0.00010	9550975
Dissolved Calcium (Ca)	mg/L	108	9549368	106	108	0.050	9549368
Dissolved Magnesium (Mg)	mg/L	17.3	9549368	17.0	17.2	0.050	9549368
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5526		WH5527	WH5528		
Sampling Date		2019/08/14 08:05		2019/08/14 09:10	2019/08/14 08:40		
COC Number		1 OF 2		1 OF 2	1 OF 2		
	UNITS	2C	QC Batch	3A	3B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.59	9549368	3.64	3.75	0.050	9549368
Dissolved Sodium (Na)	mg/L	27.5	9549368	27.0	27.4	0.050	9549368
Dissolved Sulphur (S)	mg/L	93.0	9549368	92.6	94.1	3.0	9549368
RDL = Reportable Detection Limit							



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VERITAS

BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5529	WH5530	WH5531		WH5532		
Sampling Date		2019/08/14 08:10	2019/08/14 09:15	2019/08/14 08:45		2019/08/14 08:15		
COC Number		1 OF 2	2 OF 2	2 OF 2		2 OF 2		
	UNITS	3C	4A	4B	QC Batch	4C	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	353	340	353	9549888	370	0.50	9549888
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	<0.00050	<0.00050	0.00152	9557356	<0.00050	0.00050	9550975
Dissolved Antimony (Sb)	mg/L	0.0167	0.0139	0.0105	9550975	0.00721	0.000020	9550975
Dissolved Arsenic (As)	mg/L	0.0340	0.0325	0.0160	9550975	0.00800	0.000020	9550975
Dissolved Barium (Ba)	mg/L	0.0583	0.0588	0.0600	9550975	0.0592	0.000020	9550975
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9550975	<0.000010	0.000010	9550975
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Boron (B)	mg/L	0.025	0.036	0.013	9550975	<0.010	0.010	9550975
Dissolved Cadmium (Cd)	mg/L	0.0000822	0.000232	0.0000225	9550975	0.0000065	0.0000050	9550975
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Cobalt (Co)	mg/L	0.0000223	0.000119	0.0000192	9550975	0.0000291	0.0000050	9550975
Dissolved Copper (Cu)	mg/L	0.00143	0.00194	0.000895	9550975	0.000410	0.000050	9550975
Dissolved Iron (Fe)	mg/L	0.0052	0.0082	0.0048	9550975	0.0101	0.0010	9550975
Dissolved Lead (Pb)	mg/L	0.0000263	0.000200	0.0000412	9550975	0.0000171	0.0000050	9550975
Dissolved Lithium (Li)	mg/L	0.0107	0.0101	0.00910	9550975	0.0129	0.00050	9550975
Dissolved Manganese (Mn)	mg/L	0.00247	0.0116	0.00606	9550975	0.00968	0.000050	9550975
Dissolved Molybdenum (Mo)	mg/L	0.000986	0.00105	0.000488	9550975	0.000292	0.000050	9550975
Dissolved Nickel (Ni)	mg/L	0.00291	0.00569	0.00344	9550975	0.00199	0.000020	9550975
Dissolved Selenium (Se)	mg/L	0.00507	0.00349	0.00202	9550975	0.00122	0.000040	9550975
Dissolved Silicon (Si)	mg/L	0.553	0.750	0.790	9550975	0.830	0.050	9550975
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Strontium (Sr)	mg/L	0.622	0.615	0.631	9550975	0.643	0.000050	9550975
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	9550975	<0.0000020	0.0000020	9550975
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9550975	<0.00050	0.00050	9550975
Dissolved Uranium (U)	mg/L	0.00665	0.0109	0.00310	9550975	0.00108	0.0000020	9550975
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Zinc (Zn)	mg/L	0.0385	0.0576	0.0189	9550975	0.00618	0.00010	9550975
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Calcium (Ca)	mg/L	112	108	112	9549368	118	0.050	9549368
Dissolved Magnesium (Mg)	mg/L	17.6	17.0	17.9	9549368	18.7	0.050	9549368

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5529	WH5530	WH5531		WH5532		
Sampling Date		2019/08/14 08:10	2019/08/14 09:15	2019/08/14 08:45		2019/08/14 08:15		
COC Number		1 OF 2	2 OF 2	2 OF 2		2 OF 2		
	UNITS	3C	4A	4B	QC Batch	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.72	3.13	2.58	9549368	1.64	0.050	9549368
Dissolved Sodium (Na)	mg/L	28.3	27.1	28.1	9549368	29.6	0.050	9549368
Dissolved Sulphur (S)	mg/L	94.1	92.2	97.1	9549368	99.7	3.0	9549368
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B967670
Report Date: 2019/08/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WH5533		WH5534		WH5535		
Sampling Date		2019/08/14 09:20		2019/08/14 08:50		2019/08/14 08:20		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5A	QC Batch	5B	QC Batch	5C	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	340	9549888	354	9549888	392	0.50	9549888
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00204	9550975	0.00404	9557356	<0.00050	0.00050	9550975
Dissolved Antimony (Sb)	mg/L	0.0159	9550975	0.0113	9550975	0.00435	0.000020	9550975
Dissolved Arsenic (As)	mg/L	0.0349	9550975	0.0151	9550975	0.00441	0.000020	9550975
Dissolved Barium (Ba)	mg/L	0.0635	9550975	0.0594	9550975	0.0639	0.000020	9550975
Dissolved Beryllium (Be)	mg/L	<0.000010	9550975	<0.000010	9550975	<0.000010	0.000010	9550975
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9550975	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Boron (B)	mg/L	0.019	9550975	0.013	9550975	<0.010	0.010	9550975
Dissolved Cadmium (Cd)	mg/L	0.000223	9550975	0.0000666	9550975	0.0000190	0.0000050	9550975
Dissolved Chromium (Cr)	mg/L	<0.00010	9550975	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Cobalt (Co)	mg/L	0.000548	9550975	0.000144	9550975	0.000118	0.0000050	9550975
Dissolved Copper (Cu)	mg/L	0.00286	9550975	0.00101	9550975	0.000333	0.000050	9550975
Dissolved Iron (Fe)	mg/L	0.0169	9550975	0.0165	9550975	0.0554	0.0010	9550975
Dissolved Lead (Pb)	mg/L	0.000688	9550975	0.000153	9550975	0.0000333	0.0000050	9550975
Dissolved Lithium (Li)	mg/L	0.0101	9550975	0.0113	9550975	0.0119	0.00050	9550975
Dissolved Manganese (Mn)	mg/L	0.0371	9550975	0.0358	9550975	0.0416	0.000050	9550975
Dissolved Molybdenum (Mo)	mg/L	0.00110	9550975	0.000686	9550975	0.000408	0.000050	9550975
Dissolved Nickel (Ni)	mg/L	0.00594	9550975	0.00296	9550975	0.00139	0.000020	9550975
Dissolved Selenium (Se)	mg/L	0.00320	9550975	0.00111	9550975	0.000379	0.000040	9550975
Dissolved Silicon (Si)	mg/L	0.785	9550975	0.888	9550975	1.13	0.050	9550975
Dissolved Silver (Ag)	mg/L	<0.0000050	9550975	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Strontium (Sr)	mg/L	0.616	9550975	0.632	9550975	0.669	0.000050	9550975
Dissolved Thallium (Tl)	mg/L	<0.0000020	9550975	<0.0000020	9550975	<0.0000020	0.0000020	9550975
Dissolved Tin (Sn)	mg/L	<0.00020	9550975	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Titanium (Ti)	mg/L	<0.00050	9550975	<0.00050	9550975	<0.00050	0.00050	9550975
Dissolved Uranium (U)	mg/L	0.0135	9550975	0.00211	9550975	0.000380	0.0000020	9550975
Dissolved Vanadium (V)	mg/L	<0.00020	9550975	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Zinc (Zn)	mg/L	0.0529	9550975	0.0133	9550975	0.00385	0.00010	9550975
Dissolved Zirconium (Zr)	mg/L	<0.00010	9550975	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Calcium (Ca)	mg/L	108	9549368	112	9549368	124	0.050	9549368
Dissolved Magnesium (Mg)	mg/L	17.3	9549368	18.4	9549368	20.1	0.050	9549368

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5533		WH5534		WH5535		
Sampling Date		2019/08/14 09:20		2019/08/14 08:50		2019/08/14 08:20		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5A	QC Batch	5B	QC Batch	5C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.13	9549368	2.60	9549368	1.65	0.050	9549368
Dissolved Sodium (Na)	mg/L	27.2	9549368	27.2	9549368	30.6	0.050	9549368
Dissolved Sulphur (S)	mg/L	93.8	9549368	96.1	9549368	102	3.0	9549368
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B967670
Report Date: 2019/08/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WH5536		WH5537		WH5538		
Sampling Date		2019/08/14 09:25		2019/08/14 08:55		2019/08/14 08:25		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	6A	QC Batch	6B	QC Batch	6C	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	339	9549888	350	9549888	364	0.50	9549888
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00188	9550975	<0.00050	9557356	<0.00050	0.00050	9550975
Dissolved Antimony (Sb)	mg/L	0.0156	9550975	0.0113	9550975	0.0102	0.000020	9550975
Dissolved Arsenic (As)	mg/L	0.0352	9550975	0.0178	9550975	0.0109	0.000020	9550975
Dissolved Barium (Ba)	mg/L	0.0590	9550975	0.0600	9550975	0.0626	0.000020	9550975
Dissolved Beryllium (Be)	mg/L	<0.000010	9550975	<0.000010	9550975	<0.000010	0.000010	9550975
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9550975	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Boron (B)	mg/L	0.026	9550975	0.010	9550975	<0.010	0.010	9550975
Dissolved Cadmium (Cd)	mg/L	0.000455	9550975	0.0000825	9550975	0.0000125	0.0000050	9550975
Dissolved Chromium (Cr)	mg/L	<0.00010	9550975	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Cobalt (Co)	mg/L	0.000602	9550975	0.0000754	9550975	0.0000262	0.0000050	9550975
Dissolved Copper (Cu)	mg/L	0.00374	9550975	0.00146	9550975	0.000579	0.000050	9550975
Dissolved Iron (Fe)	mg/L	0.0186	9550975	0.0101	9550975	0.0143	0.0010	9550975
Dissolved Lead (Pb)	mg/L	0.000477	9550975	0.000108	9550975	0.0000245	0.0000050	9550975
Dissolved Lithium (Li)	mg/L	0.0102	9550975	0.00846	9550975	0.0106	0.00050	9557356
Dissolved Manganese (Mn)	mg/L	0.0266	9550975	0.0131	9550975	0.0135	0.000050	9550975
Dissolved Molybdenum (Mo)	mg/L	0.00132	9550975	0.000651	9550975	0.000374	0.000050	9550975
Dissolved Nickel (Ni)	mg/L	0.00584	9550975	0.00353	9550975	0.00182	0.000020	9550975
Dissolved Selenium (Se)	mg/L	0.00431	9550975	0.00202	9550975	0.00161	0.000040	9550975
Dissolved Silicon (Si)	mg/L	0.780	9550975	0.837	9550975	0.795	0.050	9550975
Dissolved Silver (Ag)	mg/L	<0.0000050	9550975	<0.0000050	9550975	<0.0000050	0.0000050	9550975
Dissolved Strontium (Sr)	mg/L	0.612	9550975	0.622	9550975	0.640	0.000050	9550975
Dissolved Thallium (Tl)	mg/L	<0.0000020	9550975	<0.0000020	9550975	<0.0000020	0.0000020	9550975
Dissolved Tin (Sn)	mg/L	<0.00020	9550975	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Titanium (Ti)	mg/L	<0.00050	9550975	<0.00050	9550975	<0.00050	0.00050	9550975
Dissolved Uranium (U)	mg/L	0.0170	9550975	0.00406	9550975	0.00156	0.0000020	9550975
Dissolved Vanadium (V)	mg/L	<0.00020	9550975	<0.00020	9550975	<0.00020	0.00020	9550975
Dissolved Zinc (Zn)	mg/L	0.0680	9550975	0.0216	9550975	0.00419	0.00010	9550975
Dissolved Zirconium (Zr)	mg/L	<0.00010	9550975	<0.00010	9550975	<0.00010	0.00010	9550975
Dissolved Calcium (Ca)	mg/L	107	9549368	111	9549368	115	0.050	9549368
Dissolved Magnesium (Mg)	mg/L	17.4	9549368	17.8	9549368	18.5	0.050	9549368

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WH5536		WH5537		WH5538		
Sampling Date		2019/08/14 09:25		2019/08/14 08:55		2019/08/14 08:25		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	6A	QC Batch	6B	QC Batch	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.24	9549368	2.79	9549368	2.13	0.050	9549368
Dissolved Sodium (Na)	mg/L	27.1	9549368	28.0	9549368	29.1	0.050	9549368
Dissolved Sulphur (S)	mg/L	93.2	9549368	95.5	9549368	97.1	3.0	9549368
RDL = Reportable Detection Limit								



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5520		WH5521		WH5522		
Sampling Date		2019/08/14 10:00		2019/08/14 09:00		2019/08/14 08:30		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	336	9549887	331	9549887	337	0.50	9549887
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0324	9557361	0.00381	9557361	<0.00050	0.00050	9549774
Total Antimony (Sb)	mg/L	0.0225	9549774	0.0207	9549774	0.0200	0.000020	9549774
Total Arsenic (As)	mg/L	0.0626	9549774	0.0540	9549774	0.0417	0.000020	9549774
Total Barium (Ba)	mg/L	0.0604	9549774	0.0590	9549774	0.0595	0.000020	9549774
Total Beryllium (Be)	mg/L	<0.000010	9549774	<0.000010	9549774	<0.000010	0.000010	9549774
Total Bismuth (Bi)	mg/L	<0.0000050	9549774	<0.0000050	9549774	<0.0000050	0.0000050	9549774
Total Boron (B)	mg/L	0.027	9549774	0.037	9549774	0.036	0.010	9549774
Total Cadmium (Cd)	mg/L	0.00219	9549774	0.00119	9549774	0.000424	0.0000050	9549774
Total Chromium (Cr)	mg/L	0.00014	9549774	<0.00010	9549774	<0.00010	0.00010	9549774
Total Cobalt (Co)	mg/L	0.00265	9549774	0.000312	9549774	0.0000468	0.0000050	9549774
Total Copper (Cu)	mg/L	0.0230	9549774	0.00746	9549774	0.00278	0.000050	9549774
Total Iron (Fe)	mg/L	0.0017	9549774	0.0043	9557361	0.0051	0.0010	9549774
Total Lead (Pb)	mg/L	0.0167	9549774	0.00193	9549774	0.000179	0.0000050	9549774
Total Lithium (Li)	mg/L	0.0100	9549774	0.00739	9549774	0.0125	0.00050	9557361
Total Manganese (Mn)	mg/L	0.0526	9549774	0.00774	9549774	0.00246	0.000050	9549774
Total Molybdenum (Mo)	mg/L	0.00153	9549774	0.00142	9549774	0.00156	0.000050	9549774
Total Nickel (Ni)	mg/L	0.00761	9549774	0.00616	9549774	0.00456	0.000020	9549774
Total Selenium (Se)	mg/L	0.00805	9549774	0.00714	9549774	0.00675	0.000040	9549774
Total Silicon (Si)	mg/L	0.733	9549774	0.383	9549774	0.305	0.050	9549774
Total Silver (Ag)	mg/L	<0.0000050	9549774	<0.0000050	9549774	<0.0000050	0.0000050	9549774
Total Strontium (Sr)	mg/L	0.614	9549774	0.615	9549774	0.621	0.000050	9549774
Total Thallium (Tl)	mg/L	<0.0000020	9549774	<0.0000020	9549774	<0.0000020	0.0000020	9549774
Total Tin (Sn)	mg/L	<0.00020	9549774	<0.00020	9549774	<0.00020	0.00020	9549774
Total Titanium (Ti)	mg/L	<0.00050	9549774	<0.00050	9549774	<0.00050	0.00050	9549774
Total Uranium (U)	mg/L	0.0279	9549774	0.0241	9549774	0.0182	0.0000020	9549774
Total Vanadium (V)	mg/L	<0.00020	9549774	<0.00020	9549774	<0.00020	0.00020	9549774
Total Zinc (Zn)	mg/L	0.177	9549774	0.146	9549774	0.102	0.00010	9549774
Total Zirconium (Zr)	mg/L	<0.00010	9549774	<0.00010	9549774	<0.00010	0.00010	9549774
Total Calcium (Ca)	mg/L	107	9549371	105	9549371	107	0.050	9549371
Total Magnesium (Mg)	mg/L	17.0	9549371	16.9	9549371	17.0	0.050	9549371
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5520		WH5521		WH5522		
Sampling Date		2019/08/14 10:00		2019/08/14 09:00		2019/08/14 08:30		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Total Potassium (K)	mg/L	3.77	9549371	3.85	9549371	3.93	0.050	9549371
Total Sodium (Na)	mg/L	25.9	9549371	26.3	9549371	27.0	0.050	9549371
Total Sulphur (S)	mg/L	95.8	9549371	92.7	9549371	93.8	3.0	9549371
RDL = Reportable Detection Limit								



BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5523	WH5524		WH5525		
Sampling Date		2019/08/14 08:00	2019/08/14 09:05		2019/08/14 08:35		
COC Number		1 OF 2	1 OF 2		1 OF 2		
	UNITS	1C	2A	QC Batch	2B	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	348	392	9549887	337	0.50	9549887
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	<0.00050	0.00784	9549774	0.00182	0.00050	9549774
Total Antimony (Sb)	mg/L	0.0172	0.0212	9549774	0.0194	0.000020	9549774
Total Arsenic (As)	mg/L	0.0274	0.0525	9549774	0.0438	0.000020	9549774
Total Barium (Ba)	mg/L	0.0590	0.0587	9549774	0.0576	0.000020	9549774
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	9549774	<0.000010	0.000010	9549774
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9549774	<0.0000050	0.0000050	9549774
Total Boron (B)	mg/L	0.042	0.035	9549774	0.038	0.010	9549774
Total Cadmium (Cd)	mg/L	0.000116	0.000941	9549774	0.000281	0.0000050	9549774
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	9549774	<0.00010	0.00010	9549774
Total Cobalt (Co)	mg/L	0.0000255	0.000155	9549774	0.0000339	0.0000050	9557361
Total Copper (Cu)	mg/L	0.00134	0.00628	9549774	0.00215	0.000050	9549774
Total Iron (Fe)	mg/L	0.0178	0.0064	9549774	0.0100	0.0010	9557361
Total Lead (Pb)	mg/L	0.0000563	0.00124	9549774	0.0000714	0.0000050	9549774
Total Lithium (Li)	mg/L	0.0120	0.0135	9549774	0.00926	0.00050	9549774
Total Manganese (Mn)	mg/L	0.00393	0.00868	9549774	0.00389	0.000050	9549774
Total Molybdenum (Mo)	mg/L	0.00144	0.00159	9549774	0.00127	0.000050	9549774
Total Nickel (Ni)	mg/L	0.00284	0.00588	9549774	0.00466	0.000020	9549774
Total Selenium (Se)	mg/L	0.00569	0.00908	9549774	0.00648	0.000040	9549774
Total Silicon (Si)	mg/L	0.423	0.582	9549774	0.511	0.050	9549774
Total Silver (Ag)	mg/L	<0.0000050	0.0000063	9549774	<0.0000050	0.0000050	9549774
Total Strontium (Sr)	mg/L	0.628	0.610	9549774	0.608	0.000050	9549774
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9549774	<0.0000020	0.0000020	9549774
Total Tin (Sn)	mg/L	<0.00020	<0.00020	9549774	<0.00020	0.00020	9549774
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	9549774	<0.00050	0.00050	9549774
Total Uranium (U)	mg/L	0.0126	0.0306	9549774	0.0140	0.0000020	9549774
Total Vanadium (V)	mg/L	<0.00020	<0.00020	9549774	<0.00020	0.00020	9549774
Total Zinc (Zn)	mg/L	0.0454	0.120	9549774	0.0862	0.00010	9549774
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	9549774	<0.00010	0.00010	9549774
Total Calcium (Ca)	mg/L	110	129	9549371	106	0.050	9549371
Total Magnesium (Mg)	mg/L	17.7	16.7	9549371	17.2	0.050	9549371
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5523	WH5524		WH5525		
Sampling Date		2019/08/14 08:00	2019/08/14 09:05		2019/08/14 08:35		
COC Number		1 OF 2	1 OF 2		1 OF 2		
	UNITS	1C	2A	QC Batch	2B	RDL	QC Batch
Total Potassium (K)	mg/L	3.88	3.73	9549371	3.57	0.050	9549371
Total Sodium (Na)	mg/L	28.0	26.4	9549371	27.0	0.050	9549371
Total Sulphur (S)	mg/L	96.7	93.0	9549371	94.1	3.0	9549371
RDL = Reportable Detection Limit							

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VERITASBV Labs Job #: B967670
Report Date: 2019/08/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WH5526		WH5527	WH5528		
Sampling Date		2019/08/14 08:05		2019/08/14 09:10	2019/08/14 08:40		
COC Number		1 OF 2		1 OF 2	1 OF 2		
	UNITS	2C	QC Batch	3A	3B	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	341	9549887	336	339	0.50	9549887
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	<0.00050	9549774	0.0127	0.00082	0.00050	9549774
Total Antimony (Sb)	mg/L	0.0185	9549774	0.0220	0.0197	0.000020	9549774
Total Arsenic (As)	mg/L	0.0375	9549774	0.0540	0.0425	0.000020	9549774
Total Barium (Ba)	mg/L	0.0591	9549774	0.0588	0.0592	0.000020	9549774
Total Beryllium (Be)	mg/L	<0.000010	9549774	<0.000010	<0.000010	0.000010	9549774
Total Bismuth (Bi)	mg/L	<0.0000050	9549774	<0.0000050	<0.0000050	0.0000050	9549774
Total Boron (B)	mg/L	0.030	9549774	0.023	0.036	0.010	9549774
Total Cadmium (Cd)	mg/L	0.000102	9549774	0.000797	0.000237	0.0000050	9549774
Total Chromium (Cr)	mg/L	<0.00010	9549774	<0.00010	<0.00010	0.00010	9549774
Total Cobalt (Co)	mg/L	0.0000225	9549774	0.000192	0.0000298	0.0000050	9549774
Total Copper (Cu)	mg/L	0.00136	9549774	0.00710	0.00278	0.000050	9549774
Total Iron (Fe)	mg/L	0.0094	9557361	0.0068	0.0051	0.0010	9549774
Total Lead (Pb)	mg/L	0.0000325	9549774	0.000901	0.0000900	0.0000050	9549774
Total Lithium (Li)	mg/L	0.00916	9549774	0.0136	0.00981	0.00050	9549774
Total Manganese (Mn)	mg/L	0.00233	9549774	0.00913	0.00343	0.000050	9549774
Total Molybdenum (Mo)	mg/L	0.00112	9549774	0.00156	0.00127	0.000050	9549774
Total Nickel (Ni)	mg/L	0.00310	9549774	0.00662	0.00454	0.000020	9549774
Total Selenium (Se)	mg/L	0.00598	9549774	0.00695	0.00580	0.000040	9549774
Total Silicon (Si)	mg/L	0.501	9549774	0.683	0.630	0.050	9549774
Total Silver (Ag)	mg/L	<0.0000050	9549774	<0.0000050	<0.0000050	0.0000050	9549774
Total Strontium (Sr)	mg/L	0.632	9549774	0.614	0.618	0.000050	9549774
Total Thallium (Tl)	mg/L	<0.0000020	9549774	<0.0000020	<0.0000020	0.0000020	9549774
Total Tin (Sn)	mg/L	<0.00020	9549774	<0.00020	<0.00020	0.00020	9549774
Total Titanium (Ti)	mg/L	<0.00050	9549774	<0.00050	<0.00050	0.00050	9549774
Total Uranium (U)	mg/L	0.00925	9549774	0.0244	0.0119	0.0000020	9549774
Total Vanadium (V)	mg/L	<0.00020	9549774	<0.00020	<0.00020	0.00020	9549774
Total Zinc (Zn)	mg/L	0.0494	9549774	0.122	0.0783	0.00010	9549774
Total Zirconium (Zr)	mg/L	<0.00010	9549774	<0.00010	<0.00010	0.00010	9549774
Total Calcium (Ca)	mg/L	108	9549371	106	108	0.050	9549371
Total Magnesium (Mg)	mg/L	17.4	9549371	17.0	17.1	0.050	9549371
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5526		WH5527	WH5528		
Sampling Date		2019/08/14 08:05		2019/08/14 09:10	2019/08/14 08:40		
COC Number		1 OF 2		1 OF 2	1 OF 2		
	UNITS	2C	QC Batch	3A	3B	RDL	QC Batch
Total Potassium (K)	mg/L	3.61	9549371	3.66	3.74	0.050	9549371
Total Sodium (Na)	mg/L	27.4	9549371	26.8	27.0	0.050	9549371
Total Sulphur (S)	mg/L	94.8	9549371	93.0	93.4	3.0	9549371
RDL = Reportable Detection Limit							



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5529		WH5530	WH5531		
Sampling Date		2019/08/14 08:10		2019/08/14 09:15	2019/08/14 08:45		
COC Number		1 OF 2		2 OF 2	2 OF 2		
	UNITS	3C	QC Batch	4A	4B	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	352	9549887	340	351	0.50	9550339
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	<0.00050	9557361	0.00177	0.00723	0.00050	9557361
Total Antimony (Sb)	mg/L	0.0176	9549774	0.0141	0.0109	0.000020	9549774
Total Arsenic (As)	mg/L	0.0341	9549774	0.0325	0.0161	0.000020	9549774
Total Barium (Ba)	mg/L	0.0597	9549774	0.0588	0.0595	0.000020	9549774
Total Beryllium (Be)	mg/L	<0.000010	9549774	<0.000010	<0.000010	0.000010	9549774
Total Bismuth (Bi)	mg/L	<0.0000050	9549774	<0.0000050	<0.0000050	0.0000050	9549774
Total Boron (B)	mg/L	0.018	9549774	0.032	0.013	0.010	9549774
Total Cadmium (Cd)	mg/L	0.0000520	9557361	0.000225	0.0000298	0.0000050	9549774
Total Chromium (Cr)	mg/L	<0.00010	9549774	<0.00010	<0.00010	0.00010	9549774
Total Cobalt (Co)	mg/L	0.0000247	9549774	0.000119	0.0000217	0.0000050	9549774
Total Copper (Cu)	mg/L	0.00136	9549774	0.00223	0.000970	0.000050	9549774
Total Iron (Fe)	mg/L	0.0059	9549774	0.0121	0.0091	0.0010	9549774
Total Lead (Pb)	mg/L	0.0000247	9549774	0.000278	0.0000540	0.0000050	9549774
Total Lithium (Li)	mg/L	0.00929	9549774	0.00937	0.0117	0.00050	9549774
Total Manganese (Mn)	mg/L	0.00234	9549774	0.0116	0.00673	0.000050	9549774
Total Molybdenum (Mo)	mg/L	0.00128	9549774	0.000952	0.000550	0.000050	9549774
Total Nickel (Ni)	mg/L	0.00284	9549774	0.00556	0.00318	0.000020	9549774
Total Selenium (Se)	mg/L	0.00518	9549774	0.00327	0.00203	0.000040	9549774
Total Silicon (Si)	mg/L	0.559	9549774	0.762	0.795	0.050	9549774
Total Silver (Ag)	mg/L	<0.0000050	9549774	<0.0000050	<0.0000050	0.0000050	9549774
Total Strontium (Sr)	mg/L	0.639	9549774	0.622	0.634	0.000050	9549774
Total Thallium (Tl)	mg/L	<0.0000020	9549774	<0.0000020	<0.0000020	0.0000020	9549774
Total Tin (Sn)	mg/L	<0.00020	9549774	<0.00020	<0.00020	0.00020	9549774
Total Titanium (Ti)	mg/L	<0.00050	9549774	<0.00050	<0.00050	0.00050	9549774
Total Uranium (U)	mg/L	0.00658	9549774	0.0106	0.00308	0.0000020	9549774
Total Vanadium (V)	mg/L	<0.00020	9549774	<0.00020	<0.00020	0.00020	9549774
Total Zinc (Zn)	mg/L	0.0383	9549774	0.0574	0.0186	0.00010	9549774
Total Zirconium (Zr)	mg/L	<0.00010	9549774	<0.00010	<0.00010	0.00010	9549774
Total Calcium (Ca)	mg/L	112	9549371	108	111	0.050	9549371
Total Magnesium (Mg)	mg/L	17.4	9549371	17.1	17.9	0.050	9549371
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5529		WH5530	WH5531		
Sampling Date		2019/08/14 08:10		2019/08/14 09:15	2019/08/14 08:45		
COC Number		1 OF 2		2 OF 2	2 OF 2		
	UNITS	3C	QC Batch	4A	4B	RDL	QC Batch
Total Potassium (K)	mg/L	3.74	9549371	3.14	2.56	0.050	9549371
Total Sodium (Na)	mg/L	27.8	9549371	27.0	27.8	0.050	9549371
Total Sulphur (S)	mg/L	95.3	9549371	94.7	96.4	3.0	9549371
RDL = Reportable Detection Limit							



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5532	WH5533		WH5534		
Sampling Date		2019/08/14 08:15	2019/08/14 09:20		2019/08/14 08:50		
COC Number		2 OF 2	2 OF 2		2 OF 2		
	UNITS	4C	5A	QC Batch	5B	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	375	332	9550339	353	0.50	9550339
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	<0.00050	0.00183	9549774	0.00233	0.00050	9557361
Total Antimony (Sb)	mg/L	0.00717	0.0161	9549774	0.0105	0.000020	9549774
Total Arsenic (As)	mg/L	0.00819	0.0363	9549774	0.0151	0.000020	9549774
Total Barium (Ba)	mg/L	0.0604	0.0606	9549774	0.0604	0.000020	9549774
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	9549774	<0.000010	0.000010	9549774
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9549774	<0.0000050	0.0000050	9549774
Total Boron (B)	mg/L	<0.010	0.017	9549774	<0.010	0.010	9549774
Total Cadmium (Cd)	mg/L	<0.0000050	0.000257	9549774	0.0000777	0.0000050	9549774
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	9549774	<0.00010	0.00010	9549774
Total Cobalt (Co)	mg/L	0.0000280	0.000577	9549774	0.000149	0.0000050	9549774
Total Copper (Cu)	mg/L	0.000475	0.00350	9549774	0.00128	0.000050	9549774
Total Iron (Fe)	mg/L	0.0130	0.0353	9549774	0.0206	0.0010	9549774
Total Lead (Pb)	mg/L	0.0000409	0.000908	9549774	0.000183	0.0000050	9549774
Total Lithium (Li)	mg/L	0.0142	0.00836	9549774	0.0105	0.00050	9549774
Total Manganese (Mn)	mg/L	0.00962	0.0377	9549774	0.0369	0.000050	9549774
Total Molybdenum (Mo)	mg/L	0.000305	0.00109	9549774	0.000592	0.000050	9549774
Total Nickel (Ni)	mg/L	0.00202	0.00568	9549774	0.00309	0.000020	9549774
Total Selenium (Se)	mg/L	0.00117	0.00306	9549774	0.00112	0.000040	9549774
Total Silicon (Si)	mg/L	0.839	0.800	9549774	0.906	0.050	9549774
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	9549774	<0.0000050	0.0000050	9549774
Total Strontium (Sr)	mg/L	0.702	0.620	9549774	0.638	0.000050	9549774
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9549774	<0.0000020	0.0000020	9549774
Total Tin (Sn)	mg/L	<0.00020	<0.00020	9549774	<0.00020	0.00020	9549774
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	9549774	<0.00050	0.00050	9549774
Total Uranium (U)	mg/L	0.00106	0.0120	9549774	0.00208	0.0000020	9549774
Total Vanadium (V)	mg/L	<0.00020	<0.00020	9549774	<0.00020	0.00020	9549774
Total Zinc (Zn)	mg/L	0.00599	0.0525	9549774	0.0137	0.00010	9549774
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	9549774	<0.00010	0.00010	9549774
Total Calcium (Ca)	mg/L	117	104	9549371	111	0.050	9549371
Total Magnesium (Mg)	mg/L	20.1	17.3	9549371	18.5	0.050	9549371
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5532	WH5533		WH5534		
Sampling Date		2019/08/14 08:15	2019/08/14 09:20		2019/08/14 08:50		
COC Number		2 OF 2	2 OF 2		2 OF 2		
	UNITS	4C	5A	QC Batch	5B	RDL	QC Batch
Total Potassium (K)	mg/L	1.75	3.14	9549371	2.64	0.050	9549371
Total Sodium (Na)	mg/L	31.3	26.8	9549371	28.3	0.050	9549371
Total Sulphur (S)	mg/L	108	94.2	9549371	98.0	3.0	9549371
RDL = Reportable Detection Limit							



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5535		WH5536		WH5537		
Sampling Date		2019/08/14 08:20		2019/08/14 09:25		2019/08/14 08:55		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5C	QC Batch	6A	QC Batch	6B	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	388	9550339	337	9550339	351	0.50	9550339
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	<0.00050	9549774	0.00618	9549774	0.00777	0.00050	9557361
Total Antimony (Sb)	mg/L	0.00455	9549774	0.0158	9549774	0.0114	0.000020	9549774
Total Arsenic (As)	mg/L	0.00453	9549774	0.0350	9549774	0.0183	0.000020	9549774
Total Barium (Ba)	mg/L	0.0645	9549774	0.0587	9549774	0.0604	0.000020	9549774
Total Beryllium (Be)	mg/L	<0.000010	9549774	<0.000010	9549774	<0.000010	0.000010	9549774
Total Bismuth (Bi)	mg/L	<0.0000050	9549774	<0.0000050	9549774	<0.0000050	0.0000050	9549774
Total Boron (B)	mg/L	<0.010	9549774	0.017	9549774	0.013	0.010	9549774
Total Cadmium (Cd)	mg/L	0.0000133	9549774	0.000488	9549774	0.0000946	0.0000050	9549774
Total Chromium (Cr)	mg/L	<0.00010	9549774	<0.00010	9549774	<0.00010	0.00010	9549774
Total Cobalt (Co)	mg/L	0.000118	9549774	0.000640	9549774	0.0000773	0.0000050	9549774
Total Copper (Cu)	mg/L	0.000396	9549774	0.00464	9549774	0.00175	0.000050	9549774
Total Iron (Fe)	mg/L	0.0661	9549774	0.0285	9549774	0.0191	0.0010	9549774
Total Lead (Pb)	mg/L	0.0000415	9549774	0.000868	9549774	0.000259	0.0000050	9549774
Total Lithium (Li)	mg/L	0.00982	9549774	0.0113	9549774	0.0142	0.00050	9549774
Total Manganese (Mn)	mg/L	0.0410	9549774	0.0275	9549774	0.0149	0.000050	9549774
Total Molybdenum (Mo)	mg/L	0.000416	9549774	0.00120	9549774	0.000659	0.000050	9549774
Total Nickel (Ni)	mg/L	0.00141	9549774	0.00584	9549774	0.00346	0.000020	9549774
Total Selenium (Se)	mg/L	0.000308	9549774	0.00454	9549774	0.00205	0.000040	9549774
Total Silicon (Si)	mg/L	1.14	9549774	0.795	9549774	0.854	0.050	9549774
Total Silver (Ag)	mg/L	<0.0000050	9549774	<0.0000050	9549774	<0.0000050	0.0000050	9549774
Total Strontium (Sr)	mg/L	0.681	9549774	0.619	9549774	0.643	0.000050	9549774
Total Thallium (Tl)	mg/L	<0.0000020	9549774	<0.0000020	9549774	<0.0000020	0.0000020	9549774
Total Tin (Sn)	mg/L	<0.00020	9549774	<0.00020	9549774	<0.00020	0.00020	9549774
Total Titanium (Ti)	mg/L	<0.00050	9549774	<0.00050	9549774	<0.00050	0.00050	9549774
Total Uranium (U)	mg/L	0.000376	9549774	0.0163	9549774	0.00403	0.0000020	9549774
Total Vanadium (V)	mg/L	<0.00020	9549774	<0.00020	9549774	<0.00020	0.00020	9549774
Total Zinc (Zn)	mg/L	0.00268	9557361	0.0695	9549774	0.0212	0.00010	9549774
Total Zirconium (Zr)	mg/L	<0.00010	9549774	<0.00010	9549774	<0.00010	0.00010	9549774
Total Calcium (Ca)	mg/L	122	9549371	107	9549371	111	0.050	9549371
Total Magnesium (Mg)	mg/L	20.0	9549371	17.2	9549371	17.8	0.050	9549371
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5535		WH5536		WH5537		
Sampling Date		2019/08/14 08:20		2019/08/14 09:25		2019/08/14 08:55		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5C	QC Batch	6A	QC Batch	6B	RDL	QC Batch
Total Potassium (K)	mg/L	1.67	9549371	3.26	9549371	2.79	0.050	9549371
Total Sodium (Na)	mg/L	30.4	9549371	26.9	9549371	27.6	0.050	9549371
Total Sulphur (S)	mg/L	103	9549371	94.5	9549371	95.1	3.0	9549371
RDL = Reportable Detection Limit								

**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WH5538		
Sampling Date		2019/08/14 08:25		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	361	0.50	9550339
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	<0.00050	0.00050	9549774
Total Antimony (Sb)	mg/L	0.00996	0.000020	9549774
Total Arsenic (As)	mg/L	0.0109	0.000020	9549774
Total Barium (Ba)	mg/L	0.0629	0.000020	9549774
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9549774
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9549774
Total Boron (B)	mg/L	<0.010	0.010	9549774
Total Cadmium (Cd)	mg/L	0.0000058	0.0000050	9549774
Total Chromium (Cr)	mg/L	<0.00010	0.00010	9549774
Total Cobalt (Co)	mg/L	0.0000266	0.0000050	9549774
Total Copper (Cu)	mg/L	0.000630	0.000050	9549774
Total Iron (Fe)	mg/L	0.0175	0.0010	9549774
Total Lead (Pb)	mg/L	0.0000308	0.0000050	9549774
Total Lithium (Li)	mg/L	0.00946	0.00050	9549774
Total Manganese (Mn)	mg/L	0.0131	0.000050	9549774
Total Molybdenum (Mo)	mg/L	0.000480	0.000050	9549774
Total Nickel (Ni)	mg/L	0.00178	0.000020	9549774
Total Selenium (Se)	mg/L	0.00160	0.000040	9549774
Total Silicon (Si)	mg/L	0.805	0.050	9549774
Total Silver (Ag)	mg/L	<0.0000050	0.0000050	9549774
Total Strontium (Sr)	mg/L	0.649	0.000050	9549774
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	9549774
Total Tin (Sn)	mg/L	<0.00020	0.00020	9549774
Total Titanium (Ti)	mg/L	<0.00050	0.00050	9549774
Total Uranium (U)	mg/L	0.00163	0.0000020	9549774
Total Vanadium (V)	mg/L	<0.00020	0.00020	9549774
Total Zinc (Zn)	mg/L	0.00378	0.00010	9549774
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	9549774
Total Calcium (Ca)	mg/L	114	0.050	9549371
Total Magnesium (Mg)	mg/L	18.4	0.050	9549371
RDL = Reportable Detection Limit				



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WH5538		
Sampling Date		2019/08/14 08:25		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Total Potassium (K)	mg/L	2.12	0.050	9549371
Total Sodium (Na)	mg/L	28.5	0.050	9549371
Total Sulphur (S)	mg/L	96.5	3.0	9549371
RDL = Reportable Detection Limit				



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5520
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9549887	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9549888	N/A	2019/08/20	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Harry (Peng) Liang
Ion Balance	CALC	9549229	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9549232	N/A	2019/08/20	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/20	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9557356	N/A	2019/08/22	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9557361	N/A	2019/08/22	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9549238	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5520 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9557356	N/A	2019/08/22	Paula Calzada
Elements by ICPMS Low Level (total)	ICP/CRCM	9557361	N/A	2019/08/22	Paula Calzada

BV Labs ID: WH5521
Sample ID: 1A
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9549887	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9549888	N/A	2019/08/20	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Harry (Peng) Liang
Ion Balance	CALC	9549229	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9549232	N/A	2019/08/20	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/20	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9557356	N/A	2019/08/22	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9557361	N/A	2019/08/22	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9549238	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

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VERITASBV Labs Job #: B967670
Report Date: 2019/08/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5522
Sample ID: 1B
Matrix: WaterCollected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9549887	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9549229	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9549232	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9549238	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5523
Sample ID: 1C
Matrix: WaterCollected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9549887	N/A	2019/08/21	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Report Automation Engine
Ion Balance	CALC	9549229	N/A	2019/08/19	Report Automation Engine
Sum of cations, anions	CALC	9549232	N/A	2019/08/21	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9549238	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5524
Sample ID: 2A
Matrix: WaterCollected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9549887	N/A	2019/08/21	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9549888	N/A	2019/08/20	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Harry (Peng) Liang
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5524
Sample ID: 2A
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9550345	N/A	2019/08/20	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/20	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5525
Sample ID: 2B
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9549887	N/A	2019/08/20	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/20	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5526
Sample ID: 2C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9549887	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5526
Sample ID: 2C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5527
Sample ID: 3A
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9549887	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5528
Sample ID: 3B
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9549887	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer



BUREAU
VERITAS

BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5529
Sample ID: 3C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9549887	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9557356	N/A	2019/08/22	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9557361	N/A	2019/08/22	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5529 Dup
Sample ID: 3C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal

BV Labs ID: WH5530
Sample ID: 4A
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9550339	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9557356	N/A	2019/08/22	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9557361	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer



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VERITAS

BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5531
Sample ID: 4B
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9550339	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9557356	N/A	2019/08/22	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9557361	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5532
Sample ID: 4C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/21	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9550339	N/A	2019/08/21	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Report Automation Engine
Ion Balance	CALC	9550342	N/A	2019/08/19	Report Automation Engine
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5532 Dup
Sample ID: 4C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer



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BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5533
Sample ID: 5A
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/21	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9550339	N/A	2019/08/21	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5534
Sample ID: 5B
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/21	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9550339	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9557356	N/A	2019/08/22	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9557361	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5535
Sample ID: 5C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/21	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9550339	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Report Automation Engine
Ion Balance	CALC	9550342	N/A	2019/08/19	Report Automation Engine



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VERITAS

BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5535
Sample ID: 5C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5536
Sample ID: 6A
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9550339	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/20	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Harry (Peng) Liang
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/20	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/20	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5537
Sample ID: 6B
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9550339	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9557356	N/A	2019/08/22	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9557361	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk



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VERITAS

BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WH5537
Sample ID: 6B
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer

BV Labs ID: WH5538
Sample ID: 6C
Matrix: Water

Collected: 2019/08/14
Shipped:
Received: 2019/08/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9554401	N/A	2019/08/21	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9555240	N/A	2019/08/20	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9550339	N/A	2019/08/21	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9549888	N/A	2019/08/21	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9555997	N/A	2019/08/20	Automated Statchk
Ion Balance	CALC	9550342	N/A	2019/08/19	Automated Statchk
Sum of cations, anions	CALC	9550345	N/A	2019/08/21	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9549368	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9550975	N/A	2019/08/20	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9549371	N/A	2019/08/21	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9549774	N/A	2019/08/20	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9549235	N/A	2019/08/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9550351	N/A	2019/08/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9552908	N/A	2019/08/17	Ian Bullecer



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	21.0°C
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Sample WH5520, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5521, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5522, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5525, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5526, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5529, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5530, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5531, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5534, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5537, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5538, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WH5520, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5521, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5522, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5525, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5526, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5529, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5530, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5531, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5534, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5535, Elements by ICPMS Low Level (total): Test repeated.
Sample WH5537, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B967670
Report Date: 2019/08/23

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9549774	Total Aluminum (Al)	2019/08/19	103	80 - 120	94	80 - 120	<0.00050	mg/L		
9549774	Total Antimony (Sb)	2019/08/20	94	80 - 120	97	80 - 120	<0.000020	mg/L	8.3	20
9549774	Total Arsenic (As)	2019/08/20	96	80 - 120	96	80 - 120	<0.000020	mg/L	8.4	20
9549774	Total Barium (Ba)	2019/08/20	88	80 - 120	95	80 - 120	<0.000020	mg/L	1.5	20
9549774	Total Beryllium (Be)	2019/08/20	110	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9549774	Total Bismuth (Bi)	2019/08/20	95	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9549774	Total Boron (B)	2019/08/20	101	80 - 120	115	80 - 120	<0.010	mg/L	NC	20
9549774	Total Cadmium (Cd)	2019/08/20	95	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9549774	Total Chromium (Cr)	2019/08/20	96	80 - 120	94	80 - 120	<0.00010	mg/L	NC	20
9549774	Total Cobalt (Co)	2019/08/20	95	80 - 120	94	80 - 120	<0.0000050	mg/L	11	20
9549774	Total Copper (Cu)	2019/08/20	94	80 - 120	94	80 - 120	<0.000050	mg/L	NC	20
9549774	Total Iron (Fe)	2019/08/20	98	80 - 120	104	80 - 120	<0.0010	mg/L	0.21	20
9549774	Total Lead (Pb)	2019/08/20	98	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9549774	Total Lithium (Li)	2019/08/20	115	80 - 120	96	80 - 120	<0.00050	mg/L	11	20
9549774	Total Manganese (Mn)	2019/08/20	95	80 - 120	97	80 - 120	<0.000050	mg/L	1.6	20
9549774	Total Molybdenum (Mo)	2019/08/20	90	80 - 120	91	80 - 120	<0.000050	mg/L	NC	20
9549774	Total Nickel (Ni)	2019/08/20	94	80 - 120	94	80 - 120	<0.000020	mg/L	7.0	20
9549774	Total Selenium (Se)	2019/08/20	99	80 - 120	91	80 - 120	<0.000040	mg/L	16	20
9549774	Total Silicon (Si)	2019/08/20	71 (1)	80 - 120	81	80 - 120	<0.050	mg/L	1.0	20
9549774	Total Silver (Ag)	2019/08/20	74 (1)	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9549774	Total Strontium (Sr)	2019/08/20	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.19	20
9549774	Total Thallium (Tl)	2019/08/20	99	80 - 120	99	80 - 120	<0.0000020	mg/L	NC	20
9549774	Total Tin (Sn)	2019/08/20	90	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9549774	Total Titanium (Ti)	2019/08/20	100	80 - 120	95	80 - 120	<0.00050	mg/L	NC	20
9549774	Total Uranium (U)	2019/08/20	112	80 - 120	103	80 - 120	<0.0000020	mg/L	9.9	20
9549774	Total Vanadium (V)	2019/08/20	98	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9549774	Total Zinc (Zn)	2019/08/19	96	80 - 120	97	80 - 120	<0.00010	mg/L		
9549774	Total Zirconium (Zr)	2019/08/20	96	80 - 120	97	80 - 120	<0.00010	mg/L	10	20
9550975	Dissolved Aluminum (Al)	2019/08/19	106	80 - 120	98	80 - 120	<0.00050	mg/L		
9550975	Dissolved Antimony (Sb)	2019/08/19	NC	80 - 120	95	80 - 120	<0.000020	mg/L	0.20	20
9550975	Dissolved Arsenic (As)	2019/08/19	NC	80 - 120	96	80 - 120	<0.000020	mg/L	0.41	20
9550975	Dissolved Barium (Ba)	2019/08/19	NC	80 - 120	96	80 - 120	<0.000020	mg/L	1.4	20



BV Labs Job #: B967670
Report Date: 2019/08/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9550975	Dissolved Beryllium (Be)	2019/08/19	105	80 - 120	92	80 - 120	<0.000010	mg/L	NC	20
9550975	Dissolved Bismuth (Bi)	2019/08/19	100	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9550975	Dissolved Boron (B)	2019/08/19	96	80 - 120	116	80 - 120	<0.010	mg/L	NC	20
9550975	Dissolved Cadmium (Cd)	2019/08/19	96	80 - 120	95	80 - 120	<0.0000050	mg/L	0.69	20
9550975	Dissolved Chromium (Cr)	2019/08/19	98	80 - 120	94	80 - 120	<0.00010	mg/L	17	20
9550975	Dissolved Cobalt (Co)	2019/08/19	97	80 - 120	93	80 - 120	<0.0000050	mg/L	0.75	20
9550975	Dissolved Copper (Cu)	2019/08/19	95	80 - 120	93	80 - 120	<0.000050	mg/L	0.71	20
9550975	Dissolved Iron (Fe)	2019/08/19	102	80 - 120	103	80 - 120	<0.0010	mg/L	3.3	20
9550975	Dissolved Lead (Pb)	2019/08/19	102	80 - 120	95	80 - 120	<0.0000050	mg/L	0.12	20
9550975	Dissolved Lithium (Li)	2019/08/19	106	80 - 120	87	80 - 120	<0.00050	mg/L	1.2	20
9550975	Dissolved Manganese (Mn)	2019/08/19	97	80 - 120	96	80 - 120	<0.000050	mg/L	1.6	20
9550975	Dissolved Molybdenum (Mo)	2019/08/19	99	80 - 120	96	80 - 120	<0.000050	mg/L	0.31	20
9550975	Dissolved Nickel (Ni)	2019/08/19	96	80 - 120	92	80 - 120	<0.000020	mg/L	0.66	20
9550975	Dissolved Selenium (Se)	2019/08/19	101	80 - 120	96	80 - 120	<0.000040	mg/L	1.2	20
9550975	Dissolved Silicon (Si)	2019/08/19	75 (1)	80 - 120	79 (1)	80 - 120	<0.050	mg/L	0.031	20
9550975	Dissolved Silver (Ag)	2019/08/19	79 (1)	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9550975	Dissolved Strontium (Sr)	2019/08/19	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.36	20
9550975	Dissolved Thallium (Tl)	2019/08/19	103	80 - 120	96	80 - 120	<0.0000020	mg/L	NC	20
9550975	Dissolved Tin (Sn)	2019/08/19	93	80 - 120	92	80 - 120	<0.00020	mg/L	NC	20
9550975	Dissolved Titanium (Ti)	2019/08/19	97	80 - 120	93	80 - 120	<0.00050	mg/L	NC	20
9550975	Dissolved Uranium (U)	2019/08/19	117	80 - 120	99	80 - 120	<0.0000020	mg/L	0.029	20
9550975	Dissolved Vanadium (V)	2019/08/19	102	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9550975	Dissolved Zinc (Zn)	2019/08/19	NC	80 - 120	97	80 - 120	<0.00010	mg/L	1.5	20
9550975	Dissolved Zirconium (Zr)	2019/08/19	104	80 - 120	94	80 - 120	<0.00010	mg/L	NC	20
9552908	Dissolved Nitrate (N)	2019/08/17	102	80 - 120	104	80 - 120	<0.0030	mg/L	NC	20
9552908	Dissolved Nitrite (N)	2019/08/17	98	80 - 120	100	80 - 120	<0.0030	mg/L	NC	20
9554401	Alkalinity (PP as CaCO3)	2019/08/20					<0.50	mg/L	NC	20
9554401	Alkalinity (Total as CaCO3)	2019/08/20			92	80 - 120	<0.50	mg/L	2.4	20
9554401	Bicarbonate (HCO3)	2019/08/20					<0.50	mg/L	2.4	20
9554401	Carbonate (CO3)	2019/08/20					<0.50	mg/L	NC	20
9554401	Hydroxide (OH)	2019/08/20					<0.50	mg/L	NC	20
9555240	Dissolved Chloride (Cl)	2019/08/20	NC	80 - 120	99	80 - 120	<0.50	mg/L	2.6	20



BV Labs Job #: B967670
Report Date: 2019/08/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9555240	Dissolved Sulphate (SO4)	2019/08/20	NC	80 - 120	99	80 - 120	<0.50	mg/L	0.67	20
9557356	Dissolved Aluminum (Al)	2019/08/22	113	80 - 120	108	80 - 120	<0.00050	mg/L	0.46	20
9557356	Dissolved Cobalt (Co)	2019/08/22	94	80 - 120	95	80 - 120	<0.0000050	mg/L		
9557356	Dissolved Iron (Fe)	2019/08/22	100	80 - 120	103	80 - 120	<0.0010	mg/L		
9557356	Dissolved Lithium (Li)	2019/08/22					<0.00050	mg/L		
9557361	Total Aluminum (Al)	2019/08/22	114	80 - 120	106	80 - 120	<0.00050	mg/L	13	20
9557361	Total Cadmium (Cd)	2019/08/22	91	80 - 120	97	80 - 120	<0.0000050	mg/L		
9557361	Total Cobalt (Co)	2019/08/22	93	80 - 120	93	80 - 120	<0.0000050	mg/L		
9557361	Total Iron (Fe)	2019/08/22	100	80 - 120	101	80 - 120	<0.0010	mg/L		
9557361	Total Lithium (Li)	2019/08/22					<0.00050	mg/L		
9557361	Total Zinc (Zn)	2019/08/22	NC	80 - 120	118	80 - 120	<0.00010	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

BV Labs Job #: B967670
Report Date: 2019/08/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

CHAIN OF CUSTODY RECORD

BBV FCD-00077/05
Page ____ of ____

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required											
Company Name: BMC MINERALS LTD.				Company Name: ALEKO ENVIRONMENTAL				Quotation #: B60751				☒ Regular TAT 5 days (Most analyses) ☐ Rush TAT (Surcharges will be applied)											
Contact Name:				Contact Name: Mary Mloska, Renate Vanderhorst				P.O. #/AFER: BMC-18-02				Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days											
Address: 530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4				Address: UNIT 3 151 INDUSTRIAL RD Whitton, YK PC: V1A 2V3				Project #: BMC-18-02				Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days											
Phone:				Phone: (867) 668-6463				Site Location: Kudz Ze Kevrah				Date Required:											
Email:				Email: mimoska@alekcoenv.com				Site #: 1				Date Required:											
Regulatory Criteria				Special Instructions				Analysis Requested				Rush Confirmation #:											
☐ BC CSR Soil ☐ BC CSR Water				☐ Return Cooler																			
☐ CCME (Specify) ☐ Other (Specify)				☐ Ship Sample Bottles (Please Specify)																			
☐ Drinking Water ☐ BC Water Quality				USE SCENARIO # 12485																			
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																							
Sample Identification		Lab Identification		Date Sampled (YYYY/MM/DD)		Time Sampled (HH:MM)		Matrix		Low Level Dissolved Metals		Low Level Total Metals		Anions (SO4, NO2, NO3, Cl)		Alkalinity		# OF CONTAINERS SUBMITTED		HOLD - DO NOT ANALYZE		COMMENTS	
1 Influent				14-Aug-19		10:00		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
2 1A				14-Aug-19		9:00		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
3 1B				14-Aug-19		8:30		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
4 1C				14-Aug-19		8:00		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
5 2A				14-Aug-19		9:05		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
6 2B				14-Aug-19		8:35		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
7 2C				14-Aug-19		8:05		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
8 3A				14-Aug-19		9:10		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
9 3B				14-Aug-19		8:40		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
10 3C				14-Aug-19		8:10		Water		X		X		X		X						Metals preserved with HNO3, dissolved metals field filtered	
REINQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)				DATE: (YYYY/MM/DD)		TIME: (HH:MM)									
<i>Burton Richards</i>								<i>[Signature]</i>				2019/08/15		0850									

14-Aug-19 13:00
Saffarm Maiter
B967670

CHAIN OF CUSTODY RECORD

COC #:

BBV FCD-00077/05

Page of of

Invoice Information		Report Information (if differs from Invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses)	
Contact Name:		Contact Name:	Mary Mitoska; Renate Vanderhorst	P.O. # / A/E#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:	530-1130 WEST PENDER ST Vancouver, BC PC V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC V1A 2V3	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)	
Phone:		Phone:	(867) 668-6463	Site Location:	Kudzu Ze Kayah	Same Day ☐ 2 Days ☐ 3 Days ☐	
Email:		Email:	mmioska@alexcoenv.com	Site #:		Date Required:	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil	☐ BC CSR Water	☐ Return Cooler				LABORATORY USE ONLY	
☐ CCME (Specify)	☐ Other (Specify)	☐ Ship Sample Bottles (Please Specify)				CUSTODY SEAL: ☐ Present ☐ Intact	
☐ Drinking Water	☐ BC Water Quality	USE SCENARIO # 12485				COOLER TEMPERATURES	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)
1 4A		14-Aug-19	9:15	Water	X	X	X
2 4B		14-Aug-19	8:45	Water	X	X	X
3 4C		14-Aug-19	8:15	Water	X	X	X
4 4A		14-Aug-19	9:20	Water	X	X	X
5 5B		14-Aug-19	8:50	Water	X	X	X
6 5C		14-Aug-19	8:20	Water	X	X	X
7 6A		14-Aug-19	9:25	Water	X	X	X
8 6B		14-Aug-19	8:55	Water	X	X	X
9 6C		14-Aug-19	8:25	Water	X	X	X
REINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)

Safann Maier

14-Aug-19 13:00

B967670



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 2, 2 of 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/08/28
 Report #: R2773869
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B968928

Received: 2019/08/19, 12:39

Sample Matrix: Water
 # Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	19	N/A	2019/08/23	AB SOP-00005	SM 23 2320 B m
Chloride/Sulphate by Auto Colourimetry	19	N/A	2019/08/23	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
Hardness Total (calculated as CaCO ₃) (1)	19	N/A	2019/08/23	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	19	N/A	2019/08/23	BBY WI-00033	Auto Calc
Ion Balance	12	N/A	2019/08/22		Auto Calc
Ion Balance	7	N/A	2019/08/23		Auto Calc
Sum of cations, anions	19	N/A	2019/08/23		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	19	N/A	2019/08/23	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	19	N/A	2019/08/23	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	19	N/A	2019/08/23	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	19	N/A	2019/08/23	CAL SOP-00265	EPA 6020 m
Nitrate and Nitrite	12	N/A	2019/08/22		Auto Calc
Nitrate and Nitrite	7	N/A	2019/08/23		Auto Calc
Nitrate + Nitrite-N (calculated)	12	N/A	2019/08/22		Auto Calc
Nitrate + Nitrite-N (calculated)	7	N/A	2019/08/23		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	19	N/A	2019/08/22	AB SOP-00023	SM 23 4110 B m
pH @25°C (2)	1	N/A	2019/08/22	AB SOP-00005	SM 23 4500-H+B m
pH @25°C (2)	18	N/A	2019/08/23	AB SOP-00005	SM 23 4500-H+B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 2, 2 of 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/08/28
Report #: R2773869
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B968928

Received: 2019/08/19, 12:39

BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(2) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WI1454		WI1455	WI1456		WI1457		WI1458		
Sampling Date		2019/08/19 10:00		2019/08/19 09:00	2019/08/19 08:30		2019/08/19 08:00		2019/08/19 09:05		
COC Number		1 of 2		1 of 2	1 of 2		1 of 2		1 of 2		
	UNITS	INFLUENT	QC Batch	1A	1B	QC Batch	1C	QC Batch	2A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.0	9556061	7.8	8.0	9556061	8.2	9556061	8.0	N/A	9556061
Cation Sum	meq/L	7.6	9556061	7.7	7.8	9556061	7.9	9556061	7.5	N/A	9556061
Ion Balance (% Difference)	%	2.5	9556060	1.2	1.3	9556060	2.0	9556060	3.3	N/A	9556060
Dissolved Nitrate (NO3)	mg/L	1.5	9556227	2.1	1.8	9556227	0.22	9556227	1.2	0.044	9556227
Nitrate plus Nitrite (N)	mg/L	0.34	9556231	0.48	0.43	9556231	0.051	9556231	0.30	0.014	9556231
Dissolved Nitrite (NO2)	mg/L	<0.033	9556227	0.057	0.035	9556227	<0.033	9556227	0.10	0.033	9556227

Misc. Inorganics

pH	pH	6.51	9557995	7.39	7.33	9558002	7.26	9558002	7.37	N/A	9558002
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Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	9558000	<1.0	1.0	9558000
Alkalinity (Total as CaCO3)	mg/L	67	9558000	66	64	9558000	70	9558000	64	1.0	9558000
Bicarbonate (HCO3)	mg/L	81	9558000	80	78	9558000	85	9558000	78	1.0	9558000
Carbonate (CO3)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	9558000	<1.0	1.0	9558000
Hydroxide (OH)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	9558000	<1.0	1.0	9558000
Dissolved Chloride (Cl)	mg/L	64	9560063	56	58	9560063	60	9560063	59	1.0	9560063
Dissolved Sulphate (SO4)	mg/L	230 (1)	9560063	240 (1)	240 (1)	9560063	250 (1)	9560063	240 (1)	2.0	9560063

Nutrients

Dissolved Nitrite (N)	mg/L	<0.010	9557592	0.017	0.011	9557592	<0.010	9557589	0.031	0.010	9557592
Dissolved Nitrate (N)	mg/L	0.34	9557592	0.46	0.42	9557592	0.051	9557589	0.27	0.010	9557592

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WI1459		WI1460	WI1461	WI1462		WI1463		
Sampling Date		2019/08/19 08:35		2019/08/19 08:05	2019/08/19 09:10	2019/08/19 08:40		2019/08/19 08:10		
COC Number		1 of 2		1 of 2	1 of 2	1 of 2		1 of 2		
	UNITS	2B	QC Batch	2C	3A	3B	QC Batch	3C	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	7.9	9556061	8.2	8.0	8.0	9556061	9.0	N/A	9556061
Cation Sum	meq/L	7.6	9556061	7.9	7.7	7.8	9556061	8.1	N/A	9556061
Ion Balance (% Difference)	%	2.0	9556060	1.3	1.6	1.2	9556060	5.3	N/A	9556060
Dissolved Nitrate (NO ₃)	mg/L	0.17	9556227	<0.044	0.59	<0.044	9556227	<0.044	0.044	9556227
Nitrate plus Nitrite (N)	mg/L	0.039	9556231	<0.014	0.13	<0.014	9556231	<0.014	0.014	9556231
Dissolved Nitrite (NO ₂)	mg/L	<0.033	9556227	<0.033	<0.033	<0.033	9556227	<0.033	0.033	9556227
Misc. Inorganics										
pH	pH	7.28	9558002	7.32	7.29	7.38	9558002	7.43	N/A	9558002
Anions										
Alkalinity (PP as CaCO ₃)	mg/L	<1.0	9558000	<1.0	<1.0	<1.0	9558000	<1.0	1.0	9558000
Alkalinity (Total as CaCO ₃)	mg/L	63	9558000	68	70	65	9558000	110	1.0	9558000
Bicarbonate (HCO ₃)	mg/L	77	9558000	82	85	79	9558000	130	1.0	9558000
Carbonate (CO ₃)	mg/L	<1.0	9558000	<1.0	<1.0	<1.0	9558000	<1.0	1.0	9558000
Hydroxide (OH)	mg/L	<1.0	9558000	<1.0	<1.0	<1.0	9558000	<1.0	1.0	9558000
Dissolved Chloride (Cl)	mg/L	59	9560063	59	57	57	9560063	60	1.0	9560063
Dissolved Sulphate (SO ₄)	mg/L	240 (1)	9560063	250 (1)	240 (1)	240 (1)	9560063	250 (1)	2.0	9560063
Nutrients										
Dissolved Nitrite (N)	mg/L	<0.010	9557589	<0.010	<0.010	<0.010	9557592	<0.010	0.010	9557589
Dissolved Nitrate (N)	mg/L	0.039	9557589	<0.010	0.13	<0.010	9557592	<0.010	0.010	9557589
RDL = Reportable Detection Limit										
N/A = Not Applicable										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WI1470		WI1471	WI1472		WI1473	WI1474		
Sampling Date		2019/08/19 09:15		2019/08/19 08:45	2019/08/19 08:15		2019/08/19 09:20	2019/08/19 08:50		
COC Number		2 of 2		2 of 2	2 of 2		2 of 2	2 of 2		
	UNITS	4A	QC Batch	4B	4C	QC Batch	5A	5B	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	8.1	9556061	8.3	8.8	9556061	8.1	8.7	N/A	9556061
Cation Sum	meq/L	7.9	9556061	8.1	8.6	9556061	7.8	8.2	N/A	9556061
Ion Balance (% Difference)	%	1.5	9556060	1.0	1.5	9556060	1.6	2.7	N/A	9556060
Dissolved Nitrate (NO ₃)	mg/L	0.13	9556227	<0.044	<0.044	9556227	0.10	<0.044	0.044	9556227
Nitrate plus Nitrite (N)	mg/L	0.030	9556231	<0.014	<0.014	9556231	0.023	<0.014	0.014	9556231
Dissolved Nitrite (NO ₂)	mg/L	<0.033	9556227	<0.033	<0.033	9556227	<0.033	<0.033	0.033	9556227
Misc. Inorganics										
pH	pH	7.15	9558002	7.25	7.26	9558002	7.26	7.28	N/A	9558002
Anions										
Alkalinity (PP as CaCO ₃)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	<1.0	1.0	9558000
Alkalinity (Total as CaCO ₃)	mg/L	71	9558000	72	81	9558000	72	83	1.0	9558000
Bicarbonate (HCO ₃)	mg/L	86	9558000	88	99	9558000	87	100	1.0	9558000
Carbonate (CO ₃)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	<1.0	1.0	9558000
Hydroxide (OH)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	<1.0	1.0	9558000
Dissolved Chloride (Cl)	mg/L	58	9560063	61	62	9560063	57	62	1.0	9560063
Dissolved Sulphate (SO ₄)	mg/L	240 (1)	9560063	250 (1)	260 (1)	9560063	240 (1)	250 (1)	2.0	9560063
Nutrients										
Dissolved Nitrite (N)	mg/L	<0.010	9557592	<0.010	<0.010	9557589	<0.010	<0.010	0.010	9557592
Dissolved Nitrate (N)	mg/L	0.030	9557592	<0.010	<0.010	9557589	0.023	<0.010	0.010	9557592
RDL = Reportable Detection Limit										
N/A = Not Applicable										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WI1475		WI1476	WI1477		WI1478		
Sampling Date		2019/08/19 08:20		2019/08/19 09:25	2019/08/19 08:55		2019/08/19 08:25		
COC Number		2 of 2		2 of 2	2 of 2		2 of 2		
	UNITS	5C	QC Batch	6A	6B	QC Batch	6C	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	9.2	9556061	7.8	8.2	9556061	8.5	N/A	9556061
Cation Sum	meq/L	8.8	9556061	7.7	7.9	9556061	8.1	N/A	9556061
Ion Balance (% Difference)	%	2.6	9556060	0.82	1.4	9556060	2.2	N/A	9556060
Dissolved Nitrate (NO3)	mg/L	<0.044	9556227	0.55	<0.044	9556227	<0.044	0.044	9556227
Nitrate plus Nitrite (N)	mg/L	<0.014	9556231	0.12	<0.014	9556231	<0.014	0.014	9556231
Dissolved Nitrite (NO2)	mg/L	<0.033	9556227	<0.033	<0.033	9556227	<0.033	0.033	9556227
Misc. Inorganics									
pH	pH	7.45	9558002	7.22	7.36	9558002	7.41	N/A	9558002
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	1.0	9558000
Alkalinity (Total as CaCO3)	mg/L	96	9558000	69	70	9558000	78	1.0	9558000
Bicarbonate (HCO3)	mg/L	120	9558000	84	86	9558000	95	1.0	9558000
Carbonate (CO3)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	1.0	9558000
Hydroxide (OH)	mg/L	<1.0	9558000	<1.0	<1.0	9558000	<1.0	1.0	9558000
Dissolved Chloride (Cl)	mg/L	64	9560063	54	60	9560063	61	1.0	9560063
Dissolved Sulphate (SO4)	mg/L	260 (1)	9560063	230 (1)	240 (1)	9560063	250 (1)	2.0	9560063
Nutrients									
Dissolved Nitrite (N)	mg/L	<0.010	9557592	<0.010	<0.010	9557589	<0.010	0.010	9557592
Dissolved Nitrate (N)	mg/L	<0.010	9557592	0.12	<0.010	9557589	<0.010	0.010	9557592
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



BUREAU
VERITAS

BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WI1454	WI1455		WI1456		
Sampling Date		2019/08/19 10:00	2019/08/19 09:00		2019/08/19 08:30		
COC Number		1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	QC Batch	1B	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	320	323	9555945	326	0.50	9555945
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.0204	0.00623	9556513	0.00465	0.00050	9562792
Dissolved Antimony (Sb)	mg/L	0.0198	0.0202	9556513	0.0209	0.000020	9556513
Dissolved Arsenic (As)	mg/L	0.0575	0.0543	9556513	0.0430	0.000020	9556513
Dissolved Barium (Ba)	mg/L	0.0577	0.0580	9556513	0.0575	0.000020	9556513
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9556513	<0.000010	0.000010	9556513
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9556513	<0.0000050	0.0000050	9556513
Dissolved Boron (B)	mg/L	0.040	0.038	9556513	0.034	0.010	9556513
Dissolved Cadmium (Cd)	mg/L	0.00193	0.00140	9556513	0.000612	0.0000050	9556513
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9556513	<0.00010	0.00010	9556513
Dissolved Cobalt (Co)	mg/L	0.00255	0.000674	9556513	0.0000493	0.0000050	9556513
Dissolved Copper (Cu)	mg/L	0.0184	0.00929	9556513	0.00344	0.000050	9556513
Dissolved Iron (Fe)	mg/L	0.0014	<0.0010	9556513	0.0029	0.0010	9556513
Dissolved Lead (Pb)	mg/L	0.0152	0.00325	9556513	0.000150	0.0000050	9556513
Dissolved Lithium (Li)	mg/L	0.00851	0.00957	9556513	0.00897	0.00050	9556513
Dissolved Manganese (Mn)	mg/L	0.0504	0.0161	9556513	0.00206	0.000050	9556513
Dissolved Molybdenum (Mo)	mg/L	0.00154	0.00154	9556513	0.00171	0.000050	9556513
Dissolved Nickel (Ni)	mg/L	0.00740	0.00651	9556513	0.00503	0.000020	9556513
Dissolved Selenium (Se)	mg/L	0.00780	0.00756	9556513	0.00742	0.000040	9556513
Dissolved Silicon (Si)	mg/L	0.672	0.456	9556513	0.354	0.050	9556513
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9556513	<0.0000050	0.0000050	9556513
Dissolved Strontium (Sr)	mg/L	0.609	0.630	9556513	0.627	0.000050	9556513
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000024	9556513	<0.0000020	0.0000020	9556513
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9556513	<0.00020	0.00020	9556513
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9556513	<0.00050	0.00050	9556513
Dissolved Uranium (U)	mg/L	0.0296	0.0308	9556513	0.0269	0.0000020	9556513
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9556513	<0.00020	0.00020	9556513
Dissolved Zinc (Zn)	mg/L	0.158	0.143	9556513	0.109	0.00010	9556513
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9556513	<0.00010	0.00010	9556513
Dissolved Calcium (Ca)	mg/L	102	103	9555946	104	0.050	9555946
Dissolved Magnesium (Mg)	mg/L	15.7	16.0	9555946	16.0	0.050	9555946
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WI1454	WI1455		WI1456		
Sampling Date		2019/08/19 10:00	2019/08/19 09:00		2019/08/19 08:30		
COC Number		1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	QC Batch	1B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.61	3.72	9555946	3.77	0.050	9555946
Dissolved Sodium (Na)	mg/L	25.3	25.6	9555946	26.2	0.050	9555946
Dissolved Sulphur (S)	mg/L	88.7	91.5	9555946	92.1	3.0	9555946
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WI1457	WI1458		WI1459		
Sampling Date		2019/08/19 08:00	2019/08/19 09:05		2019/08/19 08:35		
COC Number		1 of 2	1 of 2		1 of 2		
	UNITS	1C	2A	QC Batch	2B	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	333	317	9555945	321	0.50	9555945
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	<0.00050	0.00207	9556513	<0.00050	0.00050	9556513
Dissolved Antimony (Sb)	mg/L	0.0194	0.0201	9556513	0.0203	0.000020	9556513
Dissolved Arsenic (As)	mg/L	0.0289	0.0403	9556513	0.0511	0.000020	9556513
Dissolved Barium (Ba)	mg/L	0.0584	0.0575	9556513	0.0577	0.000020	9556513
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9556513	<0.000010	0.000010	9556513
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9556513	<0.0000050	0.0000050	9556513
Dissolved Boron (B)	mg/L	0.023	0.039	9556513	0.042	0.010	9556513
Dissolved Cadmium (Cd)	mg/L	0.000135	0.000355	9556513	0.000329	0.0000050	9556513
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9556513	<0.00010	0.00010	9556513
Dissolved Cobalt (Co)	mg/L	0.0000406	0.0000318	9556513	0.0000385	0.0000050	9556513
Dissolved Copper (Cu)	mg/L	0.00307	0.00207	9556513	0.00231	0.000050	9556513
Dissolved Iron (Fe)	mg/L	0.0081	0.0067	9556513	0.0047	0.0010	9556513
Dissolved Lead (Pb)	mg/L	0.0000876	0.0000645	9556513	0.0000693	0.0000050	9556513
Dissolved Lithium (Li)	mg/L	0.0135	0.0112	9556513	0.0123	0.00050	9556513
Dissolved Manganese (Mn)	mg/L	0.00451	0.00334	9556513	0.00324	0.000050	9556513
Dissolved Molybdenum (Mo)	mg/L	0.00160	0.00133	9556513	0.00138	0.000050	9556513
Dissolved Nickel (Ni)	mg/L	0.00348	0.00505	9556513	0.00658	0.000020	9556513
Dissolved Selenium (Se)	mg/L	0.00658	0.00664	9556513	0.00735	0.000040	9556513
Dissolved Silicon (Si)	mg/L	0.474	0.523	9556513	0.515	0.050	9556513
Dissolved Silver (Ag)	mg/L	0.0000058	<0.0000050	9556513	<0.0000050	0.0000050	9556513
Dissolved Strontium (Sr)	mg/L	0.630	0.635	9556513	0.613	0.000050	9556513
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9556513	<0.0000020	0.0000020	9556513
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9556513	<0.00020	0.00020	9556513
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9556513	<0.00050	0.00050	9556513
Dissolved Uranium (U)	mg/L	0.0198	0.0196	9556513	0.0191	0.0000020	9562792
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9556513	<0.00020	0.00020	9556513
Dissolved Zinc (Zn)	mg/L	0.0652	0.0988	9556513	0.134	0.00010	9556513
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9556513	<0.00010	0.00010	9556513
Dissolved Calcium (Ca)	mg/L	107	102	9555946	103	0.050	9555946
Dissolved Magnesium (Mg)	mg/L	16.2	15.4	9555946	15.9	0.050	9555946

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		W11457	W11458		W11459		
Sampling Date		2019/08/19 08:00	2019/08/19 09:05		2019/08/19 08:35		
COC Number		1 of 2	1 of 2		1 of 2		
	UNITS	1C	2A	QC Batch	2B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.70	3.29	9555946	3.65	0.050	9555946
Dissolved Sodium (Na)	mg/L	26.4	24.8	9555946	25.4	0.050	9555946
Dissolved Sulphur (S)	mg/L	93.5	89.9	9555946	90.2	3.0	9555946
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B968928
Report Date: 2019/08/28ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WI1460		WI1461		WI1462		
Sampling Date		2019/08/19 08:05		2019/08/19 09:10		2019/08/19 08:40		
COC Number		1 of 2		1 of 2		1 of 2		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	335	9555945	326	9555945	329	0.50	9555945
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00057	9556513	0.00474	9556513	<0.00050	0.00050	9556513
Dissolved Antimony (Sb)	mg/L	0.0194	9556513	0.0216	9556513	0.0220	0.000020	9556513
Dissolved Arsenic (As)	mg/L	0.0325	9556513	0.0481	9556513	0.0364	0.000020	9556513
Dissolved Barium (Ba)	mg/L	0.0573	9556513	0.0573	9556513	0.0586	0.000020	9556513
Dissolved Beryllium (Be)	mg/L	<0.000010	9556513	<0.000010	9556513	<0.000010	0.000010	9556513
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9556513	<0.0000050	9556513	<0.0000050	0.0000050	9556513
Dissolved Boron (B)	mg/L	0.033	9556513	<0.010	9562792	0.027	0.010	9556513
Dissolved Cadmium (Cd)	mg/L	0.000105	9556513	0.000851	9556513	0.000341	0.0000050	9556513
Dissolved Chromium (Cr)	mg/L	<0.00010	9556513	<0.00010	9556513	<0.00010	0.00010	9556513
Dissolved Cobalt (Co)	mg/L	0.0000285	9556513	0.000425	9556513	0.0000342	0.0000050	9556513
Dissolved Copper (Cu)	mg/L	0.00124	9556513	0.00659	9556513	0.00268	0.000050	9556513
Dissolved Iron (Fe)	mg/L	0.0118	9556513	0.0027	9556513	0.0022	0.0010	9556513
Dissolved Lead (Pb)	mg/L	0.0000257	9556513	0.00112	9556513	0.0000663	0.0000050	9556513
Dissolved Lithium (Li)	mg/L	0.00807	9556513	0.0130	9556513	0.00803	0.00050	9556513
Dissolved Manganese (Mn)	mg/L	0.00259	9556513	0.0109	9556513	0.00177	0.000050	9556513
Dissolved Molybdenum (Mo)	mg/L	0.00143	9556513	0.00167	9556513	0.00149	0.000050	9556513
Dissolved Nickel (Ni)	mg/L	0.00372	9556513	0.00702	9556513	0.00542	0.000020	9556513
Dissolved Selenium (Se)	mg/L	0.00621	9556513	0.00734	9556513	0.00651	0.000040	9556513
Dissolved Silicon (Si)	mg/L	0.564	9556513	0.682	9556513	0.653	0.050	9556513
Dissolved Silver (Ag)	mg/L	<0.0000050	9556513	<0.0000050	9556513	<0.0000050	0.0000050	9556513
Dissolved Strontium (Sr)	mg/L	0.628	9556513	0.620	9556513	0.634	0.000050	9556513
Dissolved Thallium (Tl)	mg/L	<0.0000020	9556513	<0.0000020	9556513	<0.0000020	0.0000020	9556513
Dissolved Tin (Sn)	mg/L	<0.00020	9556513	<0.00020	9556513	<0.00020	0.00020	9556513
Dissolved Titanium (Ti)	mg/L	<0.00050	9556513	<0.00050	9556513	<0.00050	0.00050	9556513
Dissolved Uranium (U)	mg/L	0.0147	9556513	0.0288	9556513	0.0176	0.0000020	9556513
Dissolved Vanadium (V)	mg/L	<0.00020	9556513	<0.00020	9556513	<0.00020	0.00020	9556513
Dissolved Zinc (Zn)	mg/L	0.0719	9556513	0.131	9556513	0.0984	0.00010	9556513
Dissolved Zirconium (Zr)	mg/L	<0.00010	9556513	<0.00010	9556513	<0.00010	0.00010	9556513
Dissolved Calcium (Ca)	mg/L	107	9555946	104	9555946	105	0.050	9555946
Dissolved Magnesium (Mg)	mg/L	16.4	9555946	15.8	9555946	16.1	0.050	9555946
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WI1460		WI1461		WI1462		
Sampling Date		2019/08/19 08:05		2019/08/19 09:10		2019/08/19 08:40		
COC Number		1 of 2		1 of 2		1 of 2		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.40	9555946	3.43	9555946	3.45	0.050	9555946
Dissolved Sodium (Na)	mg/L	26.4	9555946	25.5	9555946	25.9	0.050	9555946
Dissolved Sulphur (S)	mg/L	92.4	9555946	89.9	9555946	92.3	3.0	9555946
RDL = Reportable Detection Limit								



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BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WI1463	WI1470	WI1471	WI1472	WI1473		
Sampling Date		2019/08/19 08:10	2019/08/19 09:15	2019/08/19 08:45	2019/08/19 08:15	2019/08/19 09:20		
COC Number		1 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3C	4A	4B	4C	5A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	341	332	346	365	332	0.50	9555945
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00247	<0.00050	<0.00050	<0.00050	0.00554	0.00050	9556513
Dissolved Antimony (Sb)	mg/L	0.0200	0.0168	0.0142	0.00852	0.0119	0.000020	9556513
Dissolved Arsenic (As)	mg/L	0.0267	0.0302	0.0168	0.00425	0.0187	0.000020	9556513
Dissolved Barium (Ba)	mg/L	0.0583	0.0571	0.0577	0.0576	0.0587	0.000020	9556513
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9556513
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556513
Dissolved Boron (B)	mg/L	0.042	0.016	<0.010	<0.010	0.017	0.010	9556513
Dissolved Cadmium (Cd)	mg/L	0.000102	0.000259	0.0000360	0.0000087	0.000225	0.0000050	9556513
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556513
Dissolved Cobalt (Co)	mg/L	0.0000217	0.000103	0.0000240	0.0000417	0.000899	0.0000050	9556513
Dissolved Copper (Cu)	mg/L	0.00141	0.00196	0.000849	0.000343	0.00281	0.000050	9556513
Dissolved Iron (Fe)	mg/L	0.0046	0.0079	0.0036	0.0178	0.0214	0.0010	9556513
Dissolved Lead (Pb)	mg/L	0.0000189	0.000242	0.0000417	0.0000174	0.000829	0.0000050	9556513
Dissolved Lithium (Li)	mg/L	0.00916	0.0122	0.0111	0.0115	0.00942	0.00050	9556513
Dissolved Manganese (Mn)	mg/L	0.00333	0.0104	0.00420	0.0167	0.0587	0.000050	9556513
Dissolved Molybdenum (Mo)	mg/L	0.00136	0.00125	0.000727	0.000652	0.00129	0.000050	9556513
Dissolved Nickel (Ni)	mg/L	0.00363	0.00629	0.00387	0.00250	0.00605	0.000020	9556513
Dissolved Selenium (Se)	mg/L	0.00609	0.00406	0.00271	0.00120	0.00235	0.000040	9556513
Dissolved Silicon (Si)	mg/L	0.644	0.763	0.801	0.884	0.809	0.050	9556513
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556513
Dissolved Strontium (Sr)	mg/L	0.644	0.641	0.660	0.681	0.643	0.000050	9556513
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9556513
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556513
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9556513
Dissolved Uranium (U)	mg/L	0.0102	0.0167	0.00600	0.00237	0.0146	0.0000020	9556513
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556513
Dissolved Zinc (Zn)	mg/L	0.0618	0.0703	0.0277	0.00889	0.0409	0.00010	9556513
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556513
Dissolved Calcium (Ca)	mg/L	109	106	111	117	106	0.050	9555946
Dissolved Magnesium (Mg)	mg/L	16.5	16.3	16.5	17.5	16.4	0.050	9555946

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WI1463	WI1470	WI1471	WI1472	WI1473		
Sampling Date		2019/08/19 08:10	2019/08/19 09:15	2019/08/19 08:45	2019/08/19 08:15	2019/08/19 09:20		
COC Number		1 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3C	4A	4B	4C	5A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.49	3.04	2.49	1.77	3.11	0.050	9555946
Dissolved Sodium (Na)	mg/L	26.5	26.1	26.6	27.8	25.9	0.050	9555946
Dissolved Sulphur (S)	mg/L	95.0	94.5	95.5	99.9	91.0	3.0	9555946
RDL = Reportable Detection Limit								



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BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WI1474	WI1475	WI1476	WI1477	WI1478		
Sampling Date		2019/08/19 08:50	2019/08/19 08:20	2019/08/19 09:25	2019/08/19 08:55	2019/08/19 08:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	5B	5C	6A	6B	6C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	349	375	324	337	343	0.50	9555945
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	<0.00050	<0.00050	0.00198	0.00052	0.00147	0.00050	9556513
Dissolved Antimony (Sb)	mg/L	0.00793	0.00348	0.0192	0.0142	0.0135	0.000020	9556513
Dissolved Arsenic (As)	mg/L	0.00940	0.00343	0.0433	0.0206	0.0106	0.000020	9556513
Dissolved Barium (Ba)	mg/L	0.0580	0.0625	0.0585	0.0588	0.0599	0.000020	9556513
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9556513
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556513
Dissolved Boron (B)	mg/L	<0.010	<0.010	0.021	<0.010	<0.010	0.010	9556513
Dissolved Cadmium (Cd)	mg/L	0.0000653	0.0000200	0.000748	0.000104	0.0000234	0.0000050	9556513
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556513
Dissolved Cobalt (Co)	mg/L	0.000135	0.000137	0.000736	0.0000715	0.0000330	0.0000050	9556513
Dissolved Copper (Cu)	mg/L	0.00102	0.000279	0.00409	0.00137	0.000705	0.000050	9556513
Dissolved Iron (Fe)	mg/L	0.0148	0.143	0.0117	0.0078	0.0269	0.0010	9556513
Dissolved Lead (Pb)	mg/L	0.000203	0.0000414	0.000572	0.000105	0.0000267	0.0000050	9556513
Dissolved Lithium (Li)	mg/L	0.0113	0.0134	0.0114	0.0104	0.0109	0.00050	9556513
Dissolved Manganese (Mn)	mg/L	0.0276	0.0465	0.0267	0.0108	0.0126	0.000050	9556513
Dissolved Molybdenum (Mo)	mg/L	0.000722	0.000431	0.00148	0.00107	0.000895	0.000050	9556513
Dissolved Nickel (Ni)	mg/L	0.00337	0.00162	0.00662	0.00396	0.00245	0.000020	9556513
Dissolved Selenium (Se)	mg/L	0.000966	0.000289	0.00562	0.00263	0.00203	0.000040	9556513
Dissolved Silicon (Si)	mg/L	0.899	1.07	0.728	0.805	0.755	0.050	9556513
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556513
Dissolved Strontium (Sr)	mg/L	0.665	0.691	0.628	0.650	0.656	0.000050	9556513
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9556513
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556513
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9556513
Dissolved Uranium (U)	mg/L	0.00354	0.000745	0.0230	0.00631	0.00344	0.0000020	9556513
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556513
Dissolved Zinc (Zn)	mg/L	0.0117	0.00299	0.0968	0.0300	0.00820	0.00010	9556513
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556513
Dissolved Calcium (Ca)	mg/L	112	120	104	108	109	0.050	9555946
Dissolved Magnesium (Mg)	mg/L	16.8	18.2	15.9	16.4	16.9	0.050	9555946

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WI1474	WI1475	WI1476	WI1477	WI1478		
Sampling Date		2019/08/19 08:50	2019/08/19 08:20	2019/08/19 09:25	2019/08/19 08:55	2019/08/19 08:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	5B	5C	6A	6B	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	2.45	1.73	3.40	2.94	2.46	0.050	9555946
Dissolved Sodium (Na)	mg/L	26.6	28.2	25.4	26.4	27.1	0.050	9555946
Dissolved Sulphur (S)	mg/L	93.7	102	92.2	94.1	96.0	3.0	9555946
RDL = Reportable Detection Limit								



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BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1454	WI1455		WI1456		
Sampling Date		2019/08/19 10:00	2019/08/19 09:00		2019/08/19 08:30		
COC Number		1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	QC Batch	1B	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	316	322	9556224	326	0.50	9556224
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0217	0.0132	9556515	0.00409	0.00050	9562794
Total Antimony (Sb)	mg/L	0.0207	0.0207	9556515	0.0211	0.000020	9556515
Total Arsenic (As)	mg/L	0.0600	0.0540	9556515	0.0426	0.000020	9556515
Total Barium (Ba)	mg/L	0.0586	0.0590	9556515	0.0590	0.000020	9556515
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	9556515	<0.000010	0.000010	9556515
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9556515	<0.0000050	0.0000050	9556515
Total Boron (B)	mg/L	0.025	0.037	9556515	0.056	0.010	9556515
Total Cadmium (Cd)	mg/L	0.00190	0.00135	9556515	0.000593	0.0000050	9556515
Total Chromium (Cr)	mg/L	0.00011	0.00013	9556515	<0.00010	0.00010	9556515
Total Cobalt (Co)	mg/L	0.00254	0.000674	9556515	0.0000472	0.0000050	9556515
Total Copper (Cu)	mg/L	0.0197	0.00969	9556515	0.00366	0.000050	9556515
Total Iron (Fe)	mg/L	0.0104	0.0053	9556515	0.0064	0.0010	9556515
Total Lead (Pb)	mg/L	0.0224	0.00476	9556515	0.000283	0.0000050	9556515
Total Lithium (Li)	mg/L	0.0103	0.0152	9556515	0.0114	0.00050	9556515
Total Manganese (Mn)	mg/L	0.0528	0.0167	9556515	0.00221	0.000050	9556515
Total Molybdenum (Mo)	mg/L	0.00160	0.00179	9556515	0.00150	0.000050	9556515
Total Nickel (Ni)	mg/L	0.00740	0.00653	9556515	0.00490	0.000020	9556515
Total Selenium (Se)	mg/L	0.00766	0.00757	9556515	0.00719	0.000040	9556515
Total Silicon (Si)	mg/L	0.703	0.470	9556515	0.359	0.050	9556515
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	9556515	<0.0000050	0.0000050	9556515
Total Strontium (Sr)	mg/L	0.616	0.634	9556515	0.637	0.000050	9556515
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9556515	<0.0000020	0.0000020	9556515
Total Tin (Sn)	mg/L	<0.00020	<0.00020	9556515	<0.00020	0.00020	9556515
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	9556515	<0.00050	0.00050	9556515
Total Uranium (U)	mg/L	0.0292	0.0302	9556515	0.0267	0.0000020	9556515
Total Vanadium (V)	mg/L	<0.00020	<0.00020	9556515	<0.00020	0.00020	9556515
Total Zinc (Zn)	mg/L	0.161	0.142	9556515	0.107	0.00010	9556515
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	9556515	<0.00010	0.00010	9556515
Total Calcium (Ca)	mg/L	101	103	9555950	104	0.050	9555950
Total Magnesium (Mg)	mg/L	15.5	15.7	9555950	15.8	0.050	9555950
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1454	WI1455		WI1456		
Sampling Date		2019/08/19 10:00	2019/08/19 09:00		2019/08/19 08:30		
COC Number		1 of 2	1 of 2		1 of 2		
	UNITS	INFLUENT	1A	QC Batch	1B	RDL	QC Batch
Total Potassium (K)	mg/L	3.60	3.71	9555950	3.79	0.050	9555950
Total Sodium (Na)	mg/L	24.8	25.2	9555950	25.8	0.050	9555950
Total Sulphur (S)	mg/L	92.2	91.2	9555950	93.7	3.0	9555950
RDL = Reportable Detection Limit							



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BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1457	WI1458	WI1459	WI1460	WI1461		
Sampling Date		2019/08/19 08:00	2019/08/19 09:05	2019/08/19 08:35	2019/08/19 08:05	2019/08/19 09:10		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	1C	2A	2B	2C	3A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	335	323	326	335	323	0.50	9556224
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	<0.00050	0.0125	0.00470	0.00188	0.00710	0.00050	9556515
Total Antimony (Sb)	mg/L	0.0194	0.0208	0.0209	0.0197	0.0213	0.000020	9556515
Total Arsenic (As)	mg/L	0.0289	0.0524	0.0423	0.0331	0.0472	0.000020	9556515
Total Barium (Ba)	mg/L	0.0590	0.0589	0.0581	0.0581	0.0575	0.000020	9556515
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9556515
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556515
Total Boron (B)	mg/L	0.040	0.031	0.030	0.022	0.016	0.010	9556515
Total Cadmium (Cd)	mg/L	0.000147	0.00142	0.000376	0.000129	0.000891	0.0000050	9556515
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556515
Total Cobalt (Co)	mg/L	0.0000452	0.000862	0.0000365	0.0000263	0.000438	0.0000050	9556515
Total Copper (Cu)	mg/L	0.00402	0.0106	0.00253	0.00143	0.00714	0.000050	9556515
Total Iron (Fe)	mg/L	0.0147	0.0069	0.0081	0.0130	0.0058	0.0010	9556515
Total Lead (Pb)	mg/L	0.000119	0.00683	0.0000977	0.0000574	0.00195	0.0000050	9556515
Total Lithium (Li)	mg/L	0.0107	0.0130	0.0137	0.0111	0.0111	0.00050	9556515
Total Manganese (Mn)	mg/L	0.00477	0.0213	0.00345	0.00286	0.0115	0.000050	9556515
Total Molybdenum (Mo)	mg/L	0.00159	0.00168	0.00159	0.00142	0.00176	0.000050	9556515
Total Nickel (Ni)	mg/L	0.00358	0.00680	0.00517	0.00372	0.00698	0.000020	9556515
Total Selenium (Se)	mg/L	0.00657	0.00740	0.00685	0.00603	0.00723	0.000040	9556515
Total Silicon (Si)	mg/L	0.484	0.546	0.530	0.578	0.680	0.050	9556515
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556515
Total Strontium (Sr)	mg/L	0.652	0.631	0.641	0.654	0.635	0.000050	9556515
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9556515
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556515
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9556515
Total Uranium (U)	mg/L	0.0194	0.0311	0.0205	0.0145	0.0287	0.0000020	9556515
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556515
Total Zinc (Zn)	mg/L	0.0656	0.136	0.102	0.0735	0.133	0.00010	9556515
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556515
Total Calcium (Ca)	mg/L	107	104	104	108	103	0.050	9555950
Total Magnesium (Mg)	mg/L	16.3	15.7	15.9	16.2	15.9	0.050	9555950

RDL = Reportable Detection Limit



**BUREAU
VERITAS**

BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1457	WI1458	WI1459	WI1460	WI1461		
Sampling Date		2019/08/19 08:00	2019/08/19 09:05	2019/08/19 08:35	2019/08/19 08:05	2019/08/19 09:10		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	1C	2A	2B	2C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.75	3.71	3.37	3.46	3.47	0.050	9555950
Total Sodium (Na)	mg/L	26.3	25.4	25.8	26.2	25.7	0.050	9555950
Total Sulphur (S)	mg/L	93.4	91.6	92.7	93.0	93.7	3.0	9555950

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1462	WI1463	WI1470	WI1471	WI1472		
Sampling Date		2019/08/19 08:40	2019/08/19 08:10	2019/08/19 09:15	2019/08/19 08:45	2019/08/19 08:15		
COC Number		1 of 2	1 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	332	342	333	346	372	0.50	9556224
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	<0.00050	0.00353	0.00124	0.00185	<0.00050	0.00050	9556515
Total Antimony (Sb)	mg/L	0.0219	0.0201	0.0178	0.0141	0.00927	0.000020	9556515
Total Arsenic (As)	mg/L	0.0359	0.0273	0.0331	0.0171	0.00462	0.000020	9556515
Total Barium (Ba)	mg/L	0.0590	0.0594	0.0606	0.0589	0.0606	0.000020	9556515
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9556515
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556515
Total Boron (B)	mg/L	0.036	0.023	0.018	0.020	<0.010	0.010	9556515
Total Cadmium (Cd)	mg/L	0.000319	0.0000993	0.000303	0.0000322	0.0000114	0.0000050	9556515
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556515
Total Cobalt (Co)	mg/L	0.0000281	0.0000238	0.000130	0.0000225	0.0000571	0.0000050	9556515
Total Copper (Cu)	mg/L	0.00283	0.00148	0.00233	0.000954	0.000463	0.000050	9556515
Total Iron (Fe)	mg/L	0.0033	0.0077	0.0200	0.0074	0.0283	0.0010	9556515
Total Lead (Pb)	mg/L	0.000110	0.0000216	0.000406	0.0000436	0.0000279	0.0000050	9556515
Total Lithium (Li)	mg/L	0.0101	0.00967	0.00980	0.0118	0.00963	0.00050	9556515
Total Manganese (Mn)	mg/L	0.00189	0.00351	0.0117	0.00480	0.0185	0.000050	9556515
Total Molybdenum (Mo)	mg/L	0.00142	0.00145	0.00136	0.000760	0.000514	0.000050	9556515
Total Nickel (Ni)	mg/L	0.00541	0.00366	0.00596	0.00387	0.00269	0.000020	9556515
Total Selenium (Se)	mg/L	0.00656	0.00598	0.00415	0.00258	0.00129	0.000040	9556515
Total Silicon (Si)	mg/L	0.674	0.661	0.764	0.812	0.916	0.050	9556515
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556515
Total Strontium (Sr)	mg/L	0.649	0.672	0.709	0.676	0.748	0.000050	9556515
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9556515
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556515
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9556515
Total Uranium (U)	mg/L	0.0184	0.00998	0.0155	0.00584	0.00234	0.0000020	9556515
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556515
Total Zinc (Zn)	mg/L	0.0975	0.0582	0.0739	0.0264	0.00946	0.00010	9556515
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556515
Total Calcium (Ca)	mg/L	107	110	105	111	117	0.050	9555950
Total Magnesium (Mg)	mg/L	16.1	16.5	17.1	16.8	19.1	0.050	9555950

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1462	WI1463	WI1470	WI1471	WI1472		
Sampling Date		2019/08/19 08:40	2019/08/19 08:10	2019/08/19 09:15	2019/08/19 08:45	2019/08/19 08:15		
COC Number		1 of 2	1 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	3.48	3.55	3.28	2.54	1.94	0.050	9555950
Total Sodium (Na)	mg/L	25.9	26.2	27.3	26.7	30.1	0.050	9555950
Total Sulphur (S)	mg/L	92.2	95.2	98.0	97.0	110	3.0	9555950
RDL = Reportable Detection Limit								

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VERITASBV Labs Job #: B968928
Report Date: 2019/08/28ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WI1473	WI1474	WI1475	WI1476	WI1477		
Sampling Date		2019/08/19 09:20	2019/08/19 08:50	2019/08/19 08:20	2019/08/19 09:25	2019/08/19 08:55		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	5A	5B	5C	6A	6B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	338	352	376	326	337	0.50	9556224
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00561	<0.00050	0.00138	0.00530	0.00220	0.00050	9556515
Total Antimony (Sb)	mg/L	0.0117	0.00801	0.00340	0.0193	0.0144	0.000020	9556515
Total Arsenic (As)	mg/L	0.0193	0.00951	0.00357	0.0432	0.0206	0.000020	9556515
Total Barium (Ba)	mg/L	0.0597	0.0593	0.0644	0.0596	0.0600	0.000020	9556515
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9556515
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556515
Total Boron (B)	mg/L	0.022	<0.010	<0.010	0.015	0.018	0.010	9556515
Total Cadmium (Cd)	mg/L	0.000271	0.0000938	0.0000365	0.000714	0.000126	0.0000050	9556515
Total Chromium (Cr)	mg/L	<0.00010	0.00017	<0.00010	<0.00010	<0.00010	0.00010	9556515
Total Cobalt (Co)	mg/L	0.000940	0.000158	0.000145	0.000776	0.0000659	0.0000050	9556515
Total Copper (Cu)	mg/L	0.00368	0.00132	0.000471	0.00458	0.00149	0.000050	9556515
Total Iron (Fe)	mg/L	0.0343	0.0210	0.186	0.0202	0.0101	0.0010	9556515
Total Lead (Pb)	mg/L	0.00123	0.000272	0.0000657	0.00119	0.000138	0.0000050	9556515
Total Lithium (Li)	mg/L	0.0121	0.0108	0.0128	0.0112	0.00885	0.00050	9556515
Total Manganese (Mn)	mg/L	0.0614	0.0281	0.0472	0.0285	0.0105	0.000050	9556515
Total Molybdenum (Mo)	mg/L	0.00142	0.000726	0.000444	0.00151	0.00112	0.000050	9556515
Total Nickel (Ni)	mg/L	0.00596	0.00358	0.00165	0.00675	0.00409	0.000020	9556515
Total Selenium (Se)	mg/L	0.00248	0.00101	0.000325	0.00583	0.00254	0.000040	9556515
Total Silicon (Si)	mg/L	0.840	0.923	1.10	0.745	0.816	0.050	9556515
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9556515
Total Strontium (Sr)	mg/L	0.653	0.681	0.713	0.646	0.665	0.000050	9556515
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9556515
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556515
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9556515
Total Uranium (U)	mg/L	0.0146	0.00354	0.000698	0.0227	0.00635	0.0000020	9556515
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9556515
Total Zinc (Zn)	mg/L	0.0415	0.0117	0.00287	0.0961	0.0296	0.00010	9556515
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9556515
Total Calcium (Ca)	mg/L	108	113	121	104	109	0.050	9555950
Total Magnesium (Mg)	mg/L	16.4	17.0	18.1	15.8	16.1	0.050	9555950

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1473	WI1474	WI1475	WI1476	WI1477		
Sampling Date		2019/08/19 09:20	2019/08/19 08:50	2019/08/19 08:20	2019/08/19 09:25	2019/08/19 08:55		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	5A	5B	5C	6A	6B	RDL	QC Batch
Total Potassium (K)	mg/L	3.05	2.50	1.74	3.44	2.95	0.050	9555950
Total Sodium (Na)	mg/L	25.5	26.7	27.8	25.1	25.7	0.050	9555950
Total Sulphur (S)	mg/L	93.3	97.2	102	89.8	93.5	3.0	9555950

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1478		
Sampling Date		2019/08/19 08:25		
COC Number		2 of 2		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	345	0.50	9556224
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.00129	0.00050	9556515
Total Antimony (Sb)	mg/L	0.0138	0.000020	9556515
Total Arsenic (As)	mg/L	0.0107	0.000020	9556515
Total Barium (Ba)	mg/L	0.0611	0.000020	9556515
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9556515
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9556515
Total Boron (B)	mg/L	<0.010	0.010	9556515
Total Cadmium (Cd)	mg/L	0.0000240	0.0000050	9556515
Total Chromium (Cr)	mg/L	<0.00010	0.00010	9556515
Total Cobalt (Co)	mg/L	0.0000318	0.0000050	9556515
Total Copper (Cu)	mg/L	0.000679	0.000050	9556515
Total Iron (Fe)	mg/L	0.0333	0.0010	9556515
Total Lead (Pb)	mg/L	0.0000252	0.0000050	9556515
Total Lithium (Li)	mg/L	0.00794	0.00050	9556515
Total Manganese (Mn)	mg/L	0.0129	0.000050	9556515
Total Molybdenum (Mo)	mg/L	0.000856	0.000050	9556515
Total Nickel (Ni)	mg/L	0.00244	0.000020	9556515
Total Selenium (Se)	mg/L	0.00210	0.000040	9556515
Total Silicon (Si)	mg/L	0.768	0.050	9556515
Total Silver (Ag)	mg/L	<0.0000050	0.0000050	9556515
Total Strontium (Sr)	mg/L	0.670	0.000050	9556515
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	9556515
Total Tin (Sn)	mg/L	<0.00020	0.00020	9556515
Total Titanium (Ti)	mg/L	<0.00050	0.00050	9556515
Total Uranium (U)	mg/L	0.00351	0.0000020	9556515
Total Vanadium (V)	mg/L	<0.00020	0.00020	9556515
Total Zinc (Zn)	mg/L	0.00812	0.00010	9556515
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	9556515
Total Calcium (Ca)	mg/L	111	0.050	9555950
Total Magnesium (Mg)	mg/L	16.7	0.050	9555950
RDL = Reportable Detection Limit				



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VERITAS

BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WI1478		
Sampling Date		2019/08/19 08:25		
COC Number		2 of 2		
	UNITS	6C	RDL	QC Batch
Total Potassium (K)	mg/L	2.49	0.050	9555950
Total Sodium (Na)	mg/L	26.5	0.050	9555950
Total Sulphur (S)	mg/L	96.3	3.0	9555950
RDL = Reportable Detection Limit				



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BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1454
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9557995	N/A	2019/08/22	Ilonka Kovac

BV Labs ID: WI1454 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
pH @25°C	AT/ALK	9557995	N/A	2019/08/22	Ilonka Kovac

BV Labs ID: WI1455
Sample ID: 1A
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac



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BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1456

Sample ID: 1B

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Report Automation Engine
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9562792	N/A	2019/08/27	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9562794	N/A	2019/08/28	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1456 Dup

Sample ID: 1B

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer

BV Labs ID: WI1457

Sample ID: 1C

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Report Automation Engine
Ion Balance	CALC	9556060	N/A	2019/08/23	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/23	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/23	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557589	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac



BUREAU
VERITAS

BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1458
Sample ID: 2A
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Report Automation Engine
Ion Balance	CALC	9556060	N/A	2019/08/22	Report Automation Engine
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1459
Sample ID: 2B
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/23	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/23	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/23	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557589	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1460
Sample ID: 2C
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Report Automation Engine
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk



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VERITAS

BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1460

Sample ID: 2C

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1461

Sample ID: 3A

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1462

Sample ID: 3B

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1462
Sample ID: 3B
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1463
Sample ID: 3C
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/23	Report Automation Engine
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/23	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/23	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557589	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1470
Sample ID: 4A
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac



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VERITAS

BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1471

Sample ID: 4B

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Report Automation Engine
Ion Balance	CALC	9556060	N/A	2019/08/23	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/23	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/23	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557589	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1472

Sample ID: 4C

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/23	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/23	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/23	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557589	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1473

Sample ID: 5A

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk



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VERITAS

BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1473

Sample ID: 5A

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1473 Dup

Sample ID: 5A

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal

BV Labs ID: WI1474

Sample ID: 5B

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Report Automation Engine
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1475

Sample ID: 5C

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1475
Sample ID: 5C
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1476
Sample ID: 6A
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/23	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/23	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/23	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557589	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1477
Sample ID: 6B
Matrix: Water

Collected: 2019/08/19
Shipped:
Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Report Automation Engine
Ion Balance	CALC	9556060	N/A	2019/08/23	Report Automation Engine
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/23	Report Automation Engine



BUREAU
VERITAS

BV Labs Job #: B968928

Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WI1477

Sample ID: 6B

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/23	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557589	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac

BV Labs ID: WI1478

Sample ID: 6C

Matrix: Water

Collected: 2019/08/19

Shipped:

Received: 2019/08/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9558000	N/A	2019/08/23	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9560063	N/A	2019/08/23	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9556224	N/A	2019/08/23	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9555945	N/A	2019/08/23	Automated Statchk
Ion Balance	CALC	9556060	N/A	2019/08/22	Automated Statchk
Sum of cations, anions	CALC	9556061	N/A	2019/08/23	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9555946	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9556513	N/A	2019/08/23	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9555950	N/A	2019/08/23	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9556515	N/A	2019/08/23	Paula Calzada
Nitrate and Nitrite	CALC	9556227	N/A	2019/08/22	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9556231	N/A	2019/08/22	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9557592	N/A	2019/08/22	Ian Bullecer
pH @25°C	AT/ALK	9558002	N/A	2019/08/23	Ilonka Kovac



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	20.0°C
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Sample WI1456, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WI1459, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WI1461, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WI1456, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B968928
Report Date: 2019/08/28

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9556513	Dissolved Aluminum (Al)	2019/08/23	107	80 - 120	113	80 - 120	<0.00050	mg/L	8.5	20
9556513	Dissolved Antimony (Sb)	2019/08/23	NC	80 - 120	92	80 - 120	<0.000020	mg/L	2.1	20
9556513	Dissolved Arsenic (As)	2019/08/23	NC	80 - 120	92	80 - 120	<0.000020	mg/L	0.015	20
9556513	Dissolved Barium (Ba)	2019/08/23	NC	80 - 120	95	80 - 120	<0.000020	mg/L	0.88	20
9556513	Dissolved Beryllium (Be)	2019/08/23	96	80 - 120	107	80 - 120	<0.000010	mg/L	NC	20
9556513	Dissolved Bismuth (Bi)	2019/08/23	96	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9556513	Dissolved Boron (B)	2019/08/23	124 (1)	80 - 120	129 (1)	80 - 120	<0.010	mg/L	13	20
9556513	Dissolved Cadmium (Cd)	2019/08/23	95	80 - 120	94	80 - 120	<0.0000050	mg/L	3.6	20
9556513	Dissolved Chromium (Cr)	2019/08/23	95	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9556513	Dissolved Cobalt (Co)	2019/08/23	93	80 - 120	98	80 - 120	<0.0000050	mg/L	1.2	20
9556513	Dissolved Copper (Cu)	2019/08/23	91	80 - 120	97	80 - 120	<0.000050	mg/L	1.4	20
9556513	Dissolved Iron (Fe)	2019/08/23	102	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
9556513	Dissolved Lead (Pb)	2019/08/23	98	80 - 120	101	80 - 120	<0.0000050	mg/L	0.64	20
9556513	Dissolved Lithium (Li)	2019/08/23	118	80 - 120	107	80 - 120	<0.00050	mg/L	19	20
9556513	Dissolved Manganese (Mn)	2019/08/23	94	80 - 120	97	80 - 120	<0.000050	mg/L	1.8	20
9556513	Dissolved Molybdenum (Mo)	2019/08/23	110	80 - 120	99	80 - 120	<0.000050	mg/L	9.3	20
9556513	Dissolved Nickel (Ni)	2019/08/23	91	80 - 120	98	80 - 120	<0.000020	mg/L	1.9	20
9556513	Dissolved Selenium (Se)	2019/08/23	100	80 - 120	88	80 - 120	<0.000040	mg/L	3.2	20
9556513	Dissolved Silicon (Si)	2019/08/23	77 (1)	80 - 120	79 (1)	80 - 120	<0.050	mg/L	0.21	20
9556513	Dissolved Silver (Ag)	2019/08/23	88	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9556513	Dissolved Strontium (Sr)	2019/08/23	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.74	20
9556513	Dissolved Thallium (Tl)	2019/08/23	100	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9556513	Dissolved Tin (Sn)	2019/08/23	98	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9556513	Dissolved Titanium (Ti)	2019/08/23	101	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9556513	Dissolved Uranium (U)	2019/08/23	101	80 - 120	114	80 - 120	<0.0000020	mg/L	0.13	20
9556513	Dissolved Vanadium (V)	2019/08/23	97	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9556513	Dissolved Zinc (Zn)	2019/08/23	NC	80 - 120	91	80 - 120	<0.00010	mg/L	0.99	20
9556513	Dissolved Zirconium (Zr)	2019/08/23	104	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9556515	Total Aluminum (Al)	2019/08/23	112	80 - 120	117	80 - 120	<0.00050	mg/L	6.7	20
9556515	Total Antimony (Sb)	2019/08/23	NC	80 - 120	88	80 - 120	<0.000020	mg/L	0.74	20
9556515	Total Arsenic (As)	2019/08/23	NC	80 - 120	90	80 - 120	<0.000020	mg/L	8.2	20
9556515	Total Barium (Ba)	2019/08/23	NC	80 - 120	95	80 - 120	<0.000020	mg/L	0.98	20



BV Labs Job #: B968928
Report Date: 2019/08/28

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9556515	Total Beryllium (Be)	2019/08/23	120	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9556515	Total Bismuth (Bi)	2019/08/23	97	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9556515	Total Boron (B)	2019/08/23	126 (1)	80 - 120	126 (1)	80 - 120	<0.010	mg/L	19	20
9556515	Total Cadmium (Cd)	2019/08/23	95	80 - 120	94	80 - 120	<0.0000050	mg/L	0.66	20
9556515	Total Chromium (Cr)	2019/08/23	95	80 - 120	99	80 - 120	<0.00010	mg/L	10	20
9556515	Total Cobalt (Co)	2019/08/23	95	80 - 120	99	80 - 120	<0.0000050	mg/L	8.6	20
9556515	Total Copper (Cu)	2019/08/23	92	80 - 120	99	80 - 120	<0.000050	mg/L	6.4	20
9556515	Total Iron (Fe)	2019/08/23	102	80 - 120	105	80 - 120	<0.0010	mg/L	2.5	20
9556515	Total Lead (Pb)	2019/08/23	99	80 - 120	102	80 - 120	<0.0000050	mg/L	0.36	20
9556515	Total Lithium (Li)	2019/08/23	88	80 - 120	109	80 - 120	<0.00050	mg/L	2.7	20
9556515	Total Manganese (Mn)	2019/08/23	93	80 - 120	100	80 - 120	<0.000050	mg/L	7.5	20
9556515	Total Molybdenum (Mo)	2019/08/23	97	80 - 120	94	80 - 120	<0.000050	mg/L	6.7	20
9556515	Total Nickel (Ni)	2019/08/23	93	80 - 120	98	80 - 120	<0.000020	mg/L	6.4	20
9556515	Total Selenium (Se)	2019/08/23	99	80 - 120	89	80 - 120	<0.000040	mg/L	1.8	20
9556515	Total Silicon (Si)	2019/08/23	78 (1)	80 - 120	80	80 - 120	<0.050	mg/L	0.37	20
9556515	Total Silver (Ag)	2019/08/23	89	80 - 120	92	80 - 120	<0.0000050	mg/L	5.9	20
9556515	Total Strontium (Sr)	2019/08/23	NC	80 - 120	96	80 - 120	<0.000050	mg/L	7.5	20
9556515	Total Thallium (Tl)	2019/08/23	101	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9556515	Total Tin (Sn)	2019/08/23	97	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9556515	Total Titanium (Ti)	2019/08/23	102	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9556515	Total Uranium (U)	2019/08/23	102	80 - 120	116	80 - 120	<0.0000020	mg/L	0.17	20
9556515	Total Vanadium (V)	2019/08/23	98	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9556515	Total Zinc (Zn)	2019/08/23	NC	80 - 120	91	80 - 120	<0.00010	mg/L	6.0	20
9556515	Total Zirconium (Zr)	2019/08/23	102	80 - 120	95	80 - 120	<0.00010	mg/L	NC	20
9557589	Dissolved Nitrate (N)	2019/08/21	105	80 - 120	105	80 - 120	<0.010	mg/L	NC	20
9557589	Dissolved Nitrite (N)	2019/08/21	101	80 - 120	101	80 - 120	<0.010	mg/L	NC	20
9557592	Dissolved Nitrate (N)	2019/08/22	107	80 - 120	102	80 - 120	<0.010	mg/L	0.58	20
9557592	Dissolved Nitrite (N)	2019/08/22	104	80 - 120	102	80 - 120	<0.010	mg/L	6.8	20
9557995	pH	2019/08/22			100	97 - 103			0.49	N/A
9558000	Alkalinity (PP as CaCO3)	2019/08/23					<1.0	mg/L	NC	20
9558000	Alkalinity (Total as CaCO3)	2019/08/23			100	80 - 120	<1.0	mg/L	6.3	20
9558000	Bicarbonate (HCO3)	2019/08/23					<1.0	mg/L	6.3	20



BUREAU
VERITAS
BV Labs Job #: B968928
Report Date: 2019/08/28

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9558000	Carbonate (CO3)	2019/08/23					<1.0	mg/L	NC	20
9558000	Hydroxide (OH)	2019/08/23					<1.0	mg/L	NC	20
9558002	pH	2019/08/22			100	97 - 103			0.083	N/A
9560063	Dissolved Chloride (Cl)	2019/08/23	NC	80 - 120	101	80 - 120	<1.0	mg/L	3.9	20
9560063	Dissolved Sulphate (SO4)	2019/08/23	NC	80 - 120	98	80 - 120	<1.0	mg/L	0.46	20
9562792	Dissolved Aluminum (Al)	2019/08/28	117	80 - 120	80	80 - 120	<0.00050	mg/L	9.8	20
9562792	Dissolved Boron (B)	2019/08/28	NC	80 - 120	127 (1)	80 - 120	<0.010	mg/L	4.4	20
9562792	Dissolved Uranium (U)	2019/08/28	105	80 - 120	93	80 - 120	<0.0000020	mg/L	NC	20
9562794	Total Aluminum (Al)	2019/08/28	125 (1)	80 - 120	108	80 - 120	<0.00050	mg/L	20	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

BV Labs Job #: B968928
Report Date: 2019/08/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665-8566

CHAIN OF CUSTODY RECORD

BBV FCD-00077/05

COC #:

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Invoice Information				Report Information (if differs from Invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required			
Company Name: BMC MINERALS LTD.				Company Name: ALESCO ENVIRONMENTAL				Quotation #: 860751				☒ Regular TAT 5 days (Most analyses)			
Contact Name: _____				Contact Name: Mary Mioska, Renate Vanderhorst				P.O. # / AFCH: _____				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS			
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02				Rush TAT (Surcharges will be applied)			
Vancouver, BC PC: V6E 4A4				Whitehorse, YK PC: V1A 2V3				Site Location: Kudz Ze Kayah				Same Day ☐ 2 Days ☐ 3 Days ☐ 1 Day ☐			
Phone: _____				Phone: (867) 668-6463				Site #: _____				Date Required: _____			
Email: _____				Email: mmioska@alexcoenvy.com				Sampled By: _____				Rush Confirmation #: _____			
Regulatory Criteria				Special Instructions				Analysis Requested				LABORATORY USE ONLY			
☐ BC CSR Soil ☐ BC CSR Water				☐ Return Cooler								☐ CUSTODY SEAL ☐ COOLER TEMPERATURES			
☐ CCME (Specif) ☐ Other (Specif)				☐ Ship Sample Bottles (Please Specif)								☐ Present ☐ Intact			
☐ Drinking Water ☐ BC Water Quality				USE SCENARIO # 12485											
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM															
Sample Identification		Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE				
1	Influent		19-Aug-19	10:00	Water	X	X	X	X		COMMENTS				
2	1A		19-Aug-19	9:00	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
3	1B		19-Aug-19	8:30	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
4	1C		19-Aug-19	8:00	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
5	2A		19-Aug-19	9:05	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
6	2B		19-Aug-19	8:35	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
7	2C		19-Aug-19	8:05	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
8	3A		19-Aug-19	9:10	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
9	3B		19-Aug-19	8:40	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
10	3C		19-Aug-19	8:10	Water	X	X	X	X		Metals preserved with HNO3, dissolved				
REINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)								
<i>Tanner Webb</i>		2019/08/19	12:30	<i>Judith Mioska</i>		2019/08/19	07:00								

Safam Maiter
B968928

JEM INS-0110

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5, Toll Free (800) 665-8566

COC #:

BBY FCD-00077/05
Page ____ of ____

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required			
Company Name: BMC MINERALS LTD. Contact Name: Mary Mioska; Renate Vanderhorst Address: 530-1130 WEST PENDER ST Vancouver, BC V6E 4A4 Phone: (607) 668-6463 Email: mmioska@alexcoenvy.com				Company Name: ALEXCO ENVIRONMENTAL Contact Name: Mary Mioska; Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK V1A 2V3 Phone: (867) 668-6463 Email: rvanderhorst@alexcoenvy.com				Quotation #: B60751 P.O. #/ A/FEE#: Project #: BMC-18-02 Site location: Kudz Ze Kayah Site #: Sampled By:				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS ☒ Regular TAT 5 days (Most analyzed) ☐ Rush TAT (Surcharges will be applied) Same Day 1 Day 2 Days 3 Days			
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485				Analysis Requested Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity				Rush Confirmation #: LABORATORY USE ONLY CUSTODY SEAL COOLER TEMPERATURES # OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE			
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM		Date Sampled (YYYY/MM/DD)		Time Sampled (HH:MM)		Matrix									
Sample Identification	Lab Identification														
1 4A		19-Aug-19	9:15	Water	X	X	X								
2 4B		19-Aug-19	8:45	Water	X	X	X								
3 4C		19-Aug-19	8:15	Water	X	X	X								
4 5A		19-Aug-19	9:20	Water	X	X	X								
5 5B		19-Aug-19	8:50	Water	X	X	X								
6 5C		19-Aug-19	8:20	Water	X	X	X								
7 6A		19-Aug-19	9:25	Water	X	X	X								
8 6B		19-Aug-19	8:55	Water	X	X	X								
9 6C		19-Aug-19	8:25	Water	X	X	X								
REINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)					
Tanner Webb		2019/08/19		14:30		M. Mioska		2019/08/20		09:00					
19-Aug-19 12:39 Saffann Maier B968928															



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 OF 2, 2 OF 2

Attention: Mary Mioska

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/09/10
 Report #: R2779180
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B971690

Received: 2019/08/27, 12:51

Sample Matrix: Water
 # Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	5	N/A	2019/09/03	AB SOP-00005	SM 23 2310 B m
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	2	N/A	2019/09/04	AB SOP-00005	SM 23 2310 B m
Alkalinity - Low Level	19	N/A	2019/09/03	AB SOP-00005	SM 23 2320 B m
Biochemical Oxygen Demand	7	2019/08/29	2019/09/03	AB SOP-00017	SM 23 5210B m
Low level chloride/sulphate by AC	19	N/A	2019/09/01	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
COD by Colorimeter	7	N/A	2019/08/30	AB SOP-00016	SM 23 5220D m
Carbon (DOC) (1)	7	N/A	2019/09/03	AB SOP-00087	MMCW 119 1996 m
Hardness Total (calculated as CaCO ₃) (2)	19	N/A	2019/09/04	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	19	N/A	2019/09/04	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	19	N/A	2019/09/04		Auto Calc
Ion Balance	7	N/A	2019/08/30		Auto Calc
Ion Balance	12	N/A	2019/09/01		Auto Calc
Sum of cations, anions	19	N/A	2019/09/04		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	19	N/A	2019/09/04	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	19	N/A	2019/09/01	CAL SOP-00265	EPA 6020 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	19	N/A	2019/09/04	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	1	N/A	2019/09/01	CAL SOP-00265	EPA 6020 m
Elements by ICPMS Low Level (total)	18	N/A	2019/09/02	CAL SOP-00265	EPA 6020 m
Nitrate and Nitrite - Low Level	19	N/A	2019/09/03		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	19	N/A	2019/09/03		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	19	N/A	2019/08/30	AB SOP-00023	SM 23 4110 B m
Carbon (Total Organic) (3)	7	N/A	2019/09/03	AB SOP-00087	MMCW 119 1996 m
Total Suspended Solids (NFR)	7	2019/09/01	2019/09/01	AB SOP-00061	SM 23 2540 D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 OF 2, 2 OF 2

Attention: Mary Mioska

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/09/10
Report #: R2779180
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B971690

Received: 2019/08/27, 12:51

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(3) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



BUREAU
VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WJ5810			WJ5811	WJ5812			WJ5813		
Sampling Date		2019/08/27 10:00			2019/08/27 09:00	2019/08/27 08:30			2019/08/27 08:00		
COC Number		1 OF 2			1 OF 2	1 OF 2			1 OF 2		
	UNITS	INFLUENT	RDL	QC Batch	1A	1B	RDL	QC Batch	1C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.9	N/A	9566427	8.1	8.1	N/A	9566427	8.7	N/A	9566427
Cation Sum	meq/L	7.9	N/A	9566427	8.1	8.1	N/A	9566427	8.4	N/A	9566427
Ion Balance	N/A	1.0	0.010	9574842	1.0	1.0	0.010	9574842	0.96	0.010	9574842
Ion Balance (% Difference)	%	0.098	N/A	9566425	0.30	0.065	N/A	9566425	2.2	N/A	9566425
Dissolved Nitrate (NO3)	mg/L	1.3	0.013	9567052	2.1	2.1	0.013	9567052	0.98	0.013	9567052
Nitrate plus Nitrite (N)	mg/L	0.30	0.0042	9566930	0.51	0.49	0.0042	9566930	0.23	0.0042	9566930
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9567052	0.12	0.065	0.0099	9567052	0.037	0.0099	9567052

Demand Parameters

Biochemical Oxygen Demand	mg/L	<2.0 (1)	2.0	9565949					<2.0 (1)	2.0	9565949
Chemical Oxygen Demand	mg/L	<10	10	9570177					<10	10	9570177

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L	2.6	0.50	9572267					2.7	0.50	9572267
Acidity (pH 4.5)	mg/L	<1.0	1.0	9570416					<1.0	1.0	9570416
Alkalinity (Total as CaCO3)	mg/L	71.5	0.50	9572276	71.9	73.3	0.50	9572276	102	0.50	9572276
Total Organic Carbon (C)	mg/L	2.5	0.50	9572268					2.6	0.50	9572268
Acidity (pH 8.3)	mg/L	6.8	1.0	9570416					3.7	1.0	9570416
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Bicarbonate (HCO3)	mg/L	87.2	0.50	9572276	87.7	89.4	0.50	9572276	125	0.50	9572276
Carbonate (CO3)	mg/L	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Hydroxide (OH)	mg/L	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Total Suspended Solids	mg/L	1.5	1.0	9571933					<1.0	1.0	9571933

Anions

Dissolved Chloride (Cl)	mg/L	56	0.50	9572009	58	58	0.50	9572009	57	0.50	9571977
Dissolved Sulphate (SO4)	mg/L	240 (2)	1.0	9572009	240 (2)	240 (2)	1.0	9572009	240 (2)	1.0	9571977

Nutrients

Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9569812	0.035	0.020	0.0030	9569812	0.011	0.0030	9568801
Dissolved Nitrate (N)	mg/L	0.30	0.0030	9569812	0.48	0.47	0.0030	9569812	0.22	0.0030	9568801

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WJ5814	WJ5815			WJ5816			WJ5817		
Sampling Date		2019/08/27 09:05	2019/08/27 08:35			2019/08/27 08:05			2019/08/27 09:10		
COC Number		1 OF 2	1 OF 2			1 OF 2			1 OF 2		
	UNITS	2A	2B	RDL	QC Batch	2C	RDL	QC Batch	3A	RDL	QC Batch

Calculated Parameters											
Anion Sum	meq/L	8.1	8.1	N/A	9566427	8.2	N/A	9566427	8.0	N/A	9566427
Cation Sum	meq/L	8.2	8.3	N/A	9566427	8.4	N/A	9566427	8.1	N/A	9566427
Ion Balance	N/A	1.0	1.0	0.010	9574842	1.0	0.010	9574842	1.0	0.010	9574842
Ion Balance (% Difference)	%	0.91	0.97	N/A	9566425	1.2	N/A	9566425	0.53	N/A	9566425
Dissolved Nitrate (NO3)	mg/L	1.1	0.38	0.013	9567052	<0.013	0.013	9567052	0.52	0.013	9567052
Nitrate plus Nitrite (N)	mg/L	0.32	0.090	0.0042	9566930	<0.0042	0.0042	9566930	0.13	0.0042	9566930
Dissolved Nitrite (NO2)	mg/L	0.22	0.010	0.0099	9567052	<0.0099	0.0099	9567052	0.030	0.0099	9567052

Demand Parameters											
Biochemical Oxygen Demand	mg/L					<2.0 (1)	2.0	9565949			
Chemical Oxygen Demand	mg/L					<10	10	9570177			

Misc. Inorganics											
Dissolved Organic Carbon (C)	mg/L					2.8	0.50	9572267			
Acidity (pH 4.5)	mg/L					<1.0	1.0	9570416			
Alkalinity (Total as CaCO3)	mg/L	69.1	72.1	0.50	9572276	76.8	0.50	9572276	71.5	0.50	9572276
Total Organic Carbon (C)	mg/L					2.6	0.50	9572268			
Acidity (pH 8.3)	mg/L					4.1	1.0	9570416			
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276	<0.50	0.50	9572276
Bicarbonate (HCO3)	mg/L	84.3	87.9	0.50	9572276	93.7	0.50	9572276	87.2	0.50	9572276
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276	<0.50	0.50	9572276
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276	<0.50	0.50	9572276
Total Suspended Solids	mg/L					1.1	1.0	9571933			

Anions											
Dissolved Chloride (Cl)	mg/L	59	58	0.50	9572009	58	0.50	9571977	58	0.50	9572009
Dissolved Sulphate (SO4)	mg/L	240 (2)	240 (2)	1.0	9572009	240 (2)	1.0	9571977	240 (2)	1.0	9572009

Nutrients											
Dissolved Nitrite (N)	mg/L	0.067	0.0032	0.0030	9569812	<0.0030	0.0030	9568801	0.0091	0.0030	9569812
Dissolved Nitrate (N)	mg/L	0.25	0.086	0.0030	9569812	<0.0030	0.0030	9568801	0.12	0.0030	9569812

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WJ5818			WJ5819			WJ5820	WJ5821		
Sampling Date		2019/08/27 08:40			2019/08/27 08:10			2019/08/27 09:15	2019/08/27 08:45		
COC Number		1 OF 2			1 OF 2			2 OF 2	2 OF 2		
	UNITS	3B	RDL	QC Batch	3C	RDL	QC Batch	4A	4B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.2	N/A	9566427	8.3	N/A	9566427	8.3	8.3	N/A	9566427
Cation Sum	meq/L	8.1	N/A	9566427	8.5	N/A	9566427	8.3	8.9	N/A	9566427
Ion Balance	N/A	0.99	0.010	9574842	1.0	0.010	9574842	1.0	1.1	0.010	9574842
Ion Balance (% Difference)	%	0.48	N/A	9566425	0.82	N/A	9566425	0.030	3.4	N/A	9566425
Dissolved Nitrate (NO3)	mg/L	0.033	0.013	9567052	<0.013	0.013	9567052	0.18	<0.013	0.013	9567052
Nitrate plus Nitrite (N)	mg/L	0.0074	0.0042	9566930	<0.0042	0.0042	9566930	0.040	<0.0042	0.0042	9566930
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9567052	<0.0099	0.0099	9567052	<0.0099	<0.0099	0.0099	9567052

Demand Parameters

Biochemical Oxygen Demand	mg/L				<2.0 (1)	2.0	9565949				
Chemical Oxygen Demand	mg/L				<10	10	9570177				

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L				2.7	0.50	9572267				
Acidity (pH 4.5)	mg/L				<1.0	1.0	9570416				
Alkalinity (Total as CaCO3)	mg/L	78.8	0.50	9572276	74.8	0.50	9572276	78.0	77.1	0.50	9572276
Total Organic Carbon (C)	mg/L				2.5	0.50	9572268				
Acidity (pH 8.3)	mg/L				4.8	1.0	9570416				
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9572276	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276
Bicarbonate (HCO3)	mg/L	96.1	0.50	9572276	91.3	0.50	9572276	95.1	94.1	0.50	9572276
Carbonate (CO3)	mg/L	<0.50	0.50	9572276	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276
Hydroxide (OH)	mg/L	<0.50	0.50	9572276	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276
Total Suspended Solids	mg/L				<1.0	1.0	9571933				

Anions

Dissolved Chloride (Cl)	mg/L	58	0.50	9572009	65	0.50	9572009	60	61	0.50	9572009
Dissolved Sulphate (SO4)	mg/L	240 (2)	1.0	9572009	240 (2)	1.0	9572009	240 (2)	240 (2)	1.0	9572009

Nutrients

Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9569812	<0.0030	0.0030	9568801	<0.0030	<0.0030	0.0030	9569812
Dissolved Nitrate (N)	mg/L	0.0074	0.0030	9569812	<0.0030	0.0030	9568801	0.040	<0.0030	0.0030	9569812

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WJ5822			WJ5823	WJ5824			WJ5825		
Sampling Date		2019/08/27 08:15			2019/08/27 09:20	2019/08/27 08:50			2019/08/27 08:20		
COC Number		2 OF 2			2 OF 2	2 OF 2			2 OF 2		
	UNITS	4C	RDL	QC Batch	5A	5B	RDL	QC Batch	5C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.7	N/A	9566427	8.2	8.6	N/A	9566427	9.2	N/A	9566427
Cation Sum	meq/L	8.7	N/A	9566427	8.3	8.7	N/A	9566427	9.2	N/A	9566427
Ion Balance	N/A	1.0	0.010	9574842	1.0	1.0	0.010	9574842	1.0	0.010	9574842
Ion Balance (% Difference)	%	0.21	N/A	9566425	0.72	0.66	N/A	9566425	0.14	N/A	9566425
Dissolved Nitrate (NO3)	mg/L	<0.013	0.013	9567052	0.092	0.020	0.013	9567052	<0.013	0.013	9567052
Nitrate plus Nitrite (N)	mg/L	<0.0042	0.0042	9566930	0.021	0.0045	0.0042	9566930	<0.0042	0.0042	9566930
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.0099	9567052	<0.0099	<0.0099	0.0099	9567052	<0.0099	0.0099	9567052

Demand Parameters

Biochemical Oxygen Demand	mg/L	<2.0 (1)	2.0	9565949					<2.0 (1)	2.0	9565949
Chemical Oxygen Demand	mg/L	<10	10	9570177					<10	10	9570177

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L	2.7	0.50	9572267					3.1	0.50	9572267
Acidity (pH 4.5)	mg/L	<1.0	1.0	9570416					<1.0	1.0	9570416
Alkalinity (Total as CaCO3)	mg/L	85.4	0.50	9572276	78.3	86.1	0.50	9572276	100	0.50	9572276
Total Organic Carbon (C)	mg/L	2.7	0.50	9572268					3.3	0.50	9572268
Acidity (pH 8.3)	mg/L	5.5	1.0	9570416					6.0	1.0	9570416
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Bicarbonate (HCO3)	mg/L	104	0.50	9572276	95.5	105	0.50	9572276	122	0.50	9572276
Carbonate (CO3)	mg/L	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Hydroxide (OH)	mg/L	<0.50	0.50	9572276	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Total Suspended Solids	mg/L	1.3	1.0	9571933					1.7	1.0	9571933

Anions

Dissolved Chloride (Cl)	mg/L	59	0.50	9571977	59	62	0.50	9572009	66	0.50	9572009
Dissolved Sulphate (SO4)	mg/L	260 (2)	1.0	9571977	240 (2)	250 (2)	1.0	9572009	260 (2)	1.0	9572009

Nutrients

Dissolved Nitrite (N)	mg/L	<0.0030	0.0030	9568801	<0.0030	<0.0030	0.0030	9569812	<0.0030	0.0030	9569812
Dissolved Nitrate (N)	mg/L	<0.0030	0.0030	9568801	0.021	0.0045	0.0030	9569812	<0.0030	0.0030	9569812

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WJ5826	WJ5827			WJ5828		
Sampling Date		2019/08/27 09:25	2019/08/27 08:55			2019/08/27 08:25		
COC Number		2 OF 2	2 OF 2			2 OF 2		
	UNITS	6A	6B	RDL	QC Batch	6C	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	8.3	8.6	N/A	9566427	8.9	N/A	9566427
Cation Sum	meq/L	8.3	9.2	N/A	9566427	8.9	N/A	9566427
Ion Balance	N/A	0.99	1.1	0.010	9574842	1.0	0.010	9574842
Ion Balance (% Difference)	%	0.45	3.0	N/A	9566425	0.088	N/A	9566425
Dissolved Nitrate (NO3)	mg/L	0.31	<0.013	0.013	9567052	<0.013	0.013	9567052
Nitrate plus Nitrite (N)	mg/L	0.083	<0.0042	0.0042	9566930	<0.0042	0.0042	9566930
Dissolved Nitrite (NO2)	mg/L	0.042	<0.0099	0.0099	9567052	<0.0099	0.0099	9567052
Demand Parameters								
Biochemical Oxygen Demand	mg/L					<2.0 (1)	2.0	9565949
Chemical Oxygen Demand	mg/L					<10	10	9570177
Misc. Inorganics								
Dissolved Organic Carbon (C)	mg/L					3.4	0.50	9572267
Acidity (pH 4.5)	mg/L					<1.0	1.0	9570416
Alkalinity (Total as CaCO3)	mg/L	80.0	82.2	0.50	9572276	81.3	0.50	9572276
Total Organic Carbon (C)	mg/L					3.1	0.50	9572268
Acidity (pH 8.3)	mg/L					5.8	1.0	9570416
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Bicarbonate (HCO3)	mg/L	97.6	100	0.50	9572276	99.2	0.50	9572276
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9572276	<0.50	0.50	9572276
Total Suspended Solids	mg/L					<1.0	1.0	9571933
Anions								
Dissolved Chloride (Cl)	mg/L	57	57	0.50	9572009	65	0.50	9572009
Dissolved Sulphate (SO4)	mg/L	250 (2)	260 (2)	1.0	9572009	260 (2)	1.0	9572009
Nutrients								
Dissolved Nitrite (N)	mg/L	0.013	<0.0030	0.0030	9569812	<0.0030	0.0030	9569812
Dissolved Nitrate (N)	mg/L	0.070	<0.0030	0.0030	9569812	<0.0030	0.0030	9569812
RDL = Reportable Detection Limit								
N/A = Not Applicable								
(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.								
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.								



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5810	WJ5811		WJ5812		
Sampling Date		2019/08/27 10:00	2019/08/27 09:00		2019/08/27 08:30		
COC Number		1 OF 2	1 OF 2		1 OF 2		
	UNITS	INFLUENT	1A	QC Batch	1B	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	336	343	9566643	343	0.50	9566643
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.0111	0.00168	9567779	0.00246	0.00050	9567779
Dissolved Antimony (Sb)	mg/L	0.0222	0.0210	9567779	0.0204	0.000020	9567779
Dissolved Arsenic (As)	mg/L	0.0636	0.0619	9567779	0.0484	0.000020	9567779
Dissolved Barium (Ba)	mg/L	0.0593	0.0577	9567779	0.0570	0.000020	9567779
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9567779	<0.000010	0.000010	9567779
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Boron (B)	mg/L	<0.010	0.041	9567779	0.032	0.010	9575806
Dissolved Cadmium (Cd)	mg/L	0.00202	0.00161	9567779	0.000814	0.0000050	9567779
Dissolved Chromium (Cr)	mg/L	0.00015	0.00030	9567779	<0.00010	0.00010	9567779
Dissolved Cobalt (Co)	mg/L	0.00272	0.000652	9567779	0.0000590	0.0000050	9567779
Dissolved Copper (Cu)	mg/L	0.0170	0.00962	9567779	0.00336	0.000050	9567779
Dissolved Iron (Fe)	mg/L	0.0027	0.0059	9567779	0.0047	0.0010	9567779
Dissolved Lead (Pb)	mg/L	0.0192	0.00384	9567779	0.000219	0.0000050	9567779
Dissolved Lithium (Li)	mg/L	0.00713	0.00946	9567779	0.0143	0.00050	9575806
Dissolved Manganese (Mn)	mg/L	0.0565	0.0146	9567779	0.00287	0.000050	9567779
Dissolved Molybdenum (Mo)	mg/L	0.00174	0.00168	9567779	0.00129	0.000050	9567779
Dissolved Nickel (Ni)	mg/L	0.00793	0.00718	9567779	0.00513	0.000020	9567779
Dissolved Selenium (Se)	mg/L	0.00820	0.00798	9567779	0.00772	0.000040	9567779
Dissolved Silicon (Si)	mg/L	0.723	0.427	9567779	0.294	0.050	9567779
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Strontium (Sr)	mg/L	0.643	0.669	9567779	0.647	0.000050	9567779
Dissolved Thallium (Tl)	mg/L	0.0000033	0.0000040	9567779	0.0000039	0.0000020	9567779
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9567779	<0.00050	0.00050	9567779
Dissolved Uranium (U)	mg/L	0.0307	0.0296	9567779	0.0303	0.0000020	9567779
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Zinc (Zn)	mg/L	0.176	0.163	9567779	0.116	0.00010	9567779
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Calcium (Ca)	mg/L	107	109	9566646	110	0.050	9566646
Dissolved Magnesium (Mg)	mg/L	16.5	17.3	9566646	16.8	0.050	9566646
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5810	WJ5811		WJ5812		
Sampling Date		2019/08/27 10:00	2019/08/27 09:00		2019/08/27 08:30		
COC Number		1 OF 2	1 OF 2		1 OF 2		
	UNITS	INFLUENT	1A	QC Batch	1B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.83	3.99	9566646	3.87	0.050	9566646
Dissolved Sodium (Na)	mg/L	25.6	26.8	9566646	26.0	0.050	9566646
Dissolved Sulphur (S)	mg/L	93.6	98.4	9566646	95.0	3.0	9566646
RDL = Reportable Detection Limit							

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VERITASBV Labs Job #: B971690
Report Date: 2019/09/10ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5813		WJ5814	WJ5815	WJ5816		
Sampling Date		2019/08/27 08:00		2019/08/27 09:05	2019/08/27 08:35	2019/08/27 08:05		
COC Number		1 OF 2		1 OF 2	1 OF 2	1 OF 2		
	UNITS	1C	QC Batch	2A	2B	2C	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	355	9566643	347	351	357	0.50	9566643
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0120	9575806	0.00097	<0.00050	0.00178	0.00050	9567779
Dissolved Antimony (Sb)	mg/L	0.0190	9567779	0.0230	0.0205	0.0192	0.000020	9567779
Dissolved Arsenic (As)	mg/L	0.0362	9567779	0.0569	0.0479	0.0368	0.000020	9567779
Dissolved Barium (Ba)	mg/L	0.0590	9567779	0.0626	0.0596	0.0611	0.000020	9567779
Dissolved Beryllium (Be)	mg/L	<0.000010	9567779	<0.000010	<0.000010	<0.000010	0.000010	9567779
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9575806	<0.0000050	<0.0000050	<0.0000050	0.0000050	9567779
Dissolved Boron (B)	mg/L	0.017	9567779	0.024	0.027	0.027	0.010	9567779
Dissolved Cadmium (Cd)	mg/L	0.000224	9567779	0.00147	0.000526	0.000193	0.0000050	9567779
Dissolved Chromium (Cr)	mg/L	0.00011	9567779	0.00012	0.00011	<0.00010	0.00010	9567779
Dissolved Cobalt (Co)	mg/L	0.0000293	9567779	0.000817	0.0000320	0.0000241	0.0000050	9567779
Dissolved Copper (Cu)	mg/L	0.00173	9567779	0.0103	0.00296	0.00161	0.000050	9567779
Dissolved Iron (Fe)	mg/L	0.0082	9567779	0.0026	0.0054	0.0077	0.0010	9567779
Dissolved Lead (Pb)	mg/L	0.0000591	9567779	0.00419	0.000105	0.0000273	0.0000050	9567779
Dissolved Lithium (Li)	mg/L	0.0103	9575806	0.0107	0.00986	0.0170	0.00050	9567779
Dissolved Manganese (Mn)	mg/L	0.00368	9567779	0.0202	0.00285	0.00271	0.000050	9567779
Dissolved Molybdenum (Mo)	mg/L	0.00144	9567779	0.00156	0.00154	0.00135	0.000050	9567779
Dissolved Nickel (Ni)	mg/L	0.00413	9567779	0.00724	0.00558	0.00459	0.000020	9567779
Dissolved Selenium (Se)	mg/L	0.00710	9567779	0.00820	0.00712	0.00639	0.000040	9567779
Dissolved Silicon (Si)	mg/L	0.454	9567779	0.510	0.506	0.575	0.050	9567779
Dissolved Silver (Ag)	mg/L	<0.0000050	9567779	<0.0000050	<0.0000050	<0.0000050	0.0000050	9567779
Dissolved Strontium (Sr)	mg/L	0.669	9567779	0.664	0.671	0.681	0.000050	9567779
Dissolved Thallium (Tl)	mg/L	0.0000032	9567779	<0.0000020	0.0000022	<0.0000020	0.0000020	9567779
Dissolved Tin (Sn)	mg/L	<0.00020	9567779	<0.00020	<0.00020	<0.00020	0.00020	9567779
Dissolved Titanium (Ti)	mg/L	<0.00050	9567779	<0.00050	<0.00050	<0.00050	0.00050	9567779
Dissolved Uranium (U)	mg/L	0.0264	9567779	0.0299	0.0237	0.0201	0.0000020	9567779
Dissolved Vanadium (V)	mg/L	<0.00020	9567779	<0.00020	<0.00020	<0.00020	0.00020	9567779
Dissolved Zinc (Zn)	mg/L	0.0830	9567779	0.150	0.109	0.0848	0.00010	9567779
Dissolved Zirconium (Zr)	mg/L	<0.00010	9567779	<0.00010	<0.00010	<0.00010	0.00010	9567779
Dissolved Calcium (Ca)	mg/L	113	9566646	111	112	115	0.050	9566646
Dissolved Magnesium (Mg)	mg/L	17.4	9566646	17.3	17.1	17.3	0.050	9566646

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5813		WJ5814	WJ5815	WJ5816		
Sampling Date		2019/08/27 08:00		2019/08/27 09:05	2019/08/27 08:35	2019/08/27 08:05		
COC Number		1 OF 2		1 OF 2	1 OF 2	1 OF 2		
	UNITS	1C	QC Batch	2A	2B	2C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.81	9566646	4.03	3.72	3.59	0.050	9566646
Dissolved Sodium (Na)	mg/L	26.9	9566646	26.6	26.4	26.4	0.050	9566646
Dissolved Sulphur (S)	mg/L	98.9	9566646	97.1	101	98.5	3.0	9566646
RDL = Reportable Detection Limit								



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5817		WJ5818		WJ5819		
Sampling Date		2019/08/27 09:10		2019/08/27 08:40		2019/08/27 08:10		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	3A	QC Batch	3B	QC Batch	3C	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	345	9566643	346	9566643	361	0.50	9566643
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	<0.00050	9567779	0.00329	9567779	0.0323	0.00050	9575806
Dissolved Antimony (Sb)	mg/L	0.0222	9567779	0.0201	9567779	0.0189	0.000020	9567779
Dissolved Arsenic (As)	mg/L	0.0548	9567779	0.0424	9567779	0.0375	0.000020	9567779
Dissolved Barium (Ba)	mg/L	0.0599	9567779	0.0599	9567779	0.0616	0.000020	9567779
Dissolved Beryllium (Be)	mg/L	<0.000010	9567779	<0.000010	9567779	<0.000010	0.000010	9567779
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9567779	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Boron (B)	mg/L	<0.010	9567779	0.039	9575806	<0.010	0.010	9567779
Dissolved Cadmium (Cd)	mg/L	0.000761	9567779	0.000394	9567779	0.000161	0.0000050	9567779
Dissolved Chromium (Cr)	mg/L	<0.00010	9567779	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Cobalt (Co)	mg/L	0.000241	9567779	0.0000239	9567779	0.0000247	0.0000050	9567779
Dissolved Copper (Cu)	mg/L	0.00549	9567779	0.00279	9567779	0.00165	0.000050	9567779
Dissolved Iron (Fe)	mg/L	0.0028	9567779	0.0023	9567779	0.0069	0.0010	9567779
Dissolved Lead (Pb)	mg/L	0.000554	9567779	0.0000795	9567779	0.0000228	0.0000050	9567779
Dissolved Lithium (Li)	mg/L	0.0139	9567779	0.0182	9567779	0.0115	0.00050	9567779
Dissolved Manganese (Mn)	mg/L	0.00873	9567779	0.00159	9567779	0.00414	0.000050	9567779
Dissolved Molybdenum (Mo)	mg/L	0.00159	9567779	0.00140	9567779	0.00146	0.000050	9567779
Dissolved Nickel (Ni)	mg/L	0.00707	9567779	0.00564	9567779	0.00422	0.000020	9567779
Dissolved Selenium (Se)	mg/L	0.00763	9567779	0.00662	9567779	0.00635	0.000040	9567779
Dissolved Silicon (Si)	mg/L	0.696	9567779	0.734	9567779	0.807	0.050	9567779
Dissolved Silver (Ag)	mg/L	<0.0000050	9567779	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Strontium (Sr)	mg/L	0.659	9567779	0.663	9567779	0.682	0.000050	9567779
Dissolved Thallium (Tl)	mg/L	0.0000029	9567779	0.0000023	9567779	<0.0000020	0.0000020	9567779
Dissolved Tin (Sn)	mg/L	<0.00020	9567779	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Titanium (Ti)	mg/L	<0.00050	9567779	<0.00050	9567779	<0.00050	0.00050	9567779
Dissolved Uranium (U)	mg/L	0.0269	9567779	0.0223	9567779	0.0185	0.0000020	9567779
Dissolved Vanadium (V)	mg/L	<0.00020	9567779	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Zinc (Zn)	mg/L	0.129	9567779	0.103	9567779	0.0782	0.00010	9567779
Dissolved Zirconium (Zr)	mg/L	<0.00010	9567779	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Calcium (Ca)	mg/L	111	9566646	111	9566646	116	0.050	9566646
Dissolved Magnesium (Mg)	mg/L	16.7	9566646	16.7	9566646	17.4	0.050	9566646
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5817		WJ5818		WJ5819		
Sampling Date		2019/08/27 09:10		2019/08/27 08:40		2019/08/27 08:10		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	3A	QC Batch	3B	QC Batch	3C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.76	9566646	3.59	9566646	3.54	0.050	9566646
Dissolved Sodium (Na)	mg/L	25.9	9566646	25.5	9566646	26.7	0.050	9566646
Dissolved Sulphur (S)	mg/L	96.3	9566646	95.4	9566646	99.9	3.0	9566646
RDL = Reportable Detection Limit								



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5820		WJ5821		WJ5822		
Sampling Date		2019/08/27 09:15		2019/08/27 08:45		2019/08/27 08:15		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	4A	QC Batch	4B	QC Batch	4C	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	352	9566643	372	9566643	372	0.50	9566643
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	<0.00050	9567779	0.00386	9567779	0.00140	0.00050	9567779
Dissolved Antimony (Sb)	mg/L	0.0152	9567779	0.0108	9567779	0.00690	0.000020	9567779
Dissolved Arsenic (As)	mg/L	0.0336	9567779	0.0193	9567779	0.00836	0.000020	9567779
Dissolved Barium (Ba)	mg/L	0.0604	9567779	0.0590	9567779	0.0604	0.000020	9567779
Dissolved Beryllium (Be)	mg/L	<0.000010	9567779	<0.000010	9567779	<0.000010	0.000010	9567779
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9567779	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Boron (B)	mg/L	<0.010	9567779	<0.010	9567779	<0.010	0.010	9567779
Dissolved Cadmium (Cd)	mg/L	0.000323	9567779	0.0000559	9567779	0.0000135	0.0000050	9567779
Dissolved Chromium (Cr)	mg/L	<0.00010	9567779	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Cobalt (Co)	mg/L	0.000131	9567779	0.0000262	9567779	0.0000260	0.0000050	9567779
Dissolved Copper (Cu)	mg/L	0.00228	9567779	0.00122	9567779	0.000434	0.000050	9567779
Dissolved Iron (Fe)	mg/L	0.0075	9567779	0.0042	9567779	0.0105	0.0010	9567779
Dissolved Lead (Pb)	mg/L	0.000257	9567779	0.0000589	9567779	0.0000244	0.0000050	9567779
Dissolved Lithium (Li)	mg/L	0.0109	9567779	0.0132	9575806	0.00939	0.00050	9567779
Dissolved Manganese (Mn)	mg/L	0.00958	9567779	0.00416	9567779	0.0108	0.000050	9567779
Dissolved Molybdenum (Mo)	mg/L	0.00101	9567779	0.000572	9567779	0.000438	0.000050	9567779
Dissolved Nickel (Ni)	mg/L	0.00649	9567779	0.00520	9567779	0.00293	0.000020	9567779
Dissolved Selenium (Se)	mg/L	0.00429	9567779	0.00255	9567779	0.00129	0.000040	9567779
Dissolved Silicon (Si)	mg/L	0.784	9567779	0.827	9567779	0.929	0.050	9567779
Dissolved Silver (Ag)	mg/L	<0.0000050	9567779	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Strontium (Sr)	mg/L	0.674	9567779	0.808	9567779	0.686	0.000050	9567779
Dissolved Thallium (Tl)	mg/L	<0.0000020	9567779	<0.0000020	9567779	<0.0000020	0.0000020	9567779
Dissolved Tin (Sn)	mg/L	<0.00020	9567779	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Titanium (Ti)	mg/L	<0.00050	9567779	<0.00050	9567779	<0.00050	0.00050	9567779
Dissolved Uranium (U)	mg/L	0.0147	9567779	0.00871	9567779	0.00427	0.0000020	9567779
Dissolved Vanadium (V)	mg/L	<0.00020	9567779	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Zinc (Zn)	mg/L	0.0723	9567779	0.0384	9567779	0.0122	0.00010	9567779
Dissolved Zirconium (Zr)	mg/L	<0.00010	9567779	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Calcium (Ca)	mg/L	112	9566646	114	9566646	119	0.050	9566646
Dissolved Magnesium (Mg)	mg/L	17.4	9566646	21.0	9566646	18.1	0.050	9566646
RDL = Reportable Detection Limit								



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5820		WJ5821		WJ5822		
Sampling Date		2019/08/27 09:15		2019/08/27 08:45		2019/08/27 08:15		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	4A	QC Batch	4B	QC Batch	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.53	9566646	3.79	9566646	2.64	0.050	9566646
Dissolved Sodium (Na)	mg/L	26.8	9566646	32.2	9566646	27.4	0.050	9566646
Dissolved Sulphur (S)	mg/L	98.5	9566646	118	9566646	99.7	3.0	9566646
RDL = Reportable Detection Limit								



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5823	WJ5824		WJ5825		
Sampling Date		2019/08/27 09:20	2019/08/27 08:50		2019/08/27 08:20		
COC Number		2 OF 2	2 OF 2		2 OF 2		
	UNITS	5A	5B	QC Batch	5C	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	355	373	9566643	397	0.50	9567043
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00442	0.00263	9567779	0.00310	0.00050	9575806
Dissolved Antimony (Sb)	mg/L	0.0124	0.00559	9567779	0.00228	0.000020	9567779
Dissolved Arsenic (As)	mg/L	0.0246	0.00901	9567779	0.00376	0.000020	9567779
Dissolved Barium (Ba)	mg/L	0.0611	0.0611	9567779	0.0658	0.000020	9567779
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9567779	<0.000010	0.000010	9567779
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Boron (B)	mg/L	0.022	<0.010	9567779	<0.010	0.010	9567779
Dissolved Cadmium (Cd)	mg/L	0.000231	0.0000559	9567779	0.0000087	0.0000050	9567779
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Cobalt (Co)	mg/L	0.00111	0.000218	9567779	0.000146	0.0000050	9567779
Dissolved Copper (Cu)	mg/L	0.00243	0.000858	9567779	0.000279	0.000050	9567779
Dissolved Iron (Fe)	mg/L	0.0308	0.0178	9567779	0.0769	0.0010	9567779
Dissolved Lead (Pb)	mg/L	0.000698	0.000155	9567779	0.0000335	0.0000050	9567779
Dissolved Lithium (Li)	mg/L	0.0157	0.0111	9567779	0.0119	0.00050	9567779
Dissolved Manganese (Mn)	mg/L	0.0598	0.0344	9567779	0.0540	0.000050	9567779
Dissolved Molybdenum (Mo)	mg/L	0.00123	0.000468	9567779	0.000191	0.000050	9567779
Dissolved Nickel (Ni)	mg/L	0.00608	0.00341	9567779	0.00172	0.000020	9567779
Dissolved Selenium (Se)	mg/L	0.00305	0.000905	9567779	0.000338	0.000040	9567779
Dissolved Silicon (Si)	mg/L	0.888	1.02	9567779	1.27	0.050	9567779
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Strontium (Sr)	mg/L	0.670	0.694	9567779	0.724	0.000050	9567779
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9567779	<0.0000020	0.0000020	9567779
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9567779	<0.00050	0.00050	9567779
Dissolved Uranium (U)	mg/L	0.0126	0.00370	9567779	0.00103	0.0000020	9567779
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Zinc (Zn)	mg/L	0.0473	0.00940	9567779	0.00235	0.00010	9567779
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Calcium (Ca)	mg/L	113	119	9566646	127	0.050	9567044
Dissolved Magnesium (Mg)	mg/L	17.4	18.3	9566646	19.6	0.050	9567044
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5823	WJ5824		WJ5825		
Sampling Date		2019/08/27 09:20	2019/08/27 08:50		2019/08/27 08:20		
COC Number		2 OF 2	2 OF 2		2 OF 2		
	UNITS	5A	5B	QC Batch	5C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.29	2.75	9566646	1.97	0.050	9567044
Dissolved Sodium (Na)	mg/L	26.1	27.0	9566646	28.3	0.050	9567044
Dissolved Sulphur (S)	mg/L	96.4	99.2	9566646	101	3.0	9567044
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5826	WJ5827		WJ5828		
Sampling Date		2019/08/27 09:25	2019/08/27 08:55		2019/08/27 08:25		
COC Number		2 OF 2	2 OF 2		2 OF 2		
	UNITS	6A	6B	QC Batch	6C	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	351	396	9566643	384	0.50	9567043
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00127	0.00215	9567779	0.00687	0.00050	9567779
Dissolved Antimony (Sb)	mg/L	0.0161	0.00999	9567779	0.00795	0.000020	9567779
Dissolved Arsenic (As)	mg/L	0.0374	0.0192	9567779	0.0105	0.000020	9567779
Dissolved Barium (Ba)	mg/L	0.0625	0.0585	9567779	0.0637	0.000020	9567779
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9567779	<0.000010	0.000010	9567779
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Boron (B)	mg/L	0.038	0.017	9567779	0.015	0.010	9567779
Dissolved Cadmium (Cd)	mg/L	0.000539	0.000110	9567779	0.0000280	0.0000050	9567779
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Cobalt (Co)	mg/L	0.000683	0.0000609	9567779	0.0000371	0.0000050	9567779
Dissolved Copper (Cu)	mg/L	0.00389	0.00140	9567779	0.000647	0.000050	9567779
Dissolved Iron (Fe)	mg/L	0.0249	0.0089	9567779	0.0249	0.0010	9567779
Dissolved Lead (Pb)	mg/L	0.000573	0.0000948	9567779	0.0000293	0.0000050	9567779
Dissolved Lithium (Li)	mg/L	0.0165	0.0156	9567779	0.0101	0.00050	9567779
Dissolved Manganese (Mn)	mg/L	0.0316	0.00919	9567779	0.0131	0.000050	9567779
Dissolved Molybdenum (Mo)	mg/L	0.00125	0.000682	9567779	0.000586	0.000050	9567779
Dissolved Nickel (Ni)	mg/L	0.00661	0.00424	9567779	0.00265	0.000020	9567779
Dissolved Selenium (Se)	mg/L	0.00529	0.00250	9567779	0.00145	0.000040	9567779
Dissolved Silicon (Si)	mg/L	0.867	1.02	9567779	0.923	0.050	9567779
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9567779	<0.0000050	0.0000050	9567779
Dissolved Strontium (Sr)	mg/L	0.685	0.719	9567779	0.728	0.000050	9567779
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9567779	<0.0000020	0.0000020	9567779
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9567779	<0.00050	0.00050	9567779
Dissolved Uranium (U)	mg/L	0.0194	0.00859	9567779	0.00534	0.0000020	9567779
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9567779	<0.00020	0.00020	9567779
Dissolved Zinc (Zn)	mg/L	0.0805	0.0251	9567779	0.0105	0.00010	9567779
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9567779	<0.00010	0.00010	9567779
Dissolved Calcium (Ca)	mg/L	112	129	9566646	123	0.050	9567044
Dissolved Magnesium (Mg)	mg/L	17.1	18.2	9566646	18.5	0.050	9567044

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WJ5826	WJ5827		WJ5828		
Sampling Date		2019/08/27 09:25	2019/08/27 08:55		2019/08/27 08:25		
COC Number		2 OF 2	2 OF 2		2 OF 2		
	UNITS	6A	6B	QC Batch	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.68	3.42	9566646	2.82	0.050	9567044
Dissolved Sodium (Na)	mg/L	26.1	26.8	9566646	27.5	0.050	9567044
Dissolved Sulphur (S)	mg/L	98.1	104	9566646	103	3.0	9567044
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B971690
Report Date: 2019/09/10ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WJ5810		WJ5811		WJ5812		
Sampling Date		2019/08/27 10:00		2019/08/27 09:00		2019/08/27 08:30		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	336	9567041	342	9566640	343	0.50	9566640
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0242	9567854	0.00478	9567854	0.0121	0.00050	9567854
Total Antimony (Sb)	mg/L	0.0242	9567854	0.0223	9567854	0.0246	0.000020	9567854
Total Arsenic (As)	mg/L	0.0654	9567854	0.0609	9567854	0.0491	0.000020	9567854
Total Barium (Ba)	mg/L	0.0628	9567854	0.0604	9567854	0.0693	0.000020	9567854
Total Beryllium (Be)	mg/L	<0.000010	9567854	<0.000010	9567854	<0.000010	0.000010	9567854
Total Bismuth (Bi)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Boron (B)	mg/L	0.030	9567854	0.024	9567854	0.056	0.010	9575807
Total Cadmium (Cd)	mg/L	0.00208	9567854	0.00168	9567854	0.000948	0.0000050	9567854
Total Chromium (Cr)	mg/L	0.00018	9567854	0.00014	9567854	<0.00010	0.00010	9567854
Total Cobalt (Co)	mg/L	0.00275	9567854	0.000639	9567854	0.0000636	0.0000050	9567854
Total Copper (Cu)	mg/L	0.0177	9567854	0.00962	9567854	0.00357	0.000050	9567854
Total Iron (Fe)	mg/L	0.0122	9567854	0.0062	9567854	0.0068	0.0010	9567854
Total Lead (Pb)	mg/L	0.0231	9567854	0.00488	9567854	0.000423	0.0000050	9567854
Total Lithium (Li)	mg/L	0.0118	9567854	0.0102	9567854	0.0194	0.00050	9575807
Total Manganese (Mn)	mg/L	0.0584	9567854	0.0153	9567854	0.00284	0.000050	9567854
Total Molybdenum (Mo)	mg/L	0.00164	9567854	0.00167	9567854	0.00159	0.000050	9567854
Total Nickel (Ni)	mg/L	0.00787	9567854	0.00700	9567854	0.00528	0.000020	9567854
Total Selenium (Se)	mg/L	0.00815	9567854	0.00801	9567854	0.00723	0.000040	9567854
Total Silicon (Si)	mg/L	0.744	9567854	0.450	9567854	0.304	0.050	9567854
Total Silver (Ag)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Strontium (Sr)	mg/L	0.651	9567854	0.664	9567854	0.660	0.000050	9567854
Total Thallium (Tl)	mg/L	0.0000038	9567854	0.0000052	9567854	0.0000032	0.0000020	9567854
Total Tin (Sn)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Titanium (Ti)	mg/L	<0.00050	9567854	<0.00050	9567854	<0.00050	0.00050	9567854
Total Uranium (U)	mg/L	0.0307	9567854	0.0282	9567854	0.0340	0.0000020	9567854
Total Vanadium (V)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Zinc (Zn)	mg/L	0.178	9567854	0.161	9567854	0.116	0.00010	9567854
Total Zirconium (Zr)	mg/L	<0.00010	9567854	<0.00010	9567854	<0.00010	0.00010	9567854
Total Calcium (Ca)	mg/L	107	9566649	109	9566649	110	0.050	9566649
Total Magnesium (Mg)	mg/L	16.6	9566649	17.0	9566649	16.7	0.050	9566649

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5810		WJ5811		WJ5812		
Sampling Date		2019/08/27 10:00		2019/08/27 09:00		2019/08/27 08:30		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	INFLUENT	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Total Potassium (K)	mg/L	3.81	9566649	3.87	9566649	3.86	0.050	9566649
Total Sodium (Na)	mg/L	25.5	9566649	25.9	9566649	25.8	0.050	9566649
Total Sulphur (S)	mg/L	93.8	9566649	95.4	9566649	96.6	3.0	9566649
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5813		WJ5814	WJ5815		
Sampling Date		2019/08/27 08:00		2019/08/27 09:05	2019/08/27 08:35		
COC Number		1 OF 2		1 OF 2	1 OF 2		
	UNITS	1C	QC Batch	2A	2B	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	359	9567041	343	345	0.50	9566640
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0254	9575807	0.00263	<0.00050	0.00050	9567854
Total Antimony (Sb)	mg/L	0.0201	9567854	0.0218	0.0199	0.000020	9567854
Total Arsenic (As)	mg/L	0.0376	9567854	0.0573	0.0457	0.000020	9567854
Total Barium (Ba)	mg/L	0.0596	9567854	0.0584	0.0580	0.000020	9567854
Total Beryllium (Be)	mg/L	<0.000010	9567854	<0.000010	<0.000010	0.000010	9567854
Total Bismuth (Bi)	mg/L	<0.0000050	9575807	<0.0000050	<0.0000050	0.0000050	9567854
Total Boron (B)	mg/L	0.024	9567854	0.045	0.052	0.010	9567854
Total Cadmium (Cd)	mg/L	0.000233	9567854	0.00147	0.000440	0.0000050	9567854
Total Chromium (Cr)	mg/L	<0.00010	9567854	0.00012	<0.00010	0.00010	9567854
Total Cobalt (Co)	mg/L	0.0000342	9567854	0.000809	0.0000357	0.0000050	9567854
Total Copper (Cu)	mg/L	0.00182	9567854	0.0107	0.00325	0.000050	9567854
Total Iron (Fe)	mg/L	0.0122	9567854	0.0079	0.0075	0.0010	9567854
Total Lead (Pb)	mg/L	0.0000615	9567854	0.00534	0.000147	0.0000050	9567854
Total Lithium (Li)	mg/L	0.00692	9575807	0.0146	0.00979	0.00050	9567854
Total Manganese (Mn)	mg/L	0.00389	9567854	0.0205	0.00294	0.000050	9567854
Total Molybdenum (Mo)	mg/L	0.00171	9567854	0.00155	0.00139	0.000050	9567854
Total Nickel (Ni)	mg/L	0.00405	9567854	0.00710	0.00556	0.000020	9567854
Total Selenium (Se)	mg/L	0.00699	9567854	0.00813	0.00700	0.000040	9567854
Total Silicon (Si)	mg/L	0.455	9567854	0.506	0.491	0.050	9567854
Total Silver (Ag)	mg/L	<0.0000050	9567854	<0.0000050	<0.0000050	0.0000050	9567854
Total Strontium (Sr)	mg/L	0.684	9567854	0.664	0.667	0.000050	9567854
Total Thallium (Tl)	mg/L	0.0000040	9567854	0.0000031	0.0000027	0.0000020	9567854
Total Tin (Sn)	mg/L	<0.00020	9567854	<0.00020	<0.00020	0.00020	9567854
Total Titanium (Ti)	mg/L	<0.00050	9567854	<0.00050	<0.00050	0.00050	9567854
Total Uranium (U)	mg/L	0.0252	9567854	0.0291	0.0228	0.0000020	9567854
Total Vanadium (V)	mg/L	<0.00020	9567854	<0.00020	<0.00020	0.00020	9567854
Total Zinc (Zn)	mg/L	0.0827	9567854	0.152	0.106	0.00010	9567854
Total Zirconium (Zr)	mg/L	<0.00010	9567854	<0.00010	<0.00010	0.00010	9567854
Total Calcium (Ca)	mg/L	115	9566649	109	111	0.050	9566649
Total Magnesium (Mg)	mg/L	17.6	9566649	17.2	16.6	0.050	9566649
RDL = Reportable Detection Limit							



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5813		WJ5814	WJ5815		
Sampling Date		2019/08/27 08:00		2019/08/27 09:05	2019/08/27 08:35		
COC Number		1 OF 2		1 OF 2	1 OF 2		
	UNITS	1C	QC Batch	2A	2B	RDL	QC Batch
Total Potassium (K)	mg/L	3.80	9566649	3.99	3.63	0.050	9566649
Total Sodium (Na)	mg/L	27.1	9566649	26.4	25.9	0.050	9566649
Total Sulphur (S)	mg/L	99.9	9566649	95.0	94.5	3.0	9566649
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B971690
Report Date: 2019/09/10ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WJ5816		WJ5817		WJ5818		
Sampling Date		2019/08/27 08:05		2019/08/27 09:10		2019/08/27 08:40		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	356	9567041	343	9566640	346	0.50	9566640
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0104	9567854	0.00110	9567854	0.0123	0.00050	9567854
Total Antimony (Sb)	mg/L	0.0186	9567854	0.0215	9567854	0.0192	0.000020	9567854
Total Arsenic (As)	mg/L	0.0364	9567854	0.0546	9567854	0.0421	0.000020	9567854
Total Barium (Ba)	mg/L	0.0591	9567854	0.0581	9567854	0.0574	0.000020	9567854
Total Beryllium (Be)	mg/L	<0.000010	9567854	<0.000010	9567854	<0.000010	0.000010	9567854
Total Bismuth (Bi)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Boron (B)	mg/L	0.017	9567854	0.019	9567854	0.023	0.010	9575807
Total Cadmium (Cd)	mg/L	0.000191	9567854	0.000697	9567854	0.000373	0.0000050	9567854
Total Chromium (Cr)	mg/L	<0.00010	9567854	<0.00010	9567854	<0.00010	0.00010	9567854
Total Cobalt (Co)	mg/L	0.0000204	9567854	0.000254	9567854	0.0000395	0.0000050	9567854
Total Copper (Cu)	mg/L	0.00177	9567854	0.00579	9567854	0.00310	0.000050	9567854
Total Iron (Fe)	mg/L	0.0094	9567854	0.0064	9567854	0.0059	0.0010	9567854
Total Lead (Pb)	mg/L	0.0000347	9567854	0.000947	9567854	0.000129	0.0000050	9567854
Total Lithium (Li)	mg/L	0.0134	9567854	0.0141	9567854	0.0153	0.00050	9567854
Total Manganese (Mn)	mg/L	0.00283	9567854	0.00854	9567854	0.00145	0.000050	9567854
Total Molybdenum (Mo)	mg/L	0.00157	9567854	0.00143	9567854	0.00156	0.000050	9567854
Total Nickel (Ni)	mg/L	0.00462	9567854	0.00707	9567854	0.00565	0.000020	9567854
Total Selenium (Se)	mg/L	0.00616	9567854	0.00760	9567854	0.00657	0.000040	9567854
Total Silicon (Si)	mg/L	0.560	9567854	0.680	9567854	0.718	0.050	9567854
Total Silver (Ag)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Strontium (Sr)	mg/L	0.682	9567854	0.664	9567854	0.670	0.000050	9567854
Total Thallium (Tl)	mg/L	<0.0000020	9567854	0.0000022	9567854	<0.0000020	0.0000020	9567854
Total Tin (Sn)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Titanium (Ti)	mg/L	<0.00050	9567854	<0.00050	9567854	<0.00050	0.00050	9567854
Total Uranium (U)	mg/L	0.0201	9567854	0.0266	9567854	0.0222	0.0000020	9567854
Total Vanadium (V)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Zinc (Zn)	mg/L	0.0853	9567854	0.130	9567854	0.105	0.00010	9567854
Total Zirconium (Zr)	mg/L	<0.00010	9567854	<0.00010	9567854	<0.00010	0.00010	9567854
Total Calcium (Ca)	mg/L	114	9566649	110	9566649	111	0.050	9566649
Total Magnesium (Mg)	mg/L	17.3	9566649	16.6	9566649	16.9	0.050	9566649

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5816		WJ5817		WJ5818		
Sampling Date		2019/08/27 08:05		2019/08/27 09:10		2019/08/27 08:40		
COC Number		1 OF 2		1 OF 2		1 OF 2		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch
Total Potassium (K)	mg/L	3.57	9566649	3.70	9566649	3.59	0.050	9566649
Total Sodium (Na)	mg/L	26.6	9566649	25.9	9566649	25.8	0.050	9566649
Total Sulphur (S)	mg/L	97.6	9566649	93.6	9566649	94.0	3.0	9566649
RDL = Reportable Detection Limit								



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5819		WJ5820		WJ5821		
Sampling Date		2019/08/27 08:10		2019/08/27 09:15		2019/08/27 08:45		
COC Number		1 OF 2		2 OF 2		2 OF 2		
	UNITS	3C	QC Batch	4A	QC Batch	4B	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	359	9567041	349	9566640	361	0.50	9567041
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0281	9575807	0.00594	9567854	0.00715	0.00050	9567854
Total Antimony (Sb)	mg/L	0.0187	9567854	0.0146	9567854	0.0108	0.000020	9567854
Total Arsenic (As)	mg/L	0.0363	9567854	0.0347	9567854	0.0206	0.000020	9567854
Total Barium (Ba)	mg/L	0.0596	9567854	0.0572	9567854	0.0568	0.000020	9567854
Total Beryllium (Be)	mg/L	<0.000010	9567854	<0.000010	9567854	<0.000010	0.000010	9567854
Total Bismuth (Bi)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Boron (B)	mg/L	0.012	9567854	<0.010	9567854	0.016	0.010	9567854
Total Cadmium (Cd)	mg/L	0.000135	9567854	0.000333	9567854	0.0000504	0.0000050	9567854
Total Chromium (Cr)	mg/L	<0.00010	9567854	<0.00010	9567854	<0.00010	0.00010	9567854
Total Cobalt (Co)	mg/L	0.0000263	9567854	0.000185	9567854	0.0000238	0.0000050	9567854
Total Copper (Cu)	mg/L	0.00170	9567854	0.00279	9567854	0.00124	0.000050	9567854
Total Iron (Fe)	mg/L	0.0088	9567854	0.0252	9567854	0.0078	0.0010	9567854
Total Lead (Pb)	mg/L	0.0000339	9567854	0.000479	9567854	0.0000823	0.0000050	9567854
Total Lithium (Li)	mg/L	0.0160	9567854	0.0108	9567854	0.0139	0.00050	9575807
Total Manganese (Mn)	mg/L	0.00426	9567854	0.0133	9567854	0.00398	0.000050	9567854
Total Molybdenum (Mo)	mg/L	0.00170	9567854	0.00108	9567854	0.000718	0.000050	9567854
Total Nickel (Ni)	mg/L	0.00442	9567854	0.00664	9567854	0.00454	0.000020	9567854
Total Selenium (Se)	mg/L	0.00627	9567854	0.00399	9567854	0.00255	0.000040	9567854
Total Silicon (Si)	mg/L	0.778	9567854	0.764	9567854	0.820	0.050	9567854
Total Silver (Ag)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Strontium (Sr)	mg/L	0.692	9567854	0.673	9567854	0.708	0.000050	9567854
Total Thallium (Tl)	mg/L	<0.0000020	9567854	<0.0000020	9567854	<0.0000020	0.0000020	9567854
Total Tin (Sn)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Titanium (Ti)	mg/L	<0.00050	9567854	<0.00050	9567854	<0.00050	0.00050	9567854
Total Uranium (U)	mg/L	0.0172	9567854	0.0145	9567854	0.00883	0.0000020	9567854
Total Vanadium (V)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Zinc (Zn)	mg/L	0.0796	9567854	0.0745	9567854	0.0348	0.00010	9567854
Total Zirconium (Zr)	mg/L	<0.00010	9567854	<0.00010	9567854	<0.00010	0.00010	9567854
Total Calcium (Ca)	mg/L	115	9566649	111	9566649	114	0.050	9566649
Total Magnesium (Mg)	mg/L	17.7	9566649	17.4	9566649	18.5	0.050	9566649

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5819		WJ5820		WJ5821		
Sampling Date		2019/08/27 08:10		2019/08/27 09:15		2019/08/27 08:45		
COC Number		1 OF 2		2 OF 2		2 OF 2		
	UNITS	3C	QC Batch	4A	QC Batch	4B	RDL	QC Batch
Total Potassium (K)	mg/L	3.53	9566649	3.57	9566649	3.31	0.050	9566649
Total Sodium (Na)	mg/L	27.0	9566649	26.6	9566649	28.0	0.050	9566649
Total Sulphur (S)	mg/L	100	9566649	97.5	9566649	100	3.0	9566649
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B971690
Report Date: 2019/09/10ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WJ5822		WJ5823		WJ5824		
Sampling Date		2019/08/27 08:15		2019/08/27 09:20		2019/08/27 08:50		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	4C	QC Batch	5A	QC Batch	5B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	372	9567041	356	9567041	371	0.50	9567041
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00108	9567854	0.00877	9567854	0.00753	0.00050	9567854
Total Antimony (Sb)	mg/L	0.00662	9567854	0.0127	9567854	0.00547	0.000020	9567854
Total Arsenic (As)	mg/L	0.00856	9567854	0.0252	9567854	0.00890	0.000020	9567854
Total Barium (Ba)	mg/L	0.0582	9567854	0.0597	9567854	0.0602	0.000020	9567854
Total Beryllium (Be)	mg/L	<0.000010	9567854	<0.000010	9567854	<0.000010	0.000010	9567854
Total Bismuth (Bi)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Boron (B)	mg/L	0.011	9567854	0.021	9567854	<0.010	0.010	9567854
Total Cadmium (Cd)	mg/L	0.0000175	9567854	0.000310	9567854	0.0000650	0.0000050	9567854
Total Chromium (Cr)	mg/L	<0.00010	9567854	0.00013	9567854	<0.00010	0.00010	9567854
Total Cobalt (Co)	mg/L	0.0000353	9567854	0.00113	9567854	0.000215	0.0000050	9567854
Total Copper (Cu)	mg/L	0.000535	9567854	0.00329	9567854	0.00109	0.000050	9567854
Total Iron (Fe)	mg/L	0.0165	9567854	0.0462	9567854	0.0249	0.0010	9567854
Total Lead (Pb)	mg/L	0.0000310	9567854	0.00102	9567854	0.000199	0.0000050	9567854
Total Lithium (Li)	mg/L	0.00846	9567854	0.0156	9575807	0.00914	0.00050	9567854
Total Manganese (Mn)	mg/L	0.0109	9567854	0.0608	9567854	0.0347	0.000050	9567854
Total Molybdenum (Mo)	mg/L	0.000417	9567854	0.00140	9567854	0.000487	0.000050	9567854
Total Nickel (Ni)	mg/L	0.00286	9567854	0.00624	9567854	0.00346	0.000020	9567854
Total Selenium (Se)	mg/L	0.00133	9567854	0.00302	9567854	0.000930	0.000040	9567854
Total Silicon (Si)	mg/L	0.919	9567854	0.889	9567854	1.01	0.050	9567854
Total Silver (Ag)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Strontium (Sr)	mg/L	0.693	9567854	0.674	9567854	0.697	0.000050	9567854
Total Thallium (Tl)	mg/L	<0.0000020	9567854	<0.0000020	9567854	<0.0000020	0.0000020	9567854
Total Tin (Sn)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Titanium (Ti)	mg/L	<0.00050	9567854	<0.00050	9567854	<0.00050	0.00050	9567854
Total Uranium (U)	mg/L	0.00416	9567854	0.0127	9567854	0.00375	0.0000020	9567854
Total Vanadium (V)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Zinc (Zn)	mg/L	0.0126	9567854	0.0512	9567854	0.00871	0.00010	9567854
Total Zirconium (Zr)	mg/L	<0.00010	9567854	<0.00010	9567854	<0.00010	0.00010	9567854
Total Calcium (Ca)	mg/L	118	9566649	113	9566649	118	0.050	9566649
Total Magnesium (Mg)	mg/L	18.5	9566649	17.7	9566649	18.5	0.050	9566649

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5822		WJ5823		WJ5824		
Sampling Date		2019/08/27 08:15		2019/08/27 09:20		2019/08/27 08:50		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	4C	QC Batch	5A	QC Batch	5B	RDL	QC Batch
Total Potassium (K)	mg/L	2.64	9566649	3.35	9566649	2.77	0.050	9566649
Total Sodium (Na)	mg/L	27.6	9566649	26.3	9566649	27.0	0.050	9566649
Total Sulphur (S)	mg/L	100	9566649	98.1	9566649	101	3.0	9566649
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B971690
Report Date: 2019/09/10ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WJ5825		WJ5826		WJ5827		
Sampling Date		2019/08/27 08:20		2019/08/27 09:25		2019/08/27 08:55		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5C	QC Batch	6A	QC Batch	6B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	399	9567041	357	9567041	378	0.50	9567041
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00547	9575807	0.00285	9567854	0.00501	0.00050	9575807
Total Antimony (Sb)	mg/L	0.00218	9567854	0.0159	9567854	0.0105	0.000020	9567854
Total Arsenic (As)	mg/L	0.00393	9567854	0.0387	9567854	0.0193	0.000020	9567854
Total Barium (Ba)	mg/L	0.0657	9567854	0.0601	9567854	0.0612	0.000020	9567854
Total Beryllium (Be)	mg/L	<0.000010	9567854	<0.000010	9567854	<0.000010	0.000010	9567854
Total Bismuth (Bi)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Boron (B)	mg/L	<0.010	9567854	0.032	9567854	<0.010	0.010	9567854
Total Cadmium (Cd)	mg/L	0.0000242	9567854	0.000569	9567854	0.0000841	0.0000050	9567854
Total Chromium (Cr)	mg/L	<0.00010	9567854	<0.00010	9567854	<0.00010	0.00010	9567854
Total Cobalt (Co)	mg/L	0.000156	9567854	0.000706	9567854	0.0000687	0.0000050	9567854
Total Copper (Cu)	mg/L	0.000395	9567854	0.00466	9567854	0.00160	0.000050	9567854
Total Iron (Fe)	mg/L	0.131	9567854	0.0341	9567854	0.0109	0.0010	9567854
Total Lead (Pb)	mg/L	0.0000552	9567854	0.000971	9567854	0.000120	0.0000050	9567854
Total Lithium (Li)	mg/L	0.0116	9567854	0.0112	9567854	0.0153	0.00050	9567854
Total Manganese (Mn)	mg/L	0.0543	9567854	0.0318	9567854	0.00970	0.000050	9567854
Total Molybdenum (Mo)	mg/L	0.000270	9567854	0.00120	9567854	0.000923	0.000050	9567854
Total Nickel (Ni)	mg/L	0.00186	9567854	0.00656	9567854	0.00420	0.000020	9567854
Total Selenium (Se)	mg/L	0.000317	9567854	0.00522	9567854	0.00228	0.000040	9567854
Total Silicon (Si)	mg/L	1.26	9567854	0.877	9567854	0.961	0.050	9567854
Total Silver (Ag)	mg/L	<0.0000050	9567854	<0.0000050	9567854	<0.0000050	0.0000050	9567854
Total Strontium (Sr)	mg/L	0.739	9567854	0.694	9567854	0.729	0.000050	9567854
Total Thallium (Tl)	mg/L	<0.0000020	9567854	<0.0000020	9567854	<0.0000020	0.0000020	9567854
Total Tin (Sn)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Titanium (Ti)	mg/L	<0.00050	9567854	<0.00050	9567854	<0.00050	0.00050	9567854
Total Uranium (U)	mg/L	0.000986	9567854	0.0192	9567854	0.00845	0.0000020	9567854
Total Vanadium (V)	mg/L	<0.00020	9567854	<0.00020	9567854	<0.00020	0.00020	9567854
Total Zinc (Zn)	mg/L	0.00294	9567854	0.0836	9567854	0.0245	0.00010	9567854
Total Zirconium (Zr)	mg/L	<0.00010	9567854	<0.00010	9567854	<0.00010	0.00010	9567854
Total Calcium (Ca)	mg/L	127	9567046	114	9566649	121	0.050	9566649
Total Magnesium (Mg)	mg/L	20.1	9567046	17.5	9566649	18.3	0.050	9566649
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5825		WJ5826		WJ5827		
Sampling Date		2019/08/27 08:20		2019/08/27 09:25		2019/08/27 08:55		
COC Number		2 OF 2		2 OF 2		2 OF 2		
	UNITS	5C	QC Batch	6A	QC Batch	6B	RDL	QC Batch
Total Potassium (K)	mg/L	2.01	9567046	3.66	9566649	3.45	0.050	9566649
Total Sodium (Na)	mg/L	28.9	9567046	26.3	9566649	27.4	0.050	9566649
Total Sulphur (S)	mg/L	103	9567046	96.7	9566649	106	3.0	9566649
RDL = Reportable Detection Limit								



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5828		
Sampling Date		2019/08/27 08:25		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	385	0.50	9567041
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.00706	0.00050	9567854
Total Antimony (Sb)	mg/L	0.00795	0.000020	9567854
Total Arsenic (As)	mg/L	0.0105	0.000020	9567854
Total Barium (Ba)	mg/L	0.0617	0.000020	9567854
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9567854
Total Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9567854
Total Boron (B)	mg/L	<0.010	0.010	9567854
Total Cadmium (Cd)	mg/L	0.0000249	0.0000050	9567854
Total Chromium (Cr)	mg/L	<0.00010	0.00010	9567854
Total Cobalt (Co)	mg/L	0.0000320	0.0000050	9567854
Total Copper (Cu)	mg/L	0.000672	0.000050	9567854
Total Iron (Fe)	mg/L	0.0264	0.0010	9567854
Total Lead (Pb)	mg/L	0.0000286	0.0000050	9567854
Total Lithium (Li)	mg/L	0.0229	0.00050	9567854
Total Manganese (Mn)	mg/L	0.0126	0.000050	9567854
Total Molybdenum (Mo)	mg/L	0.000709	0.000050	9567854
Total Nickel (Ni)	mg/L	0.00264	0.000020	9567854
Total Selenium (Se)	mg/L	0.00156	0.000040	9567854
Total Silicon (Si)	mg/L	0.935	0.050	9567854
Total Silver (Ag)	mg/L	<0.0000050	0.0000050	9567854
Total Strontium (Sr)	mg/L	0.732	0.000050	9567854
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	9567854
Total Tin (Sn)	mg/L	<0.00020	0.00020	9567854
Total Titanium (Ti)	mg/L	<0.00050	0.00050	9567854
Total Uranium (U)	mg/L	0.00490	0.0000020	9567854
Total Vanadium (V)	mg/L	<0.00020	0.00020	9567854
Total Zinc (Zn)	mg/L	0.00995	0.00010	9567854
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	9567854
Total Calcium (Ca)	mg/L	124	0.050	9567046
Total Magnesium (Mg)	mg/L	18.5	0.050	9567046
RDL = Reportable Detection Limit				



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WJ5828		
Sampling Date		2019/08/27 08:25		
COC Number		2 OF 2		
	UNITS	6C	RDL	QC Batch
Total Potassium (K)	mg/L	2.80	0.050	9567046
Total Sodium (Na)	mg/L	27.4	0.050	9567046
Total Sulphur (S)	mg/L	104	3.0	9567046
RDL = Reportable Detection Limit				



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5810
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9570416	N/A	2019/09/03	Linda Zhang
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9565949	2019/08/29	2019/09/03	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
COD by Colorimeter	M/PROB	9570177	N/A	2019/08/30	Preetleen Kathuria
Carbon (DOC)	TECH	9572267	N/A	2019/09/03	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/08/30	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/01	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton
Carbon (Total Organic)	TECH	9572268	N/A	2019/09/03	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9571933	2019/09/01	2019/09/01	Haydee Estilong

BV Labs ID: WJ5810 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/01	Paula Calzada
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5811
Sample ID: 1A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9566640	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5811
Sample ID: 1A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5812
Sample ID: 1B
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9566640	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5813
Sample ID: 1C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9570416	N/A	2019/09/03	Linda Zhang
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9565949	2019/08/29	2019/09/03	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9571977	N/A	2019/09/01	Serena Tian
COD by Colorimeter	M/PROB	9570177	N/A	2019/08/30	Preetleen Kathuria
Carbon (DOC)	TECH	9572267	N/A	2019/09/03	Kayla Ghanem
Hardness Total (calculated as CaCO3)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/08/30	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9575806	N/A	2019/09/09	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9575807	N/A	2019/09/09	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5813
Sample ID: 1C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9568801	N/A	2019/08/30	Kathleen Dalton
Carbon (Total Organic)	TECH	9572268	N/A	2019/09/03	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9571933	2019/09/01	2019/09/01	Haydee Estilong

BV Labs ID: WJ5813 Dup
Sample ID: 1C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand	DO/PROB	9565949	2019/08/29	2019/09/03	Preetleen Kathuria

BV Labs ID: WJ5814
Sample ID: 2A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9566640	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5815
Sample ID: 2B
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9566640	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk



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BV Labs Job #: B971690

Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5815

Sample ID: 2B

Matrix: Water

Collected: 2019/08/27

Shipped:

Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5816

Sample ID: 2C

Matrix: Water

Collected: 2019/08/27

Shipped:

Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9570416	N/A	2019/09/03	Linda Zhang
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9565949	2019/08/29	2019/09/03	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9571977	N/A	2019/09/01	Serena Tian
COD by Colorimeter	M/PROB	9570177	N/A	2019/08/30	Preetleen Kathuria
Carbon (DOC)	TECH	9572267	N/A	2019/09/03	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/08/30	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9568801	N/A	2019/08/30	Kathleen Dalton
Carbon (Total Organic)	TECH	9572268	N/A	2019/09/03	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9571933	2019/09/01	2019/09/01	Haydee Estilong

BV Labs ID: WJ5817

Sample ID: 3A

Matrix: Water

Collected: 2019/08/27

Shipped:

Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9566640	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk



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BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5817
Sample ID: 3A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5818
Sample ID: 3B
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9566640	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Report Automation Engine
Ion Balance	CALC	9566425	N/A	2019/09/01	Report Automation Engine
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5819
Sample ID: 3C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9570416	N/A	2019/09/04	Linda Zhang
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9565949	2019/08/29	2019/09/03	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
COD by Colorimeter	M/PROB	9570177	N/A	2019/08/30	Preetleen Kathuria
Carbon (DOC)	TECH	9572267	N/A	2019/09/03	Kayla Ghanem
Hardness Total (calculated as CaCO3)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/08/30	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9575806	N/A	2019/09/09	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9575807	N/A	2019/09/09	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk



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VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5819
Sample ID: 3C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9568801	N/A	2019/08/30	Kathleen Dalton
Carbon (Total Organic)	TECH	9572268	N/A	2019/09/03	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9571933	2019/09/01	2019/09/01	Haydee Estilong

BV Labs ID: WJ5820
Sample ID: 4A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9566640	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9566643	N/A	2019/09/04	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Report Automation Engine
Ion Balance	CALC	9566425	N/A	2019/09/01	Report Automation Engine
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5821
Sample ID: 4B
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9566643	N/A	2019/09/04	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton



BUREAU
VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5822
Sample ID: 4C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9570416	N/A	2019/09/03	Linda Zhang
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9565949	2019/08/29	2019/09/03	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9571977	N/A	2019/09/01	Serena Tian
COD by Colorimeter	M/PROB	9570177	N/A	2019/08/30	Preetleen Kathuria
Carbon (DOC)	TECH	9572267	N/A	2019/09/03	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/08/30	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9568801	N/A	2019/08/30	Kathleen Dalton
Carbon (Total Organic)	TECH	9572268	N/A	2019/09/03	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9571933	2019/09/01	2019/09/01	Haydee Estilong

BV Labs ID: WJ5822 Dup
Sample ID: 4C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbon (DOC)	TECH	9572267	N/A	2019/09/03	Kayla Ghanem

BV Labs ID: WJ5823
Sample ID: 5A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5823
Sample ID: 5A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5824
Sample ID: 5B
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5825
Sample ID: 5C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9570416	N/A	2019/09/04	Linda Zhang
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9565949	2019/08/29	2019/09/03	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
COD by Colorimeter	M/PROB	9570177	N/A	2019/08/30	Preetleen Kathuria
Carbon (DOC)	TECH	9572267	N/A	2019/09/03	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9567043	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Report Automation Engine
Ion Balance	CALC	9566425	N/A	2019/08/30	Report Automation Engine
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9567044	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9575806	N/A	2019/09/09	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9567046	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9575807	N/A	2019/09/09	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton
Carbon (Total Organic)	TECH	9572268	N/A	2019/09/03	Kayla Ghanem



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VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5825
Sample ID: 5C
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Suspended Solids (NFR)	BAL	9571933	2019/09/01	2019/09/01	Haydee Estilong

BV Labs ID: WJ5826
Sample ID: 6A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/09/01	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5826 Dup
Sample ID: 6A
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian

BV Labs ID: WJ5827
Sample ID: 6B
Matrix: Water

Collected: 2019/08/27
Shipped:
Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9566643	N/A	2019/09/04	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Report Automation Engine
Ion Balance	CALC	9566425	N/A	2019/09/01	Report Automation Engine
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9566646	N/A	2019/09/04	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9566649	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9575807	N/A	2019/09/09	Paula Calzada



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BV Labs Job #: B971690

Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WJ5827

Sample ID: 6B

Matrix: Water

Collected: 2019/08/27

Shipped:

Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton

BV Labs ID: WJ5828

Sample ID: 6C

Matrix: Water

Collected: 2019/08/27

Shipped:

Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9570416	N/A	2019/09/03	Linda Zhang
Alkalinity - Low Level	AT/ALK	9572276	N/A	2019/09/03	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9565949	2019/08/29	2019/09/03	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9572009	N/A	2019/09/01	Serena Tian
COD by Colorimeter	M/PROB	9570177	N/A	2019/08/30	Preetleen Kathuria
Carbon (DOC)	TECH	9572267	N/A	2019/09/03	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9567041	N/A	2019/09/04	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9567043	N/A	2019/09/04	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9574842	N/A	2019/09/04	Automated Statchk
Ion Balance	CALC	9566425	N/A	2019/08/30	Automated Statchk
Sum of cations, anions	CALC	9566427	N/A	2019/09/04	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9567044	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9567779	N/A	2019/09/01	Paula Calzada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9567046	N/A	2019/09/04	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9567854	N/A	2019/09/02	Paula Calzada
Nitrate and Nitrite - Low Level	CALC	9567052	N/A	2019/09/03	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9566930	N/A	2019/09/03	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9569812	N/A	2019/08/30	Kathleen Dalton
Carbon (Total Organic)	TECH	9572268	N/A	2019/09/03	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9571933	2019/09/01	2019/09/01	Haydee Estilong

BV Labs ID: WJ5828 Dup

Sample ID: 6C

Matrix: Water

Collected: 2019/08/27

Shipped:

Received: 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbon (Total Organic)	TECH	9572268	N/A	2019/09/03	Kayla Ghanem



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	21.0°C
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Sample WJ5812, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WJ5813, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WJ5818, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WJ5819, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WJ5821, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WJ5825, Elements by ICPMS Low Level (dissolved): Test repeated.
Sample WJ5812, Elements by ICPMS Low Level (total): Test repeated.
Sample WJ5813, Elements by ICPMS Low Level (total): Test repeated.
Sample WJ5818, Elements by ICPMS Low Level (total): Test repeated.
Sample WJ5819, Elements by ICPMS Low Level (total): Test repeated.
Sample WJ5821, Elements by ICPMS Low Level (total): Test repeated.
Sample WJ5823, Elements by ICPMS Low Level (total): Test repeated.
Sample WJ5825, Elements by ICPMS Low Level (total): Test repeated.
Sample WJ5827, Elements by ICPMS Low Level (total): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B971690
Report Date: 2019/09/10

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9565949	Biochemical Oxygen Demand	2019/09/03			98	85 - 115	<2.0	mg/L	NC	20
9567779	Dissolved Aluminum (Al)	2019/09/01	91	80 - 120	110	80 - 120	<0.00050	mg/L	20	20
9567779	Dissolved Antimony (Sb)	2019/09/01	NC	80 - 120	85	80 - 120	<0.000020	mg/L	2.5	20
9567779	Dissolved Arsenic (As)	2019/09/01	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.48	20
9567779	Dissolved Barium (Ba)	2019/09/01	NC	80 - 120	93	80 - 120	<0.000020	mg/L	4.2	20
9567779	Dissolved Beryllium (Be)	2019/09/01	107	80 - 120	85	80 - 120	<0.000010	mg/L	NC	20
9567779	Dissolved Bismuth (Bi)	2019/09/01	102	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
9567779	Dissolved Boron (B)	2019/09/01	73 (1)	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
9567779	Dissolved Cadmium (Cd)	2019/09/01	100	80 - 120	99	80 - 120	<0.0000050	mg/L	0.94	20
9567779	Dissolved Chromium (Cr)	2019/09/01	101	80 - 120	104	80 - 120	<0.00010	mg/L	3.6	20
9567779	Dissolved Cobalt (Co)	2019/09/01	100	80 - 120	104	80 - 120	<0.0000050	mg/L	0.79	20
9567779	Dissolved Copper (Cu)	2019/09/01	95	80 - 120	104	80 - 120	<0.000050	mg/L	1.1	20
9567779	Dissolved Iron (Fe)	2019/09/01	106	80 - 120	107	80 - 120	<0.0010	mg/L	4.6	20
9567779	Dissolved Lead (Pb)	2019/09/01	105	80 - 120	106	80 - 120	<0.0000050	mg/L	0.000052	20
9567779	Dissolved Lithium (Li)	2019/09/01	107	80 - 120	113	80 - 120	<0.00050	mg/L	13	20
9567779	Dissolved Manganese (Mn)	2019/09/01	100	80 - 120	104	80 - 120	<0.000050	mg/L	1.8	20
9567779	Dissolved Molybdenum (Mo)	2019/09/01	110	80 - 120	95	80 - 120	<0.000050	mg/L	7.1	20
9567779	Dissolved Nickel (Ni)	2019/09/01	97	80 - 120	104	80 - 120	<0.000020	mg/L	1.4	20
9567779	Dissolved Selenium (Se)	2019/09/01	106	80 - 120	94	80 - 120	<0.000040	mg/L	0.41	20
9567779	Dissolved Silicon (Si)	2019/09/01	82	80 - 120	81	80 - 120	<0.050	mg/L	1.9	20
9567779	Dissolved Silver (Ag)	2019/09/01	88	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
9567779	Dissolved Strontium (Sr)	2019/09/01	NC	80 - 120	98	80 - 120	<0.000050	mg/L	2.3	20
9567779	Dissolved Thallium (Tl)	2019/09/01	107	80 - 120	107	80 - 120	<0.0000020	mg/L	6.2	20
9567779	Dissolved Tin (Sn)	2019/09/01	98	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9567779	Dissolved Titanium (Ti)	2019/09/01	108	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9567779	Dissolved Uranium (U)	2019/09/01	111	80 - 120	120	80 - 120	<0.0000020	mg/L	1.0	20
9567779	Dissolved Vanadium (V)	2019/09/01	105	80 - 120	105	80 - 120	<0.00020	mg/L	NC	20
9567779	Dissolved Zinc (Zn)	2019/09/01	NC	80 - 120	99	80 - 120	<0.00010	mg/L	1.0	20
9567779	Dissolved Zirconium (Zr)	2019/09/01	111	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9567854	Total Aluminum (Al)	2019/09/01	100	80 - 120	98	80 - 120	<0.00050	mg/L	5.2	20
9567854	Total Antimony (Sb)	2019/09/01	NC	80 - 120	84	80 - 120	<0.000020	mg/L	4.3	20
9567854	Total Arsenic (As)	2019/09/01	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.50	20



BV Labs Job #: B971690
Report Date: 2019/09/10

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9567854	Total Barium (Ba)	2019/09/01	NC	80 - 120	91	80 - 120	<0.000020	mg/L	5.4	20
9567854	Total Beryllium (Be)	2019/09/01	82	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
9567854	Total Bismuth (Bi)	2019/09/01	102	80 - 120	107	80 - 120	<0.0000050	mg/L	NC	20
9567854	Total Boron (B)	2019/09/01	90	80 - 120	81	80 - 120	<0.010	mg/L	NC	20
9567854	Total Cadmium (Cd)	2019/09/01	99	80 - 120	97	80 - 120	<0.0000050	mg/L	6.0	20
9567854	Total Chromium (Cr)	2019/09/01	103	80 - 120	105	80 - 120	<0.00010	mg/L	4.6	20
9567854	Total Cobalt (Co)	2019/09/01	100	80 - 120	104	80 - 120	<0.0000050	mg/L	2.0	20
9567854	Total Copper (Cu)	2019/09/01	97	80 - 120	103	80 - 120	<0.000050	mg/L	0.25	20
9567854	Total Iron (Fe)	2019/09/01	105	80 - 120	108	80 - 120	<0.0010	mg/L	3.0	20
9567854	Total Lead (Pb)	2019/09/01	105	80 - 120	107	80 - 120	<0.0000050	mg/L	3.2	20
9567854	Total Lithium (Li)	2019/09/01	128 (1)	80 - 120	129 (1)	80 - 120	<0.00050	mg/L	5.4	20
9567854	Total Manganese (Mn)	2019/09/01	102	80 - 120	104	80 - 120	<0.000050	mg/L	0.26	20
9567854	Total Molybdenum (Mo)	2019/09/01	94	80 - 120	110	80 - 120	<0.000050	mg/L	1.9	20
9567854	Total Nickel (Ni)	2019/09/01	97	80 - 120	104	80 - 120	<0.000020	mg/L	2.0	20
9567854	Total Selenium (Se)	2019/09/01	106	80 - 120	94	80 - 120	<0.000040	mg/L	1.2	20
9567854	Total Silicon (Si)	2019/09/01	83	80 - 120	83	80 - 120	<0.050	mg/L	1.3	20
9567854	Total Silver (Ag)	2019/09/01	81	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9567854	Total Strontium (Sr)	2019/09/01	NC	80 - 120	103	80 - 120	<0.000050	mg/L	0.31	20
9567854	Total Thallium (Tl)	2019/09/01	107	80 - 120	108	80 - 120	<0.0000020	mg/L	NC	20
9567854	Total Tin (Sn)	2019/09/01	95	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9567854	Total Titanium (Ti)	2019/09/01	102	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9567854	Total Uranium (U)	2019/09/01	115	80 - 120	122 (1)	80 - 120	<0.0000020	mg/L	4.1	20
9567854	Total Vanadium (V)	2019/09/01	106	80 - 120	105	80 - 120	<0.00020	mg/L	NC	20
9567854	Total Zinc (Zn)	2019/09/01	NC	80 - 120	99	80 - 120	<0.00010	mg/L	0.42	20
9567854	Total Zirconium (Zr)	2019/09/01	111	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9568801	Dissolved Nitrate (N)	2019/08/30	102	80 - 120	102	80 - 120	<0.0030	mg/L	11	20
9568801	Dissolved Nitrite (N)	2019/08/30	97	80 - 120	97	80 - 120	<0.0030	mg/L	0.74	20
9569812	Dissolved Nitrate (N)	2019/08/30	103	80 - 120	102	80 - 120	<0.0030	mg/L	0.34	20
9569812	Dissolved Nitrite (N)	2019/08/30	98	80 - 120	99	80 - 120	<0.0030	mg/L	NC	20
9570177	Chemical Oxygen Demand	2019/08/30	100	80 - 120	102	80 - 120	<10	mg/L	6.5	20
9570416	Acidity (pH 4.5)	2019/09/03					<1.0	mg/L	NC	20
9570416	Acidity (pH 8.3)	2019/09/03			94	N/A	<1.0	mg/L	8.9	20



BV Labs Job #: B971690
Report Date: 2019/09/10

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9571933	Total Suspended Solids	2019/09/01	105	80 - 120	97	80 - 120	<1.0	mg/L	15	20
9571977	Dissolved Chloride (Cl)	2019/09/01	103	80 - 120	101	80 - 120	<0.50	mg/L	9.6	20
9571977	Dissolved Sulphate (SO4)	2019/09/01	100	80 - 120	100	80 - 120	<0.50	mg/L	4.0	20
9572009	Dissolved Chloride (Cl)	2019/09/01	NC	80 - 120	101	80 - 120	<0.50	mg/L	1.1	20
9572009	Dissolved Sulphate (SO4)	2019/09/01	NC	80 - 120	99	80 - 120	<0.50	mg/L	1.1	20
9572267	Dissolved Organic Carbon (C)	2019/09/03	112	80 - 120	109	80 - 120	<0.50	mg/L	9.1	20
9572268	Total Organic Carbon (C)	2019/09/03	106	80 - 120	108	80 - 120	<0.50	mg/L	0.56	20
9572276	Alkalinity (PP as CaCO3)	2019/09/03					<0.50	mg/L	NC	20
9572276	Alkalinity (Total as CaCO3)	2019/09/03			94	80 - 120	<0.50	mg/L	7.3	20
9572276	Bicarbonate (HCO3)	2019/09/03					<0.50	mg/L	7.3	20
9572276	Carbonate (CO3)	2019/09/03					<0.50	mg/L	NC	20
9572276	Hydroxide (OH)	2019/09/03					<0.50	mg/L	NC	20
9575806	Dissolved Aluminum (Al)	2019/09/09	119	80 - 120	109	80 - 120	<0.00050	mg/L	16	20
9575806	Dissolved Bismuth (Bi)	2019/09/09	97	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9575806	Dissolved Boron (B)	2019/09/09	82	80 - 120	117	80 - 120	<0.010	mg/L	19	20
9575806	Dissolved Lithium (Li)	2019/09/09	84	80 - 120	118	80 - 120	<0.00050	mg/L	18	20
9575807	Total Aluminum (Al)	2019/09/09	119	80 - 120	124 (1)	80 - 120	<0.00050	mg/L	0.52	20
9575807	Total Bismuth (Bi)	2019/09/09	98	80 - 120	108	80 - 120	<0.000050	mg/L	NC	20
9575807	Total Boron (B)	2019/09/09	124 (1)	80 - 120	117	80 - 120	<0.010	mg/L	17	20
9575807	Total Lithium (Li)	2019/09/09	80	80 - 120	89	80 - 120	<0.00050	mg/L	7.3	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

BV Labs Job #: B971690
Report Date: 2019/09/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Safiam Maiter

B971690

Maxxam
A Bureau Veritas Group Company

SBZ
INS-0239

800) 665-8566

COC #:

BBY FCD-00077/05

Page ____ of ____

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information		Project Information (where applicable)		Turnaround Time (TAT) Required												
Company Name: BMC MINERALS LTD.		Company Name: ALEXCO ENVIRONMENTAL		Quotation #: B60751		☒ Regular TAT 5 days (Most analyses) ☐ Rush TAT (Surcharges will be applied)												
Contact Name: _____		Contact Name: Mary Mioska; Renate Vanderhorst		P.O. #/ AFF#: _____		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS												
Address: 530-1130 WEST PENDER ST		Address: UNIT 3 151 INDUSTRIAL RD		Project #:		Rush TAT (Surcharges will be applied)												
Vancouver, BC PC V6E 4A4		Whitehorse, YK PC V1A 2V3		Site location: Kud Ze Kayah		Same Day ☐ 2 Days ☐ 3 Days ☐												
Phone: _____		Phone: (867) 668-6463		Site #: _____		Date Required: _____												
Email: _____		Email: mmioska@alexcoenv.com		Sampled By: _____		Date Required: _____												
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:												
☐ BC CSN Soil		☐ Return Cooler				☐ Laboratory Use Only												
☐ CCME (Specify) _____		☐ Ship Sample Bottles (Please Specify) _____				☐ COOLER TEMPERATURES												
☐ Drinking Water		USE SCENARIO # 12485				☐ PRESENT / INITIAL												
						☐ COOLING MEDIA PRESENT												
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM						COMMENTS												
Sample Identification		Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Acidity	BOD	TSS	COD/TOC	DOC	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS	
1	4A		27-Aug-19	9:15	Water	X	X	X	X							5		Metals preserved with HNO3, dissolved metals field filtered
2	4B		27-Aug-19	8:45	Water	X	X	X	X							5		Metals preserved with HNO3, dissolved metals field filtered
3	4C		27-Aug-19	8:15	Water	X	X	X	X	X	X	X	X			9		Metals preserved with HNO3, dissolved metals and DOC field filtered
4	5A		27-Aug-19	9:20	Water	X	X	X	X							5		Metals preserved with HNO3, dissolved metals field filtered
5	5B		27-Aug-19	8:50	Water	X	X	X	X							5		Metals preserved with HNO3, dissolved metals field filtered
6	5C		27-Aug-19	8:20	Water	X	X	X	X	X	X	X	X			9		Metals preserved with HNO3, dissolved metals and DOC field filtered
7	6A		27-Aug-19	9:25	Water	X	X	X	X							5		Metals preserved with HNO3, dissolved metals field filtered
8	6B		27-Aug-19	8:55	Water	X	X	X	X							5		Metals preserved with HNO3, dissolved metals field filtered
9	6C		27-Aug-19	8:25	Water	X	X	X	X	X	X	X	X	X	X	9		Metals preserved with HNO3, dissolved metals and DOC field filtered
REINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #										
Turner Webb		2019/08/27	12:00	[Signature]		2019/08/28	09:00											



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/09/18
 Report #: R2783278
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B975892

Received: 2019/09/09, 12:50

Sample Matrix: Water
 # Samples Received: 20

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	20	N/A	2019/09/12	AB SOP-00005	SM 23 2320 B m
Chloride/Sulphate by Auto Colourimetry	6	N/A	2019/09/11	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
Chloride/Sulphate by Auto Colourimetry	14	N/A	2019/09/12	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO ₄ -E m
Hardness Total (calculated as CaCO ₃) (2)	20	N/A	2019/09/13	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	20	N/A	2019/09/13	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	20	N/A	2019/09/17		Auto Calc
Ion Balance	6	N/A	2019/09/11		Auto Calc
Ion Balance	14	N/A	2019/09/12		Auto Calc
Sum of cations, anions	20	N/A	2019/09/13		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	20	N/A	2019/09/13	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	20	N/A	2019/09/13	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	20	N/A	2019/09/13	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	19	N/A	2019/09/12	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Low Level (total) (1)	1	N/A	2019/09/13	BBY7SOP-00002	EPA 6020b R2 m
Nitrate and Nitrite	20	N/A	2019/09/12		Auto Calc
Nitrate + Nitrite-N (calculated)	20	N/A	2019/09/12		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	20	N/A	2019/09/12	AB SOP-00023	SM 23 4110 B m
pH @25°C (3)	4	N/A	2019/09/11	AB SOP-00005	SM 23 4500-H+B m
pH @25°C (3)	16	N/A	2019/09/12	AB SOP-00005	SM 23 4500-H+B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: BBY FCD-00077/05

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/09/18
Report #: R2783278
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B975892

Received: 2019/09/09, 12:50

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(3) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WL6363		WL6364		WL6365		
Sampling Date		2019/09/09 10:00		2019/09/09 09:00		2019/09/09 08:30		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	INFLUENT TANK 46	QC Batch	1A	QC Batch	1B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.0	9583212	7.9	9583212	8.0	N/A	9583212
Cation Sum	meq/L	7.5	9583212	7.6	9583212	7.5	N/A	9583212
Ion Balance	N/A	0.94	9591170	0.95	9591170	0.94	0.010	9591170
Ion Balance (% Difference)	%	3.3	9583197	2.4	9583197	3.4	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	1.2	9583187	1.5	9583187	1.7	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	0.27	9583190	0.42	9583190	0.45	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	<0.033	9583187	0.25	9583187	0.24	0.033	9583187

Misc. Inorganics

pH	pH	6.68	9585531	6.71	9585301	6.74	N/A	9585531
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Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	9585528	<1.0	9585298	<1.0	1.0	9585528
Alkalinity (Total as CaCO3)	mg/L	67	9585528	63	9585298	68	1.0	9585528
Bicarbonate (HCO3)	mg/L	82	9585528	76	9585298	83	1.0	9585528
Carbonate (CO3)	mg/L	<1.0	9585528	<1.0	9585298	<1.0	1.0	9585528
Hydroxide (OH)	mg/L	<1.0	9585528	<1.0	9585298	<1.0	1.0	9585528
Dissolved Chloride (Cl)	mg/L	58	9584230	57	9584230	58	1.0	9585781
Dissolved Sulphate (SO4)	mg/L	240 (1)	9584230	240 (1)	9584230	240 (1)	2.0	9585781

Nutrients

Dissolved Nitrite (N)	mg/L	<0.010	9584185	0.075	9584178	0.073	0.010	9584185
Dissolved Nitrate (N)	mg/L	0.27	9584185	0.35	9584178	0.38	0.010	9584185

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
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BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL6366		WL6367		WL6368		
Sampling Date		2019/09/09 08:00		2019/09/09 09:05		2019/09/09 08:35		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	1C	QC Batch	2A	QC Batch	2B	RDL	QC Batch

Calculated Parameters								
Anion Sum	meq/L	8.0	9583212	7.7	9583212	7.9	N/A	9583212
Cation Sum	meq/L	7.6	9583212	7.5	9583212	7.5	N/A	9583212
Ion Balance	N/A	0.94	9591170	0.97	9591170	0.95	0.010	9591170
Ion Balance (% Difference)	%	3.1	9583197	1.6	9583197	2.7	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	2.0	9583187	1.2	9583187	1.6	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	0.54	9583190	0.33	9583190	0.38	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	0.29	9583187	0.18	9583187	0.071	0.033	9583187

Misc. Inorganics

pH	pH	6.66	9584008	6.65	9585301	6.68	N/A	9584008
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Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	9584004	<1.0	9585298	<1.0	1.0	9584004
Alkalinity (Total as CaCO3)	mg/L	58	9584004	66	9585298	62	1.0	9584004
Bicarbonate (HCO3)	mg/L	71	9584004	80	9585298	76	1.0	9584004
Carbonate (CO3)	mg/L	<1.0	9584004	<1.0	9585298	<1.0	1.0	9584004
Hydroxide (OH)	mg/L	<1.0	9584004	<1.0	9585298	<1.0	1.0	9584004
Dissolved Chloride (Cl)	mg/L	61	9584230	54	9583915	56	1.0	9585781
Dissolved Sulphate (SO4)	mg/L	250 (1)	9584230	230 (1)	9583915	240 (1)	2.0	9585781

Nutrients

Dissolved Nitrite (N)	mg/L	0.087	9584185	0.054	9584178	0.022	0.010	9584178
Dissolved Nitrate (N)	mg/L	0.46	9584185	0.28	9584178	0.35	0.010	9584178

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL6369		WL6370		WL6371		
Sampling Date		2019/09/09 08:05		2019/09/09 09:10		2019/09/09 08:40		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2C	QC Batch	3A	QC Batch	3B	RDL	QC Batch

Calculated Parameters								
Anion Sum	meq/L	8.2	9583212	8.2	9583212	8.0	N/A	9583212
Cation Sum	meq/L	7.7	9583212	7.5	9583212	7.6	N/A	9583212
Ion Balance	N/A	0.94	9591170	0.92	9591170	0.96	0.010	9591170
Ion Balance (% Difference)	%	3.1	9583197	4.2	9583197	2.1	N/A	9583197
Dissolved Nitrate (NO ₃)	mg/L	0.54	9583187	1.3	9583187	0.97	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	0.12	9583190	0.35	9583190	0.26	0.014	9583190
Dissolved Nitrite (NO ₂)	mg/L	<0.033	9583187	0.20	9583187	0.13	0.033	9583187

Misc. Inorganics

pH	pH	6.68	9584008	6.63	9585301	6.65	N/A	9585301
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Anions

Alkalinity (PP as CaCO ₃)	mg/L	<1.0	9584004	<1.0	9585298	<1.0	1.0	9585298
Alkalinity (Total as CaCO ₃)	mg/L	70	9584004	70	9585298	62	1.0	9585298
Bicarbonate (HCO ₃)	mg/L	85	9584004	85	9585298	76	1.0	9585298
Carbonate (CO ₃)	mg/L	<1.0	9584004	<1.0	9585298	<1.0	1.0	9585298
Hydroxide (OH)	mg/L	<1.0	9584004	<1.0	9585298	<1.0	1.0	9585298
Dissolved Chloride (Cl)	mg/L	60	9584230	59	9584230	58	1.0	9584230
Dissolved Sulphate (SO ₄)	mg/L	250 (1)	9584230	240 (1)	9584230	240 (1)	2.0	9584230

Nutrients

Dissolved Nitrite (N)	mg/L	<0.010	9584185	0.060	9584178	0.041	0.010	9584185
Dissolved Nitrate (N)	mg/L	0.12	9584185	0.29	9584178	0.22	0.010	9584185

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

BUREAU
VERITASBV Labs Job #: B975892
Report Date: 2019/09/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WL6372		WL6373		WL6374		
Sampling Date		2019/09/09 08:10		2019/09/09 10:05		2019/09/09 09:15		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	3C	QC Batch	INFLUENT TANK 47	QC Batch	4A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.0	9583212	8.2	9583212	8.0	N/A	9583212
Cation Sum	meq/L	7.7	9583212	7.4	9583212	7.6	N/A	9583212
Ion Balance	N/A	0.97	9591170	0.91	9591170	0.95	0.010	9591170
Ion Balance (% Difference)	%	1.6	9583197	4.6	9583197	2.4	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	0.32	9583187	1.2	9583187	1.0	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	0.094	9583190	0.28	9583190	0.23	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	0.071	9583187	<0.033	9583187	<0.033	0.033	9583187

Misc. Inorganics

pH	pH	6.56	9585301	6.75	9584008	6.63	N/A	9585301
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Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	9585298	<1.0	9584004	<1.0	1.0	9585298
Alkalinity (Total as CaCO3)	mg/L	64	9585298	71	9584004	76	1.0	9585298
Bicarbonate (HCO3)	mg/L	78	9585298	87	9584004	92	1.0	9585298
Carbonate (CO3)	mg/L	<1.0	9585298	<1.0	9584004	<1.0	1.0	9585298
Hydroxide (OH)	mg/L	<1.0	9585298	<1.0	9584004	<1.0	1.0	9585298
Dissolved Chloride (Cl)	mg/L	56	9584230	58	9584230	54	1.0	9583915
Dissolved Sulphate (SO4)	mg/L	250 (1)	9584230	240 (1)	9584230	240 (1)	2.0	9583915

Nutrients

Dissolved Nitrite (N)	mg/L	0.021	9584178	<0.010	9584178	<0.010	0.010	9584178
Dissolved Nitrate (N)	mg/L	0.072	9584178	0.28	9584178	0.23	0.010	9584178

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WL6375		WL6376		WL6377		
Sampling Date		2019/09/09 08:45		2019/09/09 08:15		2019/09/09 09:20		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	4B	QC Batch	4C	QC Batch	5A	RDL	QC Batch

Calculated Parameters								
Anion Sum	meq/L	8.2	9583212	8.3	9583212	7.9	N/A	9583212
Cation Sum	meq/L	7.7	9583212	7.9	9583212	7.8	N/A	9583212
Ion Balance	N/A	0.95	9591170	0.95	9591170	0.99	0.010	9591170
Ion Balance (% Difference)	%	2.8	9583197	2.3	9583197	0.40	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	0.27	9583187	<0.044	9583187	0.89	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	0.061	9583190	<0.014	9583190	0.21	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	<0.033	9583187	<0.033	9583187	0.043	0.033	9583187

Misc. Inorganics

pH	pH	6.57	9585301	6.63	9585531	6.58	N/A	9585301
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Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	9585298	<1.0	9585528	<1.0	1.0	9585298
Alkalinity (Total as CaCO3)	mg/L	65	9585298	70	9585528	73	1.0	9585298
Bicarbonate (HCO3)	mg/L	80	9585298	86	9585528	89	1.0	9585298
Carbonate (CO3)	mg/L	<1.0	9585298	<1.0	9585528	<1.0	1.0	9585298
Hydroxide (OH)	mg/L	<1.0	9585298	<1.0	9585528	<1.0	1.0	9585298
Dissolved Chloride (Cl)	mg/L	61	9584230	61	9584230	56	1.0	9583915
Dissolved Sulphate (SO4)	mg/L	250 (1)	9584230	250 (1)	9584230	230 (1)	2.0	9583915

Nutrients

Dissolved Nitrite (N)	mg/L	<0.010	9584178	<0.010	9584185	0.013	0.010	9584178
Dissolved Nitrate (N)	mg/L	0.061	9584178	<0.010	9584185	0.20	0.010	9584178

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL6378	WL6379		WL6380	WL6381		
Sampling Date		2019/09/09 08:50	2019/09/09 08:20		2019/09/09 09:25	2019/09/09 08:55		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	5B	5C	QC Batch	6A	6B	RDL	QC Batch

Calculated Parameters								
Anion Sum	meq/L	8.3	8.4	9583212	7.5	7.6	N/A	9583212
Cation Sum	meq/L	7.8	8.0	9583212	7.5	7.7	N/A	9583212
Ion Balance	N/A	0.94	0.95	9591170	1.0	1.0	0.010	9591170
Ion Balance (% Difference)	%	3.3	2.3	9583197	0.20	0.57	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	0.16	<0.044	9583187	0.95	0.30	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	0.037	<0.014	9583190	0.27	0.082	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	<0.033	<0.033	9583187	0.19	0.046	0.033	9583187

Misc. Inorganics

pH	pH	6.62	6.68	9585531	6.60	6.59	N/A	9585301
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Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	<1.0	9585528	<1.0	<1.0	1.0	9585298
Alkalinity (Total as CaCO3)	mg/L	78	76	9585528	62	64	1.0	9585298
Bicarbonate (HCO3)	mg/L	95	92	9585528	75	79	1.0	9585298
Carbonate (CO3)	mg/L	<1.0	<1.0	9585528	<1.0	<1.0	1.0	9585298
Hydroxide (OH)	mg/L	<1.0	<1.0	9585528	<1.0	<1.0	1.0	9585298
Dissolved Chloride (Cl)	mg/L	59	61	9584230	56	57	1.0	9583915
Dissolved Sulphate (SO4)	mg/L	240 (1)	250 (1)	9584230	220 (1)	230 (1)	2.0	9583915

Nutrients

Dissolved Nitrite (N)	mg/L	<0.010	<0.010	9584185	0.059	0.014	0.010	9584178
Dissolved Nitrate (N)	mg/L	0.037	<0.010	9584185	0.22	0.068	0.010	9584178

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL6382		
Sampling Date		2019/09/09 08:25		
COC Number		BBY FCD-00077/05		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	8.3	N/A	9583212
Cation Sum	meq/L	8.1	N/A	9583212
Ion Balance	N/A	0.98	0.010	9591170
Ion Balance (% Difference)	%	1.1	N/A	9583197
Dissolved Nitrate (NO3)	mg/L	<0.044	0.044	9583187
Nitrate plus Nitrite (N)	mg/L	<0.014	0.014	9583190
Dissolved Nitrite (NO2)	mg/L	<0.033	0.033	9583187
Misc. Inorganics				
pH	pH	6.53	N/A	9585301
Anions				
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	9585298
Alkalinity (Total as CaCO3)	mg/L	86	1.0	9585298
Bicarbonate (HCO3)	mg/L	100	1.0	9585298
Carbonate (CO3)	mg/L	<1.0	1.0	9585298
Hydroxide (OH)	mg/L	<1.0	1.0	9585298
Dissolved Chloride (Cl)	mg/L	58	1.0	9583915
Dissolved Sulphate (SO4)	mg/L	240 (1)	2.0	9583915
Nutrients				
Dissolved Nitrite (N)	mg/L	<0.010	0.010	9584178
Dissolved Nitrate (N)	mg/L	<0.010	0.010	9584178
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.				



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6363	WL6364	WL6365	WL6366		
Sampling Date		2019/09/09 10:00	2019/09/09 09:00	2019/09/09 08:30	2019/09/09 08:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT TANK 46	1A	1B	1C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	317	319	316	319	0.50	9582660
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0163	0.0132	0.00743	0.00217	0.00050	9585971
Dissolved Antimony (Sb)	mg/L	0.0194	0.0183	0.0183	0.0186	0.000020	9585971
Dissolved Arsenic (As)	mg/L	0.0592	0.0575	0.0499	0.0494	0.000020	9585971
Dissolved Barium (Ba)	mg/L	0.0551	0.0542	0.0537	0.0560	0.000020	9585971
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9585971
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585971
Dissolved Boron (B)	mg/L	0.037	0.036	0.035	0.035	0.010	9585971
Dissolved Cadmium (Cd)	mg/L	0.00182	0.00167	0.00136	0.000794	0.0000050	9585971
Dissolved Chromium (Cr)	mg/L	0.00013	0.00013	0.00010	<0.00010	0.00010	9585971
Dissolved Cobalt (Co)	mg/L	0.00252	0.00147	0.000186	0.0000647	0.0000050	9585971
Dissolved Copper (Cu)	mg/L	0.0145	0.0156	0.00592	0.00315	0.000050	9585971
Dissolved Iron (Fe)	mg/L	0.0044	0.0034	0.0088	0.0036	0.0010	9585971
Dissolved Lead (Pb)	mg/L	0.0103	0.00815	0.000781	0.000296	0.0000050	9585971
Dissolved Lithium (Li)	mg/L	0.0117	0.0114	0.0113	0.0117	0.00050	9585971
Dissolved Manganese (Mn)	mg/L	0.0516	0.0319	0.00469	0.00216	0.000050	9585971
Dissolved Molybdenum (Mo)	mg/L	0.00160	0.00153	0.00156	0.00154	0.000050	9585971
Dissolved Nickel (Ni)	mg/L	0.00740	0.00728	0.00647	0.00561	0.000020	9585971
Dissolved Selenium (Se)	mg/L	0.00718	0.00697	0.00689	0.00690	0.000040	9585971
Dissolved Silicon (Si)	mg/L	0.633	0.563	0.505	0.467	0.050	9585971
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585971
Dissolved Strontium (Sr)	mg/L	0.583	0.582	0.578	0.592	0.000050	9585971
Dissolved Thallium (Tl)	mg/L	0.0000032	0.0000036	0.0000038	0.0000038	0.0000020	9585971
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585971
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9585971
Dissolved Uranium (U)	mg/L	0.0280	0.0285	0.0297	0.0230	0.0000020	9585971
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585971
Dissolved Zinc (Zn)	mg/L	0.142	0.142	0.131	0.127	0.00010	9585971
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585971
Dissolved Calcium (Ca)	mg/L	100	101	100	101	0.050	9582661

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6363	WL6364	WL6365	WL6366		
Sampling Date		2019/09/09 10:00	2019/09/09 09:00	2019/09/09 08:30	2019/09/09 08:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT TANK 46	1A	1B	1C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.2	16.3	16.1	16.2	0.050	9582661
Dissolved Potassium (K)	mg/L	3.66	3.67	3.69	3.75	0.050	9582661
Dissolved Sodium (Na)	mg/L	25.4	25.2	25.1	25.2	0.050	9582661
Dissolved Sulphur (S)	mg/L	78.6	77.9	76.6	77.1	3.0	9582661
RDL = Reportable Detection Limit							



BUREAU
VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6367	WL6368	WL6369		WL6370		
Sampling Date		2019/09/09 09:05	2019/09/09 08:35	2019/09/09 08:05		2019/09/09 09:10		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2A	2B	2C	QC Batch	3A	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	314	313	323	9582660	317	0.50	9582660
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00902	0.00248	0.00152	9585971	0.0162	0.00050	9585971
Dissolved Antimony (Sb)	mg/L	0.0189	0.0187	0.0184	9585971	0.0188	0.000020	9585971
Dissolved Arsenic (As)	mg/L	0.0573	0.0560	0.0494	9585971	0.0611	0.000020	9585971
Dissolved Barium (Ba)	mg/L	0.0555	0.0539	0.0555	9585971	0.0534	0.000020	9585971
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9585971	<0.000010	0.000010	9585971
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9585971	<0.0000050	0.0000050	9585971
Dissolved Boron (B)	mg/L	0.033	0.031	0.036	9585971	0.027	0.010	9585971
Dissolved Cadmium (Cd)	mg/L	0.00150	0.000982	0.000608	9585971	0.00143	0.0000050	9585971
Dissolved Chromium (Cr)	mg/L	0.00012	0.00011	<0.00010	9585971	0.00013	0.00010	9585971
Dissolved Cobalt (Co)	mg/L	0.000957	0.0000776	0.0000406	9585971	0.000903	0.0000050	9585971
Dissolved Copper (Cu)	mg/L	0.00971	0.00444	0.00263	9585971	0.0133	0.000050	9585971
Dissolved Iron (Fe)	mg/L	0.0025	0.0030	0.0052	9585971	0.0067	0.0010	9592339
Dissolved Lead (Pb)	mg/L	0.00327	0.000371	0.000138	9585971	0.00276	0.0000050	9585971
Dissolved Lithium (Li)	mg/L	0.0114	0.0114	0.0115	9585971	0.0114	0.00050	9585971
Dissolved Manganese (Mn)	mg/L	0.0234	0.00210	0.00270	9585971	0.0190	0.000050	9585971
Dissolved Molybdenum (Mo)	mg/L	0.00156	0.00159	0.00137	9585971	0.00164	0.000050	9585971
Dissolved Nickel (Ni)	mg/L	0.00672	0.00637	0.00644	9585971	0.00700	0.000020	9585971
Dissolved Selenium (Se)	mg/L	0.00688	0.00680	0.00654	9585971	0.00692	0.000040	9585971
Dissolved Silicon (Si)	mg/L	0.502	0.508	0.524	9585971	0.599	0.050	9585971
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	9585971	<0.0000050	0.0000050	9585971
Dissolved Strontium (Sr)	mg/L	0.590	0.581	0.587	9585971	0.590	0.000050	9585971
Dissolved Thallium (Tl)	mg/L	0.0000037	0.0000033	0.0000022	9585971	0.0000038	0.0000020	9585971
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9585971	<0.00020	0.00020	9585971
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9585971	0.00084	0.00050	9585971
Dissolved Uranium (U)	mg/L	0.0313	0.0288	0.0162	9585971	0.0305	0.0000020	9585971
Dissolved Vanadium (V)	mg/L	<0.00020	0.00021	<0.00020	9585971	<0.00020	0.00020	9585971
Dissolved Zinc (Zn)	mg/L	0.122	0.119	0.131	9585971	0.135	0.00010	9585971
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	9585971	<0.00010	0.00010	9585971
Dissolved Calcium (Ca)	mg/L	99.9	98.5	102	9582661	99.9	0.050	9582661

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6367	WL6368	WL6369		WL6370		
Sampling Date		2019/09/09 09:05	2019/09/09 08:35	2019/09/09 08:05		2019/09/09 09:10		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2A	2B	2C	QC Batch	3A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	15.8	16.2	16.2	9582661	16.3	0.050	9582661
Dissolved Potassium (K)	mg/L	3.69	3.81	3.77	9582661	3.88	0.050	9582661
Dissolved Sodium (Na)	mg/L	24.8	25.9	26.9	9582661	25.1	0.050	9582661
Dissolved Sulphur (S)	mg/L	75.5	76.0	77.0	9582661	76.6	3.0	9582661
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6371		WL6372		WL6373		
Sampling Date		2019/09/09 08:40		2019/09/09 08:10		2019/09/09 10:05		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	3B	QC Batch	3C	QC Batch	INFLUENT TANK 47	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	321	9582660	325	9582660	313	0.50	9583207
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00326	9585971	0.00094	9585971	0.0176	0.00050	9585971
Dissolved Antimony (Sb)	mg/L	0.0198	9585971	0.0187	9585971	0.0182	0.000020	9585971
Dissolved Arsenic (As)	mg/L	0.0604	9585971	0.0501	9585971	0.0569	0.000020	9585971
Dissolved Barium (Ba)	mg/L	0.0550	9585971	0.0543	9585971	0.0537	0.000020	9585971
Dissolved Beryllium (Be)	mg/L	<0.000010	9585971	<0.000010	9585971	<0.000010	0.000010	9585971
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9585971	<0.0000050	9585971	<0.0000050	0.0000050	9585971
Dissolved Boron (B)	mg/L	0.027	9585971	0.030	9585971	0.034	0.010	9585971
Dissolved Cadmium (Cd)	mg/L	0.000833	9585971	0.000488	9585971	0.00177	0.0000050	9585971
Dissolved Chromium (Cr)	mg/L	<0.00010	9585971	<0.00010	9585971	0.00011	0.00010	9585971
Dissolved Cobalt (Co)	mg/L	0.0000854	9585971	0.0000407	9585971	0.00251	0.0000050	9585971
Dissolved Copper (Cu)	mg/L	0.00522	9585971	0.00262	9585971	0.0213	0.000050	9585971
Dissolved Iron (Fe)	mg/L	0.0029	9585971	0.0024	9585971	0.0025	0.0010	9585971
Dissolved Lead (Pb)	mg/L	0.000407	9585971	0.000173	9585971	0.0142	0.0000050	9585971
Dissolved Lithium (Li)	mg/L	0.0117	9585971	0.0115	9585971	0.0113	0.00050	9585971
Dissolved Manganese (Mn)	mg/L	0.00189	9585971	0.00227	9585971	0.0485	0.000050	9585971
Dissolved Molybdenum (Mo)	mg/L	0.00165	9585971	0.00144	9585971	0.00150	0.000050	9585971
Dissolved Nickel (Ni)	mg/L	0.00655	9585971	0.00628	9585971	0.00723	0.000020	9585971
Dissolved Selenium (Se)	mg/L	0.00728	9585971	0.00665	9585971	0.00681	0.000040	9585971
Dissolved Silicon (Si)	mg/L	0.609	9585971	0.630	9585971	0.611	0.050	9585971
Dissolved Silver (Ag)	mg/L	<0.0000050	9585971	<0.0000050	9585971	<0.0000050	0.0000050	9585971
Dissolved Strontium (Sr)	mg/L	0.600	9585971	0.595	9585971	0.584	0.000050	9585971
Dissolved Thallium (Tl)	mg/L	0.0000031	9585971	0.0000022	9585971	0.0000025	0.0000020	9585971
Dissolved Tin (Sn)	mg/L	<0.00020	9585971	<0.00020	9585971	<0.00020	0.00020	9585971
Dissolved Titanium (Ti)	mg/L	<0.00050	9585971	<0.00050	9585971	<0.00050	0.00050	9585971
Dissolved Uranium (U)	mg/L	0.0304	9585971	0.0180	9585971	0.0282	0.0000020	9585971
Dissolved Vanadium (V)	mg/L	<0.00020	9585971	<0.00020	9585971	<0.00020	0.00020	9585971
Dissolved Zinc (Zn)	mg/L	0.123	9585971	0.121	9585971	0.142	0.00010	9585971
Dissolved Zirconium (Zr)	mg/L	<0.00010	9585971	<0.00010	9585971	<0.00010	0.00010	9585971
Dissolved Calcium (Ca)	mg/L	101	9582661	103	9583213	98.9	0.050	9583213

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6371		WL6372		WL6373		
Sampling Date		2019/09/09 08:40		2019/09/09 08:10		2019/09/09 10:05		
COC Number		BBY FCD-00077/05		BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	3B	QC Batch	3C	QC Batch	INFLUENT TANK 47	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.4	9582661	16.5	9583213	16.0	0.050	9583213
Dissolved Potassium (K)	mg/L	4.08	9582661	3.83	9583213	3.71	0.050	9583213
Dissolved Sodium (Na)	mg/L	26.0	9582661	26.1	9583213	25.0	0.050	9583213
Dissolved Sulphur (S)	mg/L	81.1	9582661	79.0	9583213	73.5	3.0	9583213
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6374	WL6375	WL6376	WL6377		
Sampling Date		2019/09/09 09:15	2019/09/09 08:45	2019/09/09 08:15	2019/09/09 09:20		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4A	4B	4C	5A	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	320	323	333	331	0.50	9583207
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00706	0.00274	0.00169	0.0165 (1)	0.00050	9585971
Dissolved Antimony (Sb)	mg/L	0.0185	0.0169	0.0135	0.0212	0.000020	9585971
Dissolved Arsenic (As)	mg/L	0.0546	0.0398	0.0243	0.0569	0.000020	9585971
Dissolved Barium (Ba)	mg/L	0.0532	0.0538	0.0561	0.0560	0.000020	9585971
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9585971
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585971
Dissolved Boron (B)	mg/L	0.027	0.022	0.010	0.028	0.010	9585971
Dissolved Cadmium (Cd)	mg/L	0.00114	0.000440	0.000117	0.00138	0.0000050	9585971
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00012	0.00010	9585971
Dissolved Cobalt (Co)	mg/L	0.000526	0.000129	0.0000463	0.00157	0.0000050	9585971
Dissolved Copper (Cu)	mg/L	0.00716	0.00327	0.00134	0.00833	0.000050	9585971
Dissolved Iron (Fe)	mg/L	0.0046	0.0031	0.0065	0.0170 (1)	0.0010	9585971
Dissolved Lead (Pb)	mg/L	0.00102	0.000252	0.0000936	0.00235 (1)	0.0000050	9585971
Dissolved Lithium (Li)	mg/L	0.0115	0.0117	0.0119	0.0118	0.00050	9585971
Dissolved Manganese (Mn)	mg/L	0.0146	0.0104	0.0106	0.0392	0.000050	9585971
Dissolved Molybdenum (Mo)	mg/L	0.00158	0.00127	0.000929	0.00164	0.000050	9585971
Dissolved Nickel (Ni)	mg/L	0.00696	0.00629	0.00468	0.00761	0.000020	9585971
Dissolved Selenium (Se)	mg/L	0.00666	0.00540	0.00377	0.00724	0.000040	9585971
Dissolved Silicon (Si)	mg/L	0.630	0.630	0.666	0.682	0.050	9585971
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585971
Dissolved Strontium (Sr)	mg/L	0.590	0.591	0.611	0.604	0.000050	9585971
Dissolved Thallium (Tl)	mg/L	0.0000036	<0.0000020	<0.0000020	0.0000030	0.0000020	9585971
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585971
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9585971
Dissolved Uranium (U)	mg/L	0.0273	0.0176	0.00724	0.0277	0.0000020	9585971
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585971
Dissolved Zinc (Zn)	mg/L	0.114	0.0857	0.0458	0.136	0.00010	9585971
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585971

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6374	WL6375	WL6376	WL6377		
Sampling Date		2019/09/09 09:15	2019/09/09 08:45	2019/09/09 08:15	2019/09/09 09:20		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4A	4B	4C	5A	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	101	102	105	105	0.050	9583213
Dissolved Magnesium (Mg)	mg/L	16.5	16.6	16.8	16.9	0.050	9583213
Dissolved Potassium (K)	mg/L	3.82	3.86	3.29	3.79	0.050	9583213
Dissolved Sodium (Na)	mg/L	25.8	27.0	27.5	26.1	0.050	9583213
Dissolved Sulphur (S)	mg/L	77.4	79.2	75.8	78.1	3.0	9583213
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B975892
Report Date: 2019/09/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WL6378	WL6379	WL6380	WL6381		
Sampling Date		2019/09/09 08:50	2019/09/09 08:20	2019/09/09 09:25	2019/09/09 08:55		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	5B	5C	6A	6B	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	325	336	317	325	0.50	9583207
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00296	0.00300	0.00828	0.00205	0.00050	9585971
Dissolved Antimony (Sb)	mg/L	0.0185	0.0145	0.0189	0.0185	0.000020	9585971
Dissolved Arsenic (As)	mg/L	0.0334	0.0175	0.0574	0.0385	0.000020	9585971
Dissolved Barium (Ba)	mg/L	0.0548	0.0583	0.0538	0.0538	0.000020	9585971
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9585971
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000053	<0.0000050	<0.0000050	0.0000050	9585971
Dissolved Boron (B)	mg/L	0.021	<0.010	0.024	0.023	0.010	9585971
Dissolved Cadmium (Cd)	mg/L	0.000482	0.000214	0.00107	0.000276	0.0000050	9585971
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00012	<0.00010	0.00010	9585971
Dissolved Cobalt (Co)	mg/L	0.000638	0.000347	0.00117	0.000219	0.0000050	9585971
Dissolved Copper (Cu)	mg/L	0.00353	0.00197	0.00777	0.00306	0.000050	9585971
Dissolved Iron (Fe)	mg/L	0.0106	0.0436	0.0111	0.0059	0.0010	9585971
Dissolved Lead (Pb)	mg/L	0.000484	0.000317	0.00103	0.000272	0.0000050	9585971
Dissolved Lithium (Li)	mg/L	0.0118	0.0119	0.0113	0.0114	0.00050	9585971
Dissolved Manganese (Mn)	mg/L	0.0372	0.0428	0.0245	0.0114	0.000050	9585971
Dissolved Molybdenum (Mo)	mg/L	0.00132	0.00105	0.00154	0.00137	0.000050	9585971
Dissolved Nickel (Ni)	mg/L	0.00625	0.00449	0.00696	0.00546	0.000020	9585971
Dissolved Selenium (Se)	mg/L	0.00458	0.00272	0.00679	0.00543	0.000040	9585971
Dissolved Silicon (Si)	mg/L	0.653	0.711	0.625	0.643	0.050	9585971
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585971
Dissolved Strontium (Sr)	mg/L	0.591	0.594	0.597	0.605	0.000050	9585971
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9585971
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585971
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9585971
Dissolved Uranium (U)	mg/L	0.0130	0.00544	0.0284	0.0170	0.0000020	9585971
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585971
Dissolved Zinc (Zn)	mg/L	0.0725	0.0332	0.113	0.0620	0.00010	9585971
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585971
Dissolved Calcium (Ca)	mg/L	102	106	99.8	104	0.050	9583213

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6378	WL6379	WL6380	WL6381		
Sampling Date		2019/09/09 08:50	2019/09/09 08:20	2019/09/09 09:25	2019/09/09 08:55		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	5B	5C	6A	6B	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.8	17.4	16.4	16.1	0.050	9583213
Dissolved Potassium (K)	mg/L	3.62	3.34	3.72	3.60	0.050	9583213
Dissolved Sodium (Na)	mg/L	27.0	28.6	25.5	25.2	0.050	9583213
Dissolved Sulphur (S)	mg/L	77.3	80.2	77.6	76.6	3.0	9583213
RDL = Reportable Detection Limit							

**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WL6382		
Sampling Date		2019/09/09 08:25		
COC Number		BBY FCD-00077/05		
	UNITS	6C	RDL	QC Batch

Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	344	0.50	9583207
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.00358	0.00050	9592339
Dissolved Antimony (Sb)	mg/L	0.0163	0.000020	9585971
Dissolved Arsenic (As)	mg/L	0.0263	0.000020	9585971
Dissolved Barium (Ba)	mg/L	0.0572	0.000020	9585971
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	9585971
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9585971
Dissolved Boron (B)	mg/L	0.014	0.010	9585971
Dissolved Cadmium (Cd)	mg/L	0.0000654	0.0000050	9585971
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	9585971
Dissolved Cobalt (Co)	mg/L	0.0000514	0.0000050	9585971
Dissolved Copper (Cu)	mg/L	0.00171	0.000050	9585971
Dissolved Iron (Fe)	mg/L	0.0157	0.0010	9585971
Dissolved Lead (Pb)	mg/L	0.000134	0.0000050	9585971
Dissolved Lithium (Li)	mg/L	0.0120	0.00050	9585971
Dissolved Manganese (Mn)	mg/L	0.00944	0.000050	9585971
Dissolved Molybdenum (Mo)	mg/L	0.00115	0.000050	9585971
Dissolved Nickel (Ni)	mg/L	0.00387	0.000020	9585971
Dissolved Selenium (Se)	mg/L	0.00446	0.000040	9585971
Dissolved Silicon (Si)	mg/L	0.714	0.050	9585971
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9585971
Dissolved Strontium (Sr)	mg/L	0.614	0.000050	9585971
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000020	9585971
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9585971
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9585971
Dissolved Uranium (U)	mg/L	0.00729	0.0000020	9585971
Dissolved Vanadium (V)	mg/L	<0.00020	0.00020	9585971
Dissolved Zinc (Zn)	mg/L	0.0290	0.00010	9585971
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	9585971
Dissolved Calcium (Ca)	mg/L	110	0.050	9583213

RDL = Reportable Detection Limit



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BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL6382		
Sampling Date		2019/09/09 08:25		
COC Number		BBY FCD-00077/05		
	UNITS	6C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.0	0.050	9583213
Dissolved Potassium (K)	mg/L	3.39	0.050	9583213
Dissolved Sodium (Na)	mg/L	26.5	0.050	9583213
Dissolved Sulphur (S)	mg/L	83.2	3.0	9583213
RDL = Reportable Detection Limit				

BUREAU
VERITASBV Labs Job #: B975892
Report Date: 2019/09/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WL6363	WL6364	WL6365	WL6366		
Sampling Date		2019/09/09 10:00	2019/09/09 09:00	2019/09/09 08:30	2019/09/09 08:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT TANK 46	1A	1B	1C	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	331	323	317	318	0.50	9583184
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0335	0.0225	0.0134	0.00662	0.00050	9585959
Total Antimony (Sb)	mg/L	0.0217	0.0197	0.0194	0.0199	0.000020	9585959
Total Arsenic (As)	mg/L	0.0655	0.0563	0.0516	0.0500	0.000020	9585959
Total Barium (Ba)	mg/L	0.0591	0.0550	0.0550	0.0563	0.000020	9585959
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9585959
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585959
Total Boron (B)	mg/L	0.034	0.037	0.035	0.034	0.010	9585959
Total Cadmium (Cd)	mg/L	0.00195	0.00183	0.00146	0.000852	0.0000050	9585959
Total Chromium (Cr)	mg/L	0.00013	<0.00010	0.00011	0.00010	0.00010	9585959
Total Cobalt (Co)	mg/L	0.00258	0.00147	0.000206	0.0000782	0.0000050	9585959
Total Copper (Cu)	mg/L	0.0165	0.0166	0.00698	0.00381	0.000050	9585959
Total Iron (Fe)	mg/L	0.0178	0.0125	0.0124	0.0098	0.0010	9585959
Total Lead (Pb)	mg/L	0.0149	0.0105	0.00164	0.000687	0.0000050	9585959
Total Lithium (Li)	mg/L	0.0123	0.0115	0.0111	0.0111	0.00050	9585959
Total Manganese (Mn)	mg/L	0.0562	0.0319	0.00557	0.00245	0.000050	9585959
Total Molybdenum (Mo)	mg/L	0.00164	0.00154	0.00153	0.00154	0.000050	9585959
Total Nickel (Ni)	mg/L	0.00757	0.00713	0.00686	0.00615	0.000020	9585959
Total Selenium (Se)	mg/L	0.00797	0.00790	0.00744	0.00744	0.000040	9585959
Total Silicon (Si)	mg/L	0.734	0.595	0.527	0.483	0.050	9585959
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585959
Total Strontium (Sr)	mg/L	0.649	0.543	0.577	0.572	0.000050	9585959
Total Thallium (Tl)	mg/L	0.0000038	0.0000031	0.0000036	0.0000032	0.0000020	9585959
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585959
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9585959
Total Uranium (U)	mg/L	0.0280	0.0281	0.0291	0.0231	0.0000020	9585959
Total Vanadium (V)	mg/L	<0.00020	0.00021	0.00027	0.00033	0.00020	9585959
Total Zinc (Zn)	mg/L	0.157	0.149	0.148	0.141	0.00010	9585959
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585959
Total Calcium (Ca)	mg/L	105	104	100	99.8	0.050	9582662

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6363	WL6364	WL6365	WL6366		
Sampling Date		2019/09/09 10:00	2019/09/09 09:00	2019/09/09 08:30	2019/09/09 08:00		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	INFLUENT TANK 46	1A	1B	1C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.6	15.6	16.3	16.7	0.050	9582662
Total Potassium (K)	mg/L	3.85	3.50	3.75	3.81	0.050	9582662
Total Sodium (Na)	mg/L	25.4	24.1	25.8	25.7	0.050	9582662
Total Sulphur (S)	mg/L	87.4	78.9	82.9	84.7	3.0	9582662
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B975892
Report Date: 2019/09/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WL6367	WL6368	WL6369		WL6370		
Sampling Date		2019/09/09 09:05	2019/09/09 08:35	2019/09/09 08:05		2019/09/09 09:10		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2A	2B	2C	QC Batch	3A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	318	313	333	9583184	304	0.50	9583184
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0163	0.00614	0.00339	9585959	0.0166	0.00050	9585959
Total Antimony (Sb)	mg/L	0.0208	0.0200	0.0195	9585959	0.0194	0.000020	9585959
Total Arsenic (As)	mg/L	0.0588	0.0575	0.0518	9585959	0.0649	0.000020	9585959
Total Barium (Ba)	mg/L	0.0560	0.0550	0.0564	9585959	0.0538	0.000020	9585959
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	9585959	<0.000010	0.000010	9585959
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	9585959	<0.0000050	0.0000050	9585959
Total Boron (B)	mg/L	0.035	0.031	0.037	9585959	0.026	0.010	9585959
Total Cadmium (Cd)	mg/L	0.00172	0.00108	0.000664	9585959	0.00155	0.0000050	9585959
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00014	9585959	0.00014	0.00010	9585959
Total Cobalt (Co)	mg/L	0.00107	0.0000838	0.0000465	9585959	0.000976	0.0000050	9585959
Total Copper (Cu)	mg/L	0.0115	0.00509	0.00314	9585959	0.0158	0.000050	9585959
Total Iron (Fe)	mg/L	0.0093	0.0099	0.0097	9585959	0.0072	0.0010	9585959
Total Lead (Pb)	mg/L	0.00500	0.000858	0.000223	9585959	0.00437	0.0000050	9585959
Total Lithium (Li)	mg/L	0.0115	0.0114	0.0115	9585959	0.0110	0.00050	9585959
Total Manganese (Mn)	mg/L	0.0254	0.00245	0.00280	9585959	0.0208	0.000050	9585959
Total Molybdenum (Mo)	mg/L	0.00165	0.00162	0.00137	9585959	0.00156	0.000050	9585959
Total Nickel (Ni)	mg/L	0.00708	0.00658	0.00690	9585959	0.00756	0.000020	9585959
Total Selenium (Se)	mg/L	0.00752	0.00746	0.00732	9585959	0.00721	0.000040	9585959
Total Silicon (Si)	mg/L	0.526	0.530	0.560	9585959	0.622	0.050	9585959
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	9585959	<0.0000050	0.0000050	9585959
Total Strontium (Sr)	mg/L	0.578	0.579	0.599	9585959	0.595	0.000050	9585959
Total Thallium (Tl)	mg/L	0.0000030	0.0000027	0.0000026	9585959	0.0000029	0.0000020	9585959
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	9585959	<0.00020	0.00020	9585959
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	9585959	<0.00050	0.00050	9585959
Total Uranium (U)	mg/L	0.0317	0.0290	0.0163	9585959	0.0302	0.0000020	9585959
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	9585959	<0.00020	0.00020	9585959
Total Zinc (Zn)	mg/L	0.137	0.130	0.150	9585959	0.150	0.00010	9585959
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	9585959	<0.00010	0.00010	9585959
Total Calcium (Ca)	mg/L	99.5	98.3	105	9582662	93.9	0.050	9583217

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6367	WL6368	WL6369		WL6370		
Sampling Date		2019/09/09 09:05	2019/09/09 08:35	2019/09/09 08:05		2019/09/09 09:10		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		BBY FCD-00077/05		
	UNITS	2A	2B	2C	QC Batch	3A	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.7	16.3	17.2	9582662	16.9	0.050	9583217
Total Potassium (K)	mg/L	3.82	3.88	4.05	9582662	4.05	0.050	9583217
Total Sodium (Na)	mg/L	25.7	25.9	28.3	9582662	26.1	0.050	9583217
Total Sulphur (S)	mg/L	85.1	84.0	87.8	9582662	87.1	3.0	9583217
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6371	WL6372	WL6373	WL6374		
Sampling Date		2019/09/09 08:40	2019/09/09 08:10	2019/09/09 10:05	2019/09/09 09:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	3B	3C	INFLUENT TANK 47	4A	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	311	330	324	327	0.50	9583184
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00671	0.00226	0.0407	0.0119	0.00050	9585959
Total Antimony (Sb)	mg/L	0.0199	0.0206	0.0208	0.0200	0.000020	9585959
Total Arsenic (As)	mg/L	0.0580	0.0526	0.0620	0.0592	0.000020	9585959
Total Barium (Ba)	mg/L	0.0560	0.0565	0.0562	0.0552	0.000020	9585959
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9585959
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585959
Total Boron (B)	mg/L	0.026	0.031	0.037	0.027	0.010	9585959
Total Cadmium (Cd)	mg/L	0.000882	0.000558	0.00199	0.00126	0.0000050	9585959
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00013	<0.00010	0.00010	9585959
Total Cobalt (Co)	mg/L	0.0000909	0.0000430	0.00270	0.000584	0.0000050	9585959
Total Copper (Cu)	mg/L	0.00577	0.00290	0.0256	0.00839	0.000050	9585959
Total Iron (Fe)	mg/L	0.0068	0.0044	0.0186	0.0136	0.0010	9585959
Total Lead (Pb)	mg/L	0.000941	0.000265	0.0216	0.00212	0.0000050	9585959
Total Lithium (Li)	mg/L	0.0114	0.0117	0.0116	0.0116	0.00050	9585959
Total Manganese (Mn)	mg/L	0.00233	0.00235	0.0546	0.0161	0.000050	9585959
Total Molybdenum (Mo)	mg/L	0.00163	0.00148	0.00157	0.00156	0.000050	9585959
Total Nickel (Ni)	mg/L	0.00665	0.00651	0.00782	0.00724	0.000020	9585959
Total Selenium (Se)	mg/L	0.00745	0.00734	0.00773	0.00747	0.000040	9585959
Total Silicon (Si)	mg/L	0.611	0.642	0.701	0.664	0.050	9585959
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585959
Total Strontium (Sr)	mg/L	0.578	0.601	0.589	0.601	0.000050	9585959
Total Thallium (Tl)	mg/L	0.0000030	0.0000022	0.0000026	0.0000024	0.0000020	9585959
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585959
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9585959
Total Uranium (U)	mg/L	0.0295	0.0185	0.0282	0.0273	0.0000020	9585959
Total Vanadium (V)	mg/L	0.00024	<0.00020	0.00023	<0.00020	0.00020	9585959
Total Zinc (Zn)	mg/L	0.129	0.134	0.162	0.127	0.00010	9585959
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585959
Total Calcium (Ca)	mg/L	98.3	104	102	103	0.050	9583217

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6371	WL6372	WL6373	WL6374		
Sampling Date		2019/09/09 08:40	2019/09/09 08:10	2019/09/09 10:05	2019/09/09 09:15		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	3B	3C	INFLUENT TANK 47	4A	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.0	16.9	16.7	17.1	0.050	9583217
Total Potassium (K)	mg/L	4.02	3.81	3.79	3.90	0.050	9583217
Total Sodium (Na)	mg/L	25.2	25.9	25.7	26.4	0.050	9583217
Total Sulphur (S)	mg/L	83.4	86.3	85.0	87.0	3.0	9583217
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B975892
Report Date: 2019/09/18ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WL6375	WL6376	WL6377	WL6378		
Sampling Date		2019/09/09 08:45	2019/09/09 08:15	2019/09/09 09:20	2019/09/09 08:50		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4B	4C	5A	5B	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	341	342	323	322	0.50	9583184
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00948	0.00250	0.00848	0.00596	0.00050	9585959
Total Antimony (Sb)	mg/L	0.0180	0.0147	0.0219	0.0196	0.000020	9585959
Total Arsenic (As)	mg/L	0.0453	0.0261	0.0563	0.0341	0.000020	9585959
Total Barium (Ba)	mg/L	0.0583	0.0589	0.0570	0.0563	0.000020	9585959
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9585959
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585959
Total Boron (B)	mg/L	0.024	0.010	0.028	0.020	0.010	9585959
Total Cadmium (Cd)	mg/L	0.000503	0.000151	0.00147	0.000575	0.0000050	9585959
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585959
Total Cobalt (Co)	mg/L	0.000209	0.0000465	0.00158	0.000655	0.0000050	9585959
Total Copper (Cu)	mg/L	0.00461	0.00166	0.00817	0.00455	0.000050	9585959
Total Iron (Fe)	mg/L	0.0347	0.0106	0.0059	0.0214	0.0010	9585959
Total Lead (Pb)	mg/L	0.000728	0.000152	0.00128	0.000847	0.0000050	9585959
Total Lithium (Li)	mg/L	0.0120	0.0123	0.0119	0.0118	0.00050	9585959
Total Manganese (Mn)	mg/L	0.0319	0.0115	0.0398	0.0388	0.000050	9585959
Total Molybdenum (Mo)	mg/L	0.00140	0.000958	0.00164	0.00131	0.000050	9585959
Total Nickel (Ni)	mg/L	0.00753	0.00502	0.00789	0.00643	0.000020	9585959
Total Selenium (Se)	mg/L	0.00617	0.00415	0.00761	0.00496	0.000040	9585959
Total Silicon (Si)	mg/L	0.698	0.714	0.655	0.682	0.050	9585959
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585959
Total Strontium (Sr)	mg/L	0.637	0.624	0.604	0.597	0.000050	9585959
Total Thallium (Tl)	mg/L	0.0000021	<0.0000020	0.0000026	<0.0000020	0.0000020	9585959
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585959
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9585959
Total Uranium (U)	mg/L	0.0186	0.00783	0.0276	0.0139	0.0000020	9585959
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00024	<0.00020	0.00020	9585959
Total Zinc (Zn)	mg/L	0.102	0.0537	0.146	0.0782	0.00010	9585959
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585959
Total Calcium (Ca)	mg/L	106	108	102	102	0.050	9583217

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6375	WL6376	WL6377	WL6378		
Sampling Date		2019/09/09 08:45	2019/09/09 08:15	2019/09/09 09:20	2019/09/09 08:50		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	4B	4C	5A	5B	RDL	QC Batch
Total Magnesium (Mg)	mg/L	18.4	17.5	16.7	16.6	0.050	9583217
Total Potassium (K)	mg/L	4.20	3.56	3.82	3.67	0.050	9583217
Total Sodium (Na)	mg/L	28.5	28.7	25.9	26.3	0.050	9583217
Total Sulphur (S)	mg/L	92.8	90.4	85.5	83.9	3.0	9583217
RDL = Reportable Detection Limit							



BUREAU
VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6379	WL6380	WL6381	WL6382		
Sampling Date		2019/09/09 08:20	2019/09/09 09:25	2019/09/09 08:55	2019/09/09 08:25		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	5C	6A	6B	6C	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	328	327	328	331	0.50	9583184
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00245	0.0134	0.00597	0.00149	0.00050	9585959
Total Antimony (Sb)	mg/L	0.0146	0.0204	0.0202	0.0164	0.000020	9585959
Total Arsenic (As)	mg/L	0.0176	0.0595	0.0408	0.0255	0.000020	9585959
Total Barium (Ba)	mg/L	0.0566	0.0562	0.0574	0.0570	0.000020	9585959
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9585959
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585959
Total Boron (B)	mg/L	<0.010	0.026	0.025	0.012	0.010	9585959
Total Cadmium (Cd)	mg/L	0.000328	0.00118	0.000323	0.0000741	0.0000050	9585959
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585959
Total Cobalt (Co)	mg/L	0.000354	0.00124	0.000251	0.0000496	0.0000050	9585959
Total Copper (Cu)	mg/L	0.00266	0.00929	0.00432	0.00205	0.000050	9585959
Total Iron (Fe)	mg/L	0.0536	0.0106	0.0126	0.0148	0.0010	9585959
Total Lead (Pb)	mg/L	0.000486	0.00212	0.000591	0.000160	0.0000050	9585959
Total Lithium (Li)	mg/L	0.0116	0.0118	0.0122	0.0119	0.00050	9585959
Total Manganese (Mn)	mg/L	0.0432	0.0266	0.0129	0.00948	0.000050	9585959
Total Molybdenum (Mo)	mg/L	0.00103	0.00157	0.00139	0.00109	0.000050	9585959
Total Nickel (Ni)	mg/L	0.00450	0.00730	0.00604	0.00409	0.000020	9585959
Total Selenium (Se)	mg/L	0.00275	0.00768	0.00607	0.00454	0.000040	9585959
Total Silicon (Si)	mg/L	0.702	0.670	0.680	0.675	0.050	9585959
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9585959
Total Strontium (Sr)	mg/L	0.593	0.605	0.619	0.608	0.000050	9585959
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	<0.0000020	<0.0000020	0.0000020	9585959
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9585959
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9585959
Total Uranium (U)	mg/L	0.00571	0.0284	0.0173	0.00726	0.0000020	9585959
Total Vanadium (V)	mg/L	<0.00020	0.00025	<0.00020	<0.00020	0.00020	9585959
Total Zinc (Zn)	mg/L	0.0350	0.127	0.0716	0.0299	0.00010	9585959
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9585959
Total Calcium (Ca)	mg/L	104	103	103	105	0.050	9583217

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL6379	WL6380	WL6381	WL6382		
Sampling Date		2019/09/09 08:20	2019/09/09 09:25	2019/09/09 08:55	2019/09/09 08:25		
COC Number		BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05	BBY FCD-00077/05		
	UNITS	5C	6A	6B	6C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.7	17.1	17.0	17.0	0.050	9583217
Total Potassium (K)	mg/L	3.35	3.83	3.83	3.46	0.050	9583217
Total Sodium (Na)	mg/L	27.2	26.4	26.5	26.0	0.050	9583217
Total Sulphur (S)	mg/L	83.8	88.1	88.5	86.2	3.0	9583217
RDL = Reportable Detection Limit							



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BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6363
Sample ID: INFLUENT TANK 46
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585528	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/13	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585531	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6363 Dup
Sample ID: INFLUENT TANK 46
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/13	Vanessa Chan

BV Labs ID: WL6364
Sample ID: 1A
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/13	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac



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VERITAS

BV Labs Job #: B975892

Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6365

Sample ID: 1B

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585528	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9585781	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585531	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6366

Sample ID: 1C

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/12	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings

BV Labs ID: WL6367

Sample ID: 2A

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9583915	N/A	2019/09/11	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk



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VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6367
Sample ID: 2A
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Report Automation Engine
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6368
Sample ID: 2B
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/12	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9585781	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings

BV Labs ID: WL6368 Dup
Sample ID: 2B
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride/Sulphate by Auto Colourimetry	KONE	9585781	N/A	2019/09/12	Serena Tian

BV Labs ID: WL6369
Sample ID: 2C
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/12	Taylor Mullings



BUREAU
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BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6369
Sample ID: 2C
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Report Automation Engine
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9582662	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings

BV Labs ID: WL6369 Dup
Sample ID: 2C
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton

BV Labs ID: WL6370
Sample ID: 3A
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac



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BV Labs Job #: B975892

Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6371

Sample ID: 3B

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9582661	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6372

Sample ID: 3C

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9582660	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6373

Sample ID: INFLUENT TANK 47

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9584004	N/A	2019/09/12	Taylor Mullings
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk



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VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6373
Sample ID: INFLUENT TANK 47
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9584008	N/A	2019/09/11	Taylor Mullings

BV Labs ID: WL6374
Sample ID: 4A
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9583915	N/A	2019/09/11	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Report Automation Engine
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6375
Sample ID: 4B
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6375
Sample ID: 4B
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6376
Sample ID: 4C
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585528	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585531	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6377
Sample ID: 5A
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9583915	N/A	2019/09/11	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6377
Sample ID: 5A
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6378
Sample ID: 5B
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585528	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585531	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6379
Sample ID: 5C
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585528	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9584230	N/A	2019/09/12	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/12	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584185	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585531	N/A	2019/09/12	Ilonka Kovac



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VERITAS

BV Labs Job #: B975892

Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6380

Sample ID: 6A

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9583915	N/A	2019/09/11	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6381

Sample ID: 6B

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9583915	N/A	2019/09/11	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9585971	N/A	2019/09/13	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Report Automation Engine
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Report Automation Engine
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6381 Dup

Sample ID: 6B

Matrix: Water

Collected: 2019/09/09

Shipped:

Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac



BUREAU
VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL6382
Sample ID: 6C
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH	AT/ALK	9585298	N/A	2019/09/12	Ilonka Kovac
Chloride/Sulphate by Auto Colourimetry	KONE	9583915	N/A	2019/09/11	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9583184	N/A	2019/09/13	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9583207	N/A	2019/09/13	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Ghayasuddin Khan
Ion Balance	CALC	9583197	N/A	2019/09/11	Automated Statchk
Sum of cations, anions	CALC	9583212	N/A	2019/09/13	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9583213	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9592339	N/A	2019/09/18	Adnan Dzebic
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9583217	N/A	2019/09/13	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9585959	N/A	2019/09/12	Vanessa Chan
Nitrate and Nitrite	CALC	9583187	N/A	2019/09/12	Automated Statchk
Nitrate + Nitrite-N (calculated)	CALC	9583190	N/A	2019/09/12	Automated Statchk
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton
pH @25°C	AT/ALK	9585301	N/A	2019/09/12	Ilonka Kovac

BV Labs ID: WL6382 Dup
Sample ID: 6C
Matrix: Water

Collected: 2019/09/09
Shipped:
Received: 2019/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) by IC	IC/UV	9584178	N/A	2019/09/12	Kathleen Dalton



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	19.0°C
Package 2	5.3°C
Package 3	4.3°C

Sample WL6370, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample WL6382, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B975892
Report Date: 2019/09/18

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9583915	Dissolved Chloride (Cl)	2019/09/11	108	80 - 120	103	80 - 120	<1.0	mg/L	14	20
9583915	Dissolved Sulphate (SO4)	2019/09/11	NC	80 - 120	97	80 - 120	<1.0	mg/L	1.8	20
9584004	Alkalinity (PP as CaCO3)	2019/09/11					<1.0	mg/L	6.7	20
9584004	Alkalinity (Total as CaCO3)	2019/09/11			92	80 - 120	<1.0	mg/L	0.091	20
9584004	Bicarbonate (HCO3)	2019/09/11					<1.0	mg/L	0.37	20
9584004	Carbonate (CO3)	2019/09/11					<1.0	mg/L	6.7	20
9584004	Hydroxide (OH)	2019/09/11					<1.0	mg/L	NC	20
9584008	pH	2019/09/11			100	97 - 103			0.059	N/A
9584178	Dissolved Nitrate (N)	2019/09/12	101	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
9584178	Dissolved Nitrite (N)	2019/09/12	99	80 - 120	104	80 - 120	<0.010	mg/L	NC	20
9584185	Dissolved Nitrate (N)	2019/09/12	100	80 - 120	102	80 - 120	<0.010	mg/L	0.31	20
9584185	Dissolved Nitrite (N)	2019/09/12	99	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
9584230	Dissolved Chloride (Cl)	2019/09/12	NC	80 - 120	103	80 - 120	<1.0	mg/L	2.9	20
9584230	Dissolved Sulphate (SO4)	2019/09/12	NC	80 - 120	101	80 - 120	<1.0	mg/L	3.3	20
9585298	Alkalinity (PP as CaCO3)	2019/09/12					<1.0	mg/L	NC	20
9585298	Alkalinity (Total as CaCO3)	2019/09/12			91	80 - 120	<1.0	mg/L	2.8	20
9585298	Bicarbonate (HCO3)	2019/09/12					<1.0	mg/L	2.8	20
9585298	Carbonate (CO3)	2019/09/12					<1.0	mg/L	NC	20
9585298	Hydroxide (OH)	2019/09/12					<1.0	mg/L	NC	20
9585301	pH	2019/09/12			100	97 - 103			0.25	N/A
9585528	Alkalinity (PP as CaCO3)	2019/09/12					<1.0	mg/L	2.7	20
9585528	Alkalinity (Total as CaCO3)	2019/09/12			91	80 - 120	<1.0	mg/L	9.9	20
9585528	Bicarbonate (HCO3)	2019/09/12					<1.0	mg/L	10	20
9585528	Carbonate (CO3)	2019/09/12					<1.0	mg/L	2.7	20
9585528	Hydroxide (OH)	2019/09/12					<1.0	mg/L	NC	20
9585531	pH	2019/09/12			100	97 - 103			0.032	N/A
9585781	Dissolved Chloride (Cl)	2019/09/12	NC	80 - 120	103	80 - 120	<1.0	mg/L	0.36	20
9585781	Dissolved Sulphate (SO4)	2019/09/12	NC	80 - 120	102	80 - 120	<1.0	mg/L	0.79	20
9585959	Total Aluminum (Al)	2019/09/13	99	80 - 120	99	80 - 120	<0.00050	mg/L	6.1	20
9585959	Total Antimony (Sb)	2019/09/13	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.28	20
9585959	Total Arsenic (As)	2019/09/13	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.52	20
9585959	Total Barium (Ba)	2019/09/13	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.67	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9585959	Total Beryllium (Be)	2019/09/13	99	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9585959	Total Bismuth (Bi)	2019/09/13	98	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9585959	Total Boron (B)	2019/09/13	99	80 - 120	102	80 - 120	<0.010	mg/L	0.42	20
9585959	Total Cadmium (Cd)	2019/09/13	100	80 - 120	102	80 - 120	<0.0000050	mg/L	0.19	20
9585959	Total Chromium (Cr)	2019/09/13	98	80 - 120	102	80 - 120	<0.000010	mg/L	9.2	20
9585959	Total Cobalt (Co)	2019/09/13	95	80 - 120	103	80 - 120	<0.0000050	mg/L	0.36	20
9585959	Total Copper (Cu)	2019/09/13	82	80 - 120	102	80 - 120	<0.000050	mg/L	0.39	20
9585959	Total Iron (Fe)	2019/09/13	98	80 - 120	107	80 - 120	<0.0010	mg/L	2.6	20
9585959	Total Lead (Pb)	2019/09/13	101	80 - 120	102	80 - 120	<0.0000050	mg/L	0.46	20
9585959	Total Lithium (Li)	2019/09/13	98	80 - 120	102	80 - 120	<0.00050	mg/L	0.82	20
9585959	Total Manganese (Mn)	2019/09/13	NC	80 - 120	104	80 - 120	<0.000050	mg/L	0.77	20
9585959	Total Molybdenum (Mo)	2019/09/13	106	80 - 120	101	80 - 120	<0.000050	mg/L	1.7	20
9585959	Total Nickel (Ni)	2019/09/13	90	80 - 120	104	80 - 120	<0.000020	mg/L	2.1	20
9585959	Total Selenium (Se)	2019/09/13	108	80 - 120	107	80 - 120	<0.000040	mg/L	0.50	20
9585959	Total Silicon (Si)	2019/09/13	97	80 - 120	99	80 - 120	<0.050	mg/L	0.54	20
9585959	Total Silver (Ag)	2019/09/13	98	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9585959	Total Strontium (Sr)	2019/09/13	NC	80 - 120	102	80 - 120	<0.000050	mg/L	0.27	20
9585959	Total Thallium (Tl)	2019/09/13	101	80 - 120	101	80 - 120	<0.0000020	mg/L	5.4	20
9585959	Total Tin (Sn)	2019/09/13	100	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9585959	Total Titanium (Ti)	2019/09/13	97	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9585959	Total Uranium (U)	2019/09/13	101	80 - 120	103	80 - 120	<0.0000020	mg/L	0.12	20
9585959	Total Vanadium (V)	2019/09/13	99	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9585959	Total Zinc (Zn)	2019/09/13	NC	80 - 120	106	80 - 120	<0.00010	mg/L	0.37	20
9585959	Total Zirconium (Zr)	2019/09/13	104	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9585971	Dissolved Aluminum (Al)	2019/09/13	96	80 - 120	100	80 - 120	<0.00050	mg/L	1.9	20
9585971	Dissolved Antimony (Sb)	2019/09/13	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.15	20
9585971	Dissolved Arsenic (As)	2019/09/13	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.049	20
9585971	Dissolved Barium (Ba)	2019/09/13	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.85	20
9585971	Dissolved Beryllium (Be)	2019/09/13	93	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
9585971	Dissolved Bismuth (Bi)	2019/09/13	95	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9585971	Dissolved Boron (B)	2019/09/13	93	80 - 120	94	80 - 120	<0.010	mg/L	0.25	20
9585971	Dissolved Cadmium (Cd)	2019/09/13	94	80 - 120	98	80 - 120	<0.0000050	mg/L	0.99	20



BV Labs Job #: B975892
Report Date: 2019/09/18

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9585971	Dissolved Chromium (Cr)	2019/09/13	93	80 - 120	98	80 - 120	<0.00010	mg/L	7.5	20
9585971	Dissolved Cobalt (Co)	2019/09/13	91	80 - 120	98	80 - 120	<0.0000050	mg/L	0.36	20
9585971	Dissolved Copper (Cu)	2019/09/13	85	80 - 120	96	80 - 120	<0.000050	mg/L	0.12	20
9585971	Dissolved Iron (Fe)	2019/09/13	98	80 - 120	102	80 - 120	<0.0010	mg/L	0.50	20
9585971	Dissolved Lead (Pb)	2019/09/13	100	80 - 120	105	80 - 120	<0.0000050	mg/L	0.50	20
9585971	Dissolved Lithium (Li)	2019/09/13	98	80 - 120	101	80 - 120	<0.00050	mg/L	0.39	20
9585971	Dissolved Manganese (Mn)	2019/09/13	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.13	20
9585971	Dissolved Molybdenum (Mo)	2019/09/13	106	80 - 120	101	80 - 120	<0.000050	mg/L	1.3	20
9585971	Dissolved Nickel (Ni)	2019/09/13	90	80 - 120	100	80 - 120	<0.000020	mg/L	0.70	20
9585971	Dissolved Selenium (Se)	2019/09/13	102	80 - 120	98	80 - 120	<0.000040	mg/L	0.47	20
9585971	Dissolved Silicon (Si)	2019/09/13	101	80 - 120	104	80 - 120	<0.050	mg/L	1.2	20
9585971	Dissolved Silver (Ag)	2019/09/13	93	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9585971	Dissolved Strontium (Sr)	2019/09/13	NC	80 - 120	97	80 - 120	<0.000050	mg/L	1.6	20
9585971	Dissolved Thallium (Tl)	2019/09/13	100	80 - 120	102	80 - 120	<0.0000020	mg/L	12	20
9585971	Dissolved Tin (Sn)	2019/09/13	95	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9585971	Dissolved Titanium (Ti)	2019/09/13	97	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9585971	Dissolved Uranium (U)	2019/09/13	104	80 - 120	103	80 - 120	<0.0000020	mg/L	2.5	20
9585971	Dissolved Vanadium (V)	2019/09/13	98	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9585971	Dissolved Zinc (Zn)	2019/09/13	NC	80 - 120	101	80 - 120	<0.00010	mg/L	0.30	20
9585971	Dissolved Zirconium (Zr)	2019/09/13	106	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9592339	Dissolved Aluminum (Al)	2019/09/18			101	80 - 120	<0.00050	mg/L		
9592339	Dissolved Iron (Fe)	2019/09/18			105	80 - 120	<0.0010	mg/L		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

BV Labs Job #: B975892
Report Date: 2019/09/18

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5, Toll Free (800) 665-8566

COC #:

BBV FCD-00077/05

Page 1 of 1

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required			
Company Name: BMC MINERALS LTD. Contact Name: Mary Mioska; Renate Vanderhorst Address: 530-1130 WEST PENDER ST Vancouver, BC PC V6E 4A4 Phone: (867) 668-6463 Email: mmioska@alexcocenvy.com				Company Name: ALECO ENVIRONMENTAL Contact Name: Mary Mioska; Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC V1A 2V3 Phone: (867) 668-6463 Email: mvanderhorst@alexcocenvy.com				Quotation #: B60751 P.O. #/AF#: Project #: BMC-18-02 Site Location: Kudzi Ze Kayah Site #: Sampled By:				☒ Regular TAT 5 days (Most analyses) ☐ Rush TAT (Surcharges will be applied) Same Day ☐ 2 Days 1 Day ☐ 3 Days			
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485				Analysis Requested				Rush Confirmation #:			
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM				Sample Identification				Lab Identification				Date Sampled (YYYY/MM/DD)			
Time (HH:MM)				Matrix				Low Level Dissolved Metals				Low Level Total Metals			
Anions (SO4, NO2, NO3, Cl)				Alkalinity				# OF CONTAINERS SUBMITTED				HOLD - DO NOT ANALYZE			
COMMENTS				LABORATORY USE ONLY				COOLER TEMPERATURES				COOLING MEDIA TEMPERATURE			
1 Influent Tank 47				09-Sep-19 10:05				Water				5, 5.7, 4.1, 1.3			
2 4A				09-Sep-19 9:15				Water				metals field filtered			
3 4B				09-Sep-19 8:45				Water				metals field filtered			
4 4C				09-Sep-19 8:15				Water				metals field filtered			
5 5A				09-Sep-19 9:20				Water				metals field filtered			
6 5B				09-Sep-19 8:50				Water				metals field filtered			
7 5C				09-Sep-19 8:20				Water				metals field filtered			
8 6A				09-Sep-19 9:25				Water				metals field filtered			
9 6B				09-Sep-19 8:55				Water				metals field filtered			
10 6C				09-Sep-19 8:25				Water				metals field filtered			
RELIQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)				RECEIVED BY: (Signature/Print)			
DATE: (YYYY/MM/DD)				TIME: (HH:MM)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)			

09-Sep-19 12:50
Safam Maiter
B975892



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 2, 2 of 2

Attention: ACCOUNTS PAYABLE

BMC MINERAL (NO. 1) LTD.
 750 - 789 West Pender Street,
 Vancouver, BC
 CANADA V6C 1H2

Report Date: 2019/09/19
 Report #: R2783524
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B976638

Received: 2019/09/12, 09:00

Sample Matrix: Water
 # Samples Received: 20

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	20	N/A	2019/09/13	AB SOP-00005	SM 23 2320 B m
Low level chloride/sulphate by AC	16	N/A	2019/09/13	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC	4	N/A	2019/09/17	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1, 2)	20	N/A	2019/09/17	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	20	N/A	2019/09/17	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	20	N/A	2019/09/17		Auto Calc
Ion Balance	16	N/A	2019/09/13		Auto Calc
Ion Balance	4	N/A	2019/09/16		Auto Calc
Sum of cations, anions	20	N/A	2019/09/17		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	20	N/A	2019/09/17	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	20	N/A	2019/09/16	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	3	2019/09/17	2019/09/17	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	20	N/A	2019/09/17	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	17	N/A	2019/09/16	BBY7SOP-00002	EPA 6020b R2 m
Nitrate and Nitrite - Low Level	20	N/A	2019/09/17		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	20	N/A	2019/09/17		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	20	N/A	2019/09/14	AB SOP-00023	SM 23 4110 B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 2, 2 of 2

Attention: ACCOUNTS PAYABLE

BMC MINERAL (NO. 1) LTD.
750 - 789 West Pender Street,
Vancouver, BC
CANADA V6C 1H2

Report Date: 2019/09/19
Report #: R2783524
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B976638

Received: 2019/09/12, 09:00

BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL9970	WL9971		WL9972		WL9973	WL9974		
Sampling Date		2019/09/11 10:00	2019/09/11 09:00		2019/09/11 08:30		2019/09/11 08:00	2019/09/11 09:05		
COC Number		1 of 2	1 of 2		1 of 2		1 of 2	1 of 2		
	UNITS	INFLUENT TANK 50	1A	QC Batch	1B	QC Batch	1C	2A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.9	7.7	9585597	7.8	9585597	8.0	7.8	N/A	9585597
Cation Sum	meq/L	7.6	7.7	9585597	7.8	9585597	7.8	7.7	N/A	9585597
Ion Balance	N/A	0.97	1.0	9591170	1.0	9591178	0.98	0.99	0.010	9591178
Ion Balance (% Difference)	%	1.4	0.10	9585596	0.021	9585596	1.0	0.78	N/A	9585596
Dissolved Nitrate (NO3)	mg/L	2.1	2.4	9585411	2.5	9585411	2.1	1.2	0.013	9585411
Nitrate plus Nitrite (N)	mg/L	0.79	0.81	9585412	0.74	9585412	0.55	0.33	0.0042	9585412
Dissolved Nitrite (NO2)	mg/L	1.1	0.91	9585411	0.61	9585411	0.23	0.19	0.0099	9585411

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	51.3	51.4	9587236	54.2	9587236	56.2	57.7	0.50	9587236
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	9587236	<0.50	9587236	<0.50	<0.50	0.50	9587236
Bicarbonate (HCO3)	mg/L	62.6	62.7	9587236	66.1	9587236	68.6	70.3	0.50	9587236
Carbonate (CO3)	mg/L	<0.50	<0.50	9587236	<0.50	9587236	<0.50	<0.50	0.50	9587236
Hydroxide (OH)	mg/L	<0.50	<0.50	9587236	<0.50	9587236	<0.50	<0.50	0.50	9587236

Anions

Dissolved Chloride (Cl)	mg/L	56	57	9587469	58	9587469	59	58	0.50	9591436
Dissolved Sulphate (SO4)	mg/L	250 (1)	240 (1)	9587469	240 (1)	9587469	250 (1)	240 (1)	1.0	9591436

Nutrients

Dissolved Nitrite (N)	mg/L	0.32	0.28	9586301	0.19	9586301	0.071	0.056	0.0030	9586301
Dissolved Nitrate (N)	mg/L	0.47	0.53	9586301	0.55	9586301	0.48	0.28	0.0030	9586301

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
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BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL9975		WL9976	WL9977	WL9978	WL9979		
Sampling Date		2019/09/11 08:35		2019/09/11 08:05	2019/09/11 09:10	2019/09/11 08:40	2019/09/11 08:10		
COC Number		1 of 2		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2B	QC Batch	2C	3A	3B	3C	RDL	QC Batch

Calculated Parameters									
Anion Sum	meq/L	8.0	9585597	7.9	7.7	7.7	7.9	N/A	9585597
Cation Sum	meq/L	7.7	9585597	8.0	7.8	7.7	7.8	N/A	9585597
Ion Balance	N/A	0.97	9591178	1.0	1.0	1.0	1.0	0.010	9591178
Ion Balance (% Difference)	%	1.7	9585596	0.80	0.19	0.18	0.18	N/A	9585596
Dissolved Nitrate (NO3)	mg/L	1.6	9585411	0.82	2.1	1.4	0.73	0.013	9585411
Nitrate plus Nitrite (N)	mg/L	0.38	9585412	0.19	0.77	0.47	0.20	0.0042	9585412
Dissolved Nitrite (NO2)	mg/L	0.088	9585411	0.033	1.0	0.48	0.11	0.0099	9585411
Misc. Inorganics									
Alkalinity (Total as CaCO3)	mg/L	56.4	9587236	58.9	51.0	52.5	57.7	0.50	9587236
Alkalinity (PP as CaCO3)	mg/L	<0.50	9587236	<0.50	<0.50	<0.50	<0.50	0.50	9587236
Bicarbonate (HCO3)	mg/L	68.8	9587236	71.9	62.3	64.0	70.4	0.50	9587236
Carbonate (CO3)	mg/L	<0.50	9587236	<0.50	<0.50	<0.50	<0.50	0.50	9587236
Hydroxide (OH)	mg/L	<0.50	9587236	<0.50	<0.50	<0.50	<0.50	0.50	9587236
Anions									
Dissolved Chloride (Cl)	mg/L	59	9591436	58	59	58	58	0.50	9587469
Dissolved Sulphate (SO4)	mg/L	250 (1)	9591436	240 (1)	240 (1)	240 (1)	240 (1)	1.0	9587469
Nutrients									
Dissolved Nitrite (N)	mg/L	0.027	9586301	0.0099	0.31	0.15	0.033	0.0030	9586301
Dissolved Nitrate (N)	mg/L	0.35	9586301	0.18	0.47	0.32	0.16	0.0030	9586301
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



BUREAU
VERITAS

BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL9980	WL9981		WL9982		WL9983		
Sampling Date		2019/09/11 10:05	2019/09/11 09:15		2019/09/11 08:45		2019/09/11 08:15		
COC Number		2 of 2	2 of 2		2 of 2		2 of 2		
	UNITS	INFLUENT TANK 51	4A	QC Batch	4B	QC Batch	4C	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	7.9	7.8	9585597	8.0	9585597	7.9	N/A	9585597
Cation Sum	meq/L	7.9	8.0	9585597	7.9	9585597	7.9	N/A	9585597
Ion Balance	N/A	1.0	1.0	9591178	0.99	9591178	0.99	0.010	9591178
Ion Balance (% Difference)	%	0.0080	0.95	9585596	0.63	9585596	0.33	N/A	9585596
Dissolved Nitrate (NO3)	mg/L	1.1	1.0	9585411	0.26	9585411	<0.013	0.013	9585411
Nitrate plus Nitrite (N)	mg/L	0.26	0.24	9585412	0.059	9585412	<0.0042	0.0042	9585412
Dissolved Nitrite (NO2)	mg/L	<0.0099	0.042	9585411	<0.0099	9585411	<0.0099	0.0099	9585411
Misc. Inorganics									
Alkalinity (Total as CaCO3)	mg/L	59.0	56.4	9587236	59.1	9587236	59.3	0.50	9587236
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	9587236	<0.50	9587236	<0.50	0.50	9587236
Bicarbonate (HCO3)	mg/L	72.0	68.9	9587236	72.1	9587236	72.4	0.50	9587236
Carbonate (CO3)	mg/L	<0.50	<0.50	9587236	<0.50	9587236	<0.50	0.50	9587236
Hydroxide (OH)	mg/L	<0.50	<0.50	9587236	<0.50	9587236	<0.50	0.50	9587236
Anions									
Dissolved Chloride (Cl)	mg/L	58	58	9587469	58	9591436	58	0.50	9587469
Dissolved Sulphate (SO4)	mg/L	240 (1)	240 (1)	9587469	250 (1)	9591436	240 (1)	1.0	9587469
Nutrients									
Dissolved Nitrite (N)	mg/L	<0.0030	0.013	9586301	<0.0030	9586301	<0.0030	0.0030	9586301
Dissolved Nitrate (N)	mg/L	0.26	0.23	9586301	0.059	9586301	<0.0030	0.0030	9586301
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WL9984	WL9985		WL9986	WL9987	WL9988	WL9989		
Sampling Date		2019/09/11 09:20	2019/09/11 08:50		2019/09/11 08:20	2019/09/11 09:25	2019/09/11 08:55	2019/09/11 08:25		
COC Number		2 of 2	2 of 2		2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	5A	5B	QC Batch	5C	6A	6B	6C	RDL	QC Batch

Calculated Parameters										
Anion Sum	meq/L	7.8	7.9	9585597	8.0	7.7	7.9	7.8	N/A	9585597
Cation Sum	meq/L	7.9	8.1	9585597	8.0	7.9	7.8	8.0	N/A	9585597
Ion Balance	N/A	1.0	1.0	9591178	1.0	1.0	0.99	1.0	0.010	9591180
Ion Balance (% Difference)	%	0.72	1.3	9585596	0.16	1.8	0.58	0.87	N/A	9585596
Dissolved Nitrate (NO3)	mg/L	0.85	0.064	9585411	<0.013	1.8	0.22	0.018	0.013	9585411
Nitrate plus Nitrite (N)	mg/L	0.21	0.014	9585412	<0.0042	0.68	0.077	<0.0042	0.0042	9585412
Dissolved Nitrite (NO2)	mg/L	0.073	<0.0099	9585411	<0.0099	0.93	0.088	<0.0099	0.0099	9585411

Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	55.2	58.0	9587236	62.4	53.4	59.1	58.9	0.50	9587236
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	9587236	<0.50	<0.50	<0.50	<0.50	0.50	9587236
Bicarbonate (HCO3)	mg/L	67.3	70.8	9587236	76.1	65.1	72.1	71.8	0.50	9587236
Carbonate (CO3)	mg/L	<0.50	<0.50	9587236	<0.50	<0.50	<0.50	<0.50	0.50	9587236
Hydroxide (OH)	mg/L	<0.50	<0.50	9587236	<0.50	<0.50	<0.50	<0.50	0.50	9587236

Anions										
Dissolved Chloride (Cl)	mg/L	57	57	9587469	57	55	58	57	0.50	9587469
Dissolved Sulphate (SO4)	mg/L	240 (1)	250 (1)	9587469	250 (1)	240 (1)	240 (1)	240 (1)	1.0	9587469

Nutrients										
Dissolved Nitrite (N)	mg/L	0.022	<0.0030	9586301	<0.0030	0.28	0.027	<0.0030	0.0030	9586301
Dissolved Nitrate (N)	mg/L	0.19	0.014	9586301	<0.0030	0.40	0.050	0.0041	0.0030	9586301

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

**ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

BV Labs ID		WL9981	WL9984	WL9985		
Sampling Date		2019/09/11 09:15	2019/09/11 09:20	2019/09/11 08:50		
COC Number		2 of 2	2 of 2	2 of 2		
	UNITS	4A	5A	5B	RDL	QC Batch
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.0164	0.0176	0.0054	0.0030	9591269
Total Antimony (Sb)	mg/L	0.0220	0.0225	0.0218	0.000020	9591269
Total Arsenic (As)	mg/L	0.0556	0.0552	0.0341	0.000020	9591269
Total Barium (Ba)	mg/L	0.0558	0.0551	0.0553	0.000050	9591269
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9591269
Total Bismuth (Bi)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9591269
Total Boron (B)	mg/L	0.035	0.034	0.025	0.010	9591269
Total Cadmium (Cd)	mg/L	0.00147	0.00157	0.000445	0.0000050	9591269
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9591269
Total Cobalt (Co)	mg/L	0.000802	0.00177	0.000403	0.000010	9591269
Total Copper (Cu)	mg/L	0.00989	0.0102	0.00498	0.00010	9591269
Total Iron (Fe)	mg/L	0.0133	0.0182	0.0170	0.0050	9591269
Total Lead (Pb)	mg/L	0.00376	0.00403	0.000721	0.000020	9591269
Total Lithium (Li)	mg/L	0.0104	0.0102	0.0107	0.00050	9591269
Total Manganese (Mn)	mg/L	0.0206	0.0432	0.0257	0.00010	9591269
Total Molybdenum (Mo)	mg/L	0.00158	0.00172	0.00140	0.000050	9591269
Total Nickel (Ni)	mg/L	0.00776	0.00826	0.00682	0.00010	9591269
Total Phosphorus (P)	mg/L	0.0072	0.0190	0.0231	0.0050	9591269
Total Selenium (Se)	mg/L	0.00720	0.00739	0.00511	0.000040	9591269
Total Silicon (Si)	mg/L	0.715	0.703	0.705	0.050	9591269
Total Silver (Ag)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9591269
Total Strontium (Sr)	mg/L	0.605	0.599	0.610	0.000050	9591269
Total Thallium (Tl)	mg/L	0.0000047	0.0000051	0.0000046	0.0000020	9591269
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9591269
Total Titanium (Ti)	mg/L	<0.0020	<0.0020	<0.0020	0.0020	9591269
Total Uranium (U)	mg/L	0.0264	0.0274	0.0137	0.0000050	9591269
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9591269
Total Zinc (Zn)	mg/L	0.146	0.156	0.0855	0.0010	9591269
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9591269
Total Sulphur (S)	mg/L	81.5	78.5	82.4	0.60	9591269
RDL = Reportable Detection Limit						

**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WL9970	WL9971	WL9972	WL9973		
Sampling Date		2019/09/11 10:00	2019/09/11 09:00	2019/09/11 08:30	2019/09/11 08:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	INFLUENT TANK 50	1A	1B	1C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	321	325	327	330	0.50	9585876
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0162	0.00967	0.00467	0.00155	0.00050	9587636
Dissolved Antimony (Sb)	mg/L	0.0194	0.0193	0.0199	0.0191	0.000020	9587636
Dissolved Arsenic (As)	mg/L	0.0602	0.0595	0.0581	0.0520	0.000020	9587636
Dissolved Barium (Ba)	mg/L	0.0549	0.0545	0.0570	0.0561	0.000020	9587636
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9587636
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Boron (B)	mg/L	0.034	0.034	0.033	0.034	0.010	9587636
Dissolved Cadmium (Cd)	mg/L	0.00190	0.00183	0.00155	0.00111	0.0000050	9587636
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	0.00013	<0.00010	0.00010	9587636
Dissolved Cobalt (Co)	mg/L	0.00258	0.00114	0.000149	0.0000558	0.0000050	9587636
Dissolved Copper (Cu)	mg/L	0.0223	0.0146	0.00674	0.00390	0.000050	9587636
Dissolved Iron (Fe)	mg/L	0.0029	0.0036	0.0030	0.0066	0.0010	9587636
Dissolved Lead (Pb)	mg/L	0.0185	0.00747	0.000624	0.000233	0.0000050	9587636
Dissolved Lithium (Li)	mg/L	0.0114	0.0111	0.0114	0.0112	0.00050	9587636
Dissolved Manganese (Mn)	mg/L	0.0518	0.0284	0.00458	0.00436	0.000050	9587636
Dissolved Molybdenum (Mo)	mg/L	0.00159	0.00158	0.00161	0.00144	0.000050	9587636
Dissolved Nickel (Ni)	mg/L	0.00765	0.00716	0.00717	0.00722	0.000020	9587636
Dissolved Selenium (Se)	mg/L	0.00731	0.00766	0.00771	0.00763	0.000040	9587636
Dissolved Silicon (Si)	mg/L	0.686	0.632	0.530	0.552	0.050	9587636
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Strontium (Sr)	mg/L	0.589	0.591	0.591	0.597	0.000050	9587636
Dissolved Thallium (Tl)	mg/L	0.0000036	0.0000032	0.0000039	0.0000037	0.0000020	9587636
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9587636
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9587636
Dissolved Uranium (U)	mg/L	0.0286	0.0281	0.0268	0.0171	0.0000020	9587636
Dissolved Vanadium (V)	mg/L	0.00024	<0.00020	0.00020	<0.00020	0.00020	9587636
Dissolved Zinc (Zn)	mg/L	0.158	0.155	0.153	0.167	0.00010	9587636
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9587636
Dissolved Calcium (Ca)	mg/L	102	103	103	105	0.050	9585877

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL9970	WL9971	WL9972	WL9973		
Sampling Date		2019/09/11 10:00	2019/09/11 09:00	2019/09/11 08:30	2019/09/11 08:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	INFLUENT TANK 50	1A	1B	1C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.3	16.2	16.7	16.5	0.050	9585877
Dissolved Potassium (K)	mg/L	3.67	3.67	3.82	3.86	0.050	9585877
Dissolved Sodium (Na)	mg/L	25.9	25.7	26.3	26.0	0.050	9585877
Dissolved Sulphur (S)	mg/L	85.7	83.4	86.3	86.3	3.0	9585877
RDL = Reportable Detection Limit							



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BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL9974	WL9975	WL9976	WL9977	WL9978		
Sampling Date		2019/09/11 09:05	2019/09/11 08:35	2019/09/11 08:05	2019/09/11 09:10	2019/09/11 08:40		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2A	2B	2C	3A	3B	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	322	322	334	326	324	0.50	9585876
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0106	0.00263	0.00257	0.00936	0.00390	0.00050	9587636
Dissolved Antimony (Sb)	mg/L	0.0197	0.0200	0.0194	0.0200	0.0199	0.000020	9587636
Dissolved Arsenic (As)	mg/L	0.0608	0.0584	0.0520	0.0613	0.0544	0.000020	9587636
Dissolved Barium (Ba)	mg/L	0.0567	0.0566	0.0571	0.0569	0.0564	0.000020	9587636
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9587636
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Boron (B)	mg/L	0.032	0.030	0.030	0.027	0.026	0.010	9587636
Dissolved Cadmium (Cd)	mg/L	0.00181	0.00123	0.000730	0.00176	0.00124	0.0000050	9587636
Dissolved Chromium (Cr)	mg/L	0.00011	<0.00010	<0.00010	0.00012	<0.00010	0.00010	9587636
Dissolved Cobalt (Co)	mg/L	0.00152	0.0000953	0.0000439	0.000924	0.000129	0.0000050	9587636
Dissolved Copper (Cu)	mg/L	0.0121	0.00456	0.00295	0.0127	0.00601	0.000050	9587636
Dissolved Iron (Fe)	mg/L	0.0029	0.0027	0.0057	0.0026	0.0025	0.0010	9587636
Dissolved Lead (Pb)	mg/L	0.00738	0.000589	0.000191	0.00278	0.000447	0.0000050	9587636
Dissolved Lithium (Li)	mg/L	0.0109	0.0111	0.0112	0.0110	0.0110	0.00050	9587636
Dissolved Manganese (Mn)	mg/L	0.0340	0.00282	0.00252	0.0220	0.00485	0.000050	9587636
Dissolved Molybdenum (Mo)	mg/L	0.00157	0.00163	0.00147	0.00167	0.00157	0.000050	9587636
Dissolved Nickel (Ni)	mg/L	0.00746	0.00674	0.00668	0.00747	0.00729	0.000020	9587636
Dissolved Selenium (Se)	mg/L	0.00747	0.00753	0.00710	0.00725	0.00707	0.000040	9587636
Dissolved Silicon (Si)	mg/L	0.566	0.572	0.531	0.626	0.591	0.050	9587636
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Strontium (Sr)	mg/L	0.600	0.601	0.619	0.600	0.594	0.000050	9587636
Dissolved Thallium (Tl)	mg/L	0.0000033	0.0000034	0.0000035	0.0000033	0.0000036	0.0000020	9587636
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9587636
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9587636
Dissolved Uranium (U)	mg/L	0.0299	0.0292	0.0204	0.0300	0.0249	0.0000020	9587636
Dissolved Vanadium (V)	mg/L	0.00025	<0.00020	0.00023	0.00026	0.00025	0.00020	9587636
Dissolved Zinc (Zn)	mg/L	0.148	0.135	0.136	0.153	0.153	0.00010	9587636
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9587636
Dissolved Calcium (Ca)	mg/L	102	102	106	103	103	0.050	9585877

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL9974	WL9975	WL9976	WL9977	WL9978		
Sampling Date		2019/09/11 09:05	2019/09/11 08:35	2019/09/11 08:05	2019/09/11 09:10	2019/09/11 08:40		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2A	2B	2C	3A	3B	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.2	16.3	16.9	16.6	16.4	0.050	9585877
Dissolved Potassium (K)	mg/L	3.83	3.86	4.03	3.85	4.03	0.050	9585877
Dissolved Sodium (Na)	mg/L	27.2	27.1	27.7	26.1	26.3	0.050	9585877
Dissolved Sulphur (S)	mg/L	79.8	85.4	81.7	78.8	79.0	3.0	9585877
RDL = Reportable Detection Limit								

**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WL9979	WL9980	WL9981	WL9982		
Sampling Date		2019/09/11 08:10	2019/09/11 10:05	2019/09/11 09:15	2019/09/11 08:45		
COC Number		1 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3C	INFLUENT TANK 51	4A	4B	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	331	328	333	330	0.50	9585876
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00115	0.0182	0.00823	0.00301	0.00050	9587636
Dissolved Antimony (Sb)	mg/L	0.0198	0.0197	0.0215	0.0196	0.000020	9587636
Dissolved Arsenic (As)	mg/L	0.0536	0.0602	0.0562	0.0425	0.000020	9587636
Dissolved Barium (Ba)	mg/L	0.0561	0.0561	0.0571	0.0559	0.000020	9587636
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9587636
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Boron (B)	mg/L	0.033	0.032	0.029	0.020	0.010	9587636
Dissolved Cadmium (Cd)	mg/L	0.000774	0.00192	0.00149	0.000613	0.0000050	9587636
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00011	<0.00010	<0.00010	0.00010	9587636
Dissolved Cobalt (Co)	mg/L	0.0000407	0.00270	0.000782	0.000146	0.0000050	9587636
Dissolved Copper (Cu)	mg/L	0.00319	0.0157	0.00893	0.00341	0.000050	9587636
Dissolved Iron (Fe)	mg/L	0.0025	0.0032	0.0026	0.0024	0.0010	9587636
Dissolved Lead (Pb)	mg/L	0.000183	0.0154	0.00199	0.000374	0.0000050	9587636
Dissolved Lithium (Li)	mg/L	0.0110	0.0112	0.0113	0.0111	0.00050	9587636
Dissolved Manganese (Mn)	mg/L	0.00295	0.0535	0.0202	0.00675	0.000050	9587636
Dissolved Molybdenum (Mo)	mg/L	0.00147	0.00163	0.00156	0.00134	0.000050	9587636
Dissolved Nickel (Ni)	mg/L	0.00751	0.00769	0.00764	0.00689	0.000020	9587636
Dissolved Selenium (Se)	mg/L	0.00713	0.00757	0.00729	0.00646	0.000040	9587636
Dissolved Silicon (Si)	mg/L	0.639	0.648	0.652	0.664	0.050	9587636
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Strontium (Sr)	mg/L	0.592	0.617	0.633	0.611	0.000050	9587636
Dissolved Thallium (Tl)	mg/L	0.0000028	0.0000033	0.0000027	<0.0000020	0.0000020	9587636
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9587636
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9587636
Dissolved Uranium (U)	mg/L	0.0153	0.0298	0.0279	0.0212	0.0000020	9587636
Dissolved Vanadium (V)	mg/L	0.00021	0.00029	0.00022	<0.00020	0.00020	9587636
Dissolved Zinc (Zn)	mg/L	0.161	0.155	0.144	0.109	0.00010	9587636
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9587636
Dissolved Calcium (Ca)	mg/L	105	104	106	105	0.050	9585877

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL9979	WL9980	WL9981	WL9982		
Sampling Date		2019/09/11 08:10	2019/09/11 10:05	2019/09/11 09:15	2019/09/11 08:45		
COC Number		1 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3C	INFLUENT TANK 51	4A	4B	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.5	16.7	16.5	16.5	0.050	9585877
Dissolved Potassium (K)	mg/L	4.01	3.80	3.80	3.62	0.050	9585877
Dissolved Sodium (Na)	mg/L	25.8	27.9	27.6	26.9	0.050	9585877
Dissolved Sulphur (S)	mg/L	79.2	80.2	80.2	82.9	3.0	9585877
RDL = Reportable Detection Limit							



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BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL9983	WL9984	WL9985	WL9986	WL9987		
Sampling Date		2019/09/11 08:15	2019/09/11 09:20	2019/09/11 08:50	2019/09/11 08:20	2019/09/11 09:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4C	5A	5B	5C	6A	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	332	332	341	337	334	0.50	9585876
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.00157	0.00917	0.00292	0.00190	0.00837	0.00050	9587636
Dissolved Antimony (Sb)	mg/L	0.0167	0.0221	0.0216	0.0175	0.0213	0.000020	9587636
Dissolved Arsenic (As)	mg/L	0.0296	0.0562	0.0341	0.0239	0.0589	0.000020	9587636
Dissolved Barium (Ba)	mg/L	0.0559	0.0577	0.0574	0.0574	0.0568	0.000020	9587636
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9587636
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Boron (B)	mg/L	<0.010	0.027	0.018	<0.010	0.025	0.010	9587636
Dissolved Cadmium (Cd)	mg/L	0.000175	0.00156	0.000400	0.000278	0.00132	0.0000050	9587636
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9587636
Dissolved Cobalt (Co)	mg/L	0.0000464	0.00167	0.000385	0.000316	0.00146	0.0000050	9587636
Dissolved Copper (Cu)	mg/L	0.00161	0.00869	0.00369	0.00290	0.00807	0.000050	9587636
Dissolved Iron (Fe)	mg/L	0.0054	0.0055	0.0078	0.0308	0.0049	0.0010	9587636
Dissolved Lead (Pb)	mg/L	0.000110	0.00207	0.000386	0.000315	0.00125	0.0000050	9587636
Dissolved Lithium (Li)	mg/L	0.0113	0.0112	0.0117	0.0115	0.0115	0.00050	9587636
Dissolved Manganese (Mn)	mg/L	0.00831	0.0394	0.0255	0.0311	0.0333	0.000050	9587636
Dissolved Molybdenum (Mo)	mg/L	0.00113	0.00164	0.00141	0.00124	0.00169	0.000050	9587636
Dissolved Nickel (Ni)	mg/L	0.00535	0.00773	0.00679	0.00537	0.00749	0.000020	9587636
Dissolved Selenium (Se)	mg/L	0.00496	0.00754	0.00544	0.00379	0.00753	0.000040	9587636
Dissolved Silicon (Si)	mg/L	0.688	0.661	0.687	0.680	0.692	0.050	9587636
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Strontium (Sr)	mg/L	0.617	0.627	0.626	0.627	0.609	0.000050	9587636
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000030	<0.0000020	<0.0000020	0.0000023	0.0000020	9587636
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9587636
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9587636
Dissolved Uranium (U)	mg/L	0.0104	0.0293	0.0152	0.00898	0.0295	0.0000020	9587636
Dissolved Vanadium (V)	mg/L	<0.00020	0.00030	<0.00020	<0.00020	0.00023	0.00020	9587636
Dissolved Zinc (Zn)	mg/L	0.0661	0.153	0.0838	0.0505	0.137	0.00010	9587636
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9587636
Dissolved Calcium (Ca)	mg/L	105	106	108	107	106	0.050	9585877

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL9983	WL9984	WL9985	WL9986	WL9987		
Sampling Date		2019/09/11 08:15	2019/09/11 09:20	2019/09/11 08:50	2019/09/11 08:20	2019/09/11 09:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4C	5A	5B	5C	6A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.8	16.5	17.2	17.1	17.0	0.050	9585877
Dissolved Potassium (K)	mg/L	3.26	3.77	3.54	3.44	3.82	0.050	9585877
Dissolved Sodium (Na)	mg/L	26.4	27.3	27.5	27.2	26.8	0.050	9585877
Dissolved Sulphur (S)	mg/L	86.0	78.0	84.0	80.7	82.2	3.0	9585877
RDL = Reportable Detection Limit								



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BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL9988	WL9989		
Sampling Date		2019/09/11 08:55	2019/09/11 08:25		
COC Number		2 of 2	2 of 2		
	UNITS	6B	6C	RDL	QC Batch

Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	329	336	0.50	9585876
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00244	0.00118	0.00050	9587636
Dissolved Antimony (Sb)	mg/L	0.0210	0.0179	0.000020	9587636
Dissolved Arsenic (As)	mg/L	0.0398	0.0312	0.000020	9587636
Dissolved Barium (Ba)	mg/L	0.0561	0.0578	0.000020	9587636
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9587636
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Boron (B)	mg/L	0.025	0.014	0.010	9587636
Dissolved Cadmium (Cd)	mg/L	0.000375	0.000121	0.0000050	9587636
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9587636
Dissolved Cobalt (Co)	mg/L	0.000258	0.0000721	0.0000050	9587636
Dissolved Copper (Cu)	mg/L	0.00365	0.00225	0.000050	9587636
Dissolved Iron (Fe)	mg/L	0.0055	0.0091	0.0010	9587636
Dissolved Lead (Pb)	mg/L	0.000283	0.000133	0.0000050	9587636
Dissolved Lithium (Li)	mg/L	0.0114	0.0113	0.00050	9587636
Dissolved Manganese (Mn)	mg/L	0.0157	0.0126	0.000050	9587636
Dissolved Molybdenum (Mo)	mg/L	0.00140	0.00122	0.000050	9587636
Dissolved Nickel (Ni)	mg/L	0.00644	0.00525	0.000020	9587636
Dissolved Selenium (Se)	mg/L	0.00572	0.00492	0.000040	9587636
Dissolved Silicon (Si)	mg/L	0.661	0.640	0.050	9587636
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9587636
Dissolved Strontium (Sr)	mg/L	0.604	0.622	0.000050	9587636
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9587636
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9587636
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9587636
Dissolved Uranium (U)	mg/L	0.0151	0.00904	0.0000020	9587636
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9587636
Dissolved Zinc (Zn)	mg/L	0.0853	0.0556	0.00010	9587636
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9587636
Dissolved Calcium (Ca)	mg/L	104	107	0.050	9585877

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WL9988	WL9989		
Sampling Date		2019/09/11 08:55	2019/09/11 08:25		
COC Number		2 of 2	2 of 2		
	UNITS	6B	6C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.8	17.0	0.050	9585877
Dissolved Potassium (K)	mg/L	3.60	3.73	0.050	9585877
Dissolved Sodium (Na)	mg/L	26.5	26.8	0.050	9585877
Dissolved Sulphur (S)	mg/L	81.8	80.5	3.0	9585877
RDL = Reportable Detection Limit					



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BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9970	WL9971	WL9972	WL9973		
Sampling Date		2019/09/11 10:00	2019/09/11 09:00	2019/09/11 08:30	2019/09/11 08:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	INFLUENT TANK 50	1A	1B	1C	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	318	324	318	322	0.50	9585940
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0260	0.0172	0.00811	0.00460	0.00050	9588177
Total Antimony (Sb)	mg/L	0.0191	0.0189	0.0189	0.0189	0.000020	9588177
Total Arsenic (As)	mg/L	0.0600	0.0580	0.0559	0.0510	0.000020	9588177
Total Barium (Ba)	mg/L	0.0550	0.0548	0.0542	0.0564	0.000020	9588177
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9588177
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9588177
Total Boron (B)	mg/L	0.032	0.032	0.030	0.032	0.010	9588177
Total Cadmium (Cd)	mg/L	0.00190	0.00174	0.00147	0.00108	0.0000050	9588177
Total Chromium (Cr)	mg/L	0.00014	0.00012	0.00010	<0.00010	0.00010	9588177
Total Cobalt (Co)	mg/L	0.00255	0.00116	0.000132	0.0000575	0.0000050	9588177
Total Copper (Cu)	mg/L	0.0227	0.0152	0.00671	0.00408	0.000050	9588177
Total Iron (Fe)	mg/L	0.0125	0.0090	0.0076	0.0107	0.0010	9588177
Total Lead (Pb)	mg/L	0.0202	0.00844	0.00111	0.000418	0.0000050	9588177
Total Lithium (Li)	mg/L	0.0112	0.0112	0.0109	0.0111	0.00050	9588177
Total Manganese (Mn)	mg/L	0.0510	0.0292	0.00460	0.00441	0.000050	9588177
Total Molybdenum (Mo)	mg/L	0.00154	0.00163	0.00156	0.00145	0.000050	9588177
Total Nickel (Ni)	mg/L	0.00732	0.00736	0.00681	0.00711	0.000020	9588177
Total Selenium (Se)	mg/L	0.00725	0.00721	0.00703	0.00723	0.000040	9588177
Total Silicon (Si)	mg/L	0.731	0.633	0.525	0.542	0.050	9588177
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9588177
Total Strontium (Sr)	mg/L	0.596	0.596	0.587	0.604	0.000050	9588177
Total Thallium (Tl)	mg/L	0.0000037	0.0000038	0.0000039	0.0000037	0.0000020	9588177
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9588177
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9588177
Total Uranium (U)	mg/L	0.0287	0.0283	0.0267	0.0173	0.0000020	9588177
Total Vanadium (V)	mg/L	0.00029	0.00029	0.00025	0.00022	0.00020	9588177
Total Zinc (Zn)	mg/L	0.151	0.151	0.140	0.159	0.00010	9588177
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9588177
Total Calcium (Ca)	mg/L	101	103	101	102	0.050	9585018

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9970	WL9971	WL9972	WL9973		
Sampling Date		2019/09/11 10:00	2019/09/11 09:00	2019/09/11 08:30	2019/09/11 08:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	INFLUENT TANK 50	1A	1B	1C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	15.8	16.2	15.6	16.2	0.050	9585018
Total Potassium (K)	mg/L	3.60	3.72	3.65	3.82	0.050	9585018
Total Sodium (Na)	mg/L	24.7	25.5	24.6	25.6	0.050	9585018
Total Sulphur (S)	mg/L	79.5	83.9	80.4	82.9	3.0	9585018
RDL = Reportable Detection Limit							



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BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9974	WL9975	WL9976	WL9977	WL9978		
Sampling Date		2019/09/11 09:05	2019/09/11 08:35	2019/09/11 08:05	2019/09/11 09:10	2019/09/11 08:40		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2A	2B	2C	3A	3B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	320	316	329	325	322	0.50	9585940
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0200	0.00734	0.00379	0.0141	0.00989	0.00050	9588177
Total Antimony (Sb)	mg/L	0.0201	0.0198	0.0193	0.0200	0.0202	0.000020	9588177
Total Arsenic (As)	mg/L	0.0605	0.0574	0.0512	0.0615	0.0560	0.000020	9588177
Total Barium (Ba)	mg/L	0.0567	0.0560	0.0568	0.0569	0.0571	0.000020	9588177
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9588177
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9588177
Total Boron (B)	mg/L	0.032	0.028	0.029	0.027	0.026	0.010	9588177
Total Cadmium (Cd)	mg/L	0.00178	0.00121	0.000721	0.00175	0.00120	0.0000050	9588177
Total Chromium (Cr)	mg/L	<0.00010	0.00010	<0.00010	0.00010	0.00011	0.00010	9588177
Total Cobalt (Co)	mg/L	0.00150	0.0000993	0.0000510	0.000934	0.000142	0.0000050	9588177
Total Copper (Cu)	mg/L	0.0124	0.00475	0.00312	0.0130	0.00653	0.000050	9588177
Total Iron (Fe)	mg/L	0.0107	0.0074	0.0082	0.0083	0.0088	0.0010	9588177
Total Lead (Pb)	mg/L	0.00994	0.00126	0.000369	0.00361	0.000848	0.0000050	9588177
Total Lithium (Li)	mg/L	0.0115	0.0110	0.0111	0.0111	0.0109	0.00050	9588177
Total Manganese (Mn)	mg/L	0.0342	0.00328	0.00267	0.0224	0.00521	0.000050	9588177
Total Molybdenum (Mo)	mg/L	0.00164	0.00158	0.00143	0.00168	0.00165	0.000050	9588177
Total Nickel (Ni)	mg/L	0.00723	0.00660	0.00645	0.00741	0.00747	0.000020	9588177
Total Selenium (Se)	mg/L	0.00736	0.00730	0.00689	0.00745	0.00731	0.000040	9588177
Total Silicon (Si)	mg/L	0.619	0.573	0.556	0.675	0.634	0.050	9588177
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9588177
Total Strontium (Sr)	mg/L	0.606	0.598	0.618	0.596	0.591	0.000050	9588177
Total Thallium (Tl)	mg/L	0.0000034	0.0000037	0.0000031	0.0000033	0.0000027	0.0000020	9588177
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9588177
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9588177
Total Uranium (U)	mg/L	0.0306	0.0292	0.0203	0.0300	0.0253	0.0000020	9588177
Total Vanadium (V)	mg/L	0.00032	0.00024	0.00023	0.00027	0.00028	0.00020	9588177
Total Zinc (Zn)	mg/L	0.141	0.129	0.129	0.144	0.149	0.00010	9588177
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9588177
Total Calcium (Ca)	mg/L	102	100	105	104	102	0.050	9585018

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9974	WL9975	WL9976	WL9977	WL9978		
Sampling Date		2019/09/11 09:05	2019/09/11 08:35	2019/09/11 08:05	2019/09/11 09:10	2019/09/11 08:40		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2A	2B	2C	3A	3B	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.0	15.9	16.5	15.7	16.2	0.050	9585018
Total Potassium (K)	mg/L	3.74	3.73	3.99	3.71	3.87	0.050	9585018
Total Sodium (Na)	mg/L	26.9	26.3	27.0	24.9	25.8	0.050	9585018
Total Sulphur (S)	mg/L	80.7	81.0	84.9	82.0	82.0	3.0	9585018
RDL = Reportable Detection Limit								

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VERITASBV Labs Job #: B976638
Report Date: 2019/09/19BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WL9979	WL9980			WL9981		
Sampling Date		2019/09/11 08:10	2019/09/11 10:05			2019/09/11 09:15		
COC Number		1 of 2	2 of 2			2 of 2		
	UNITS	3C	INFLUENT TANK 51	RDL	QC Batch	4A	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	328	324	0.50	9585940	321	0.50	9585940
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00457	0.0322	0.00050	9588177			
Total Antimony (Sb)	mg/L	0.0197	0.0204	0.000020	9588177			
Total Arsenic (As)	mg/L	0.0535	0.0620	0.000020	9588177			
Total Barium (Ba)	mg/L	0.0559	0.0567	0.000020	9588177			
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9588177			
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9588177			
Total Boron (B)	mg/L	0.032	0.032	0.010	9588177			
Total Cadmium (Cd)	mg/L	0.000781	0.00191	0.0000050	9588177			
Total Chromium (Cr)	mg/L	<0.00010	0.00012	0.00010	9588177			
Total Cobalt (Co)	mg/L	0.0000499	0.00266	0.0000050	9588177			
Total Copper (Cu)	mg/L	0.00330	0.0164	0.000050	9588177			
Total Iron (Fe)	mg/L	0.0052	0.0161	0.0010	9588177			
Total Lead (Pb)	mg/L	0.000280	0.0195	0.0000050	9588177			
Total Lithium (Li)	mg/L	0.0111	0.0114	0.00050	9588177			
Total Manganese (Mn)	mg/L	0.00308	0.0541	0.000050	9588177			
Total Molybdenum (Mo)	mg/L	0.00147	0.00161	0.000050	9588177			
Total Nickel (Ni)	mg/L	0.00756	0.00759	0.000020	9588177			
Total Selenium (Se)	mg/L	0.00713	0.00749	0.000040	9588177			
Total Silicon (Si)	mg/L	0.657	0.718	0.050	9588177			
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9588177			
Total Strontium (Sr)	mg/L	0.606	0.621	0.000050	9588177			
Total Thallium (Tl)	mg/L	0.0000026	0.0000033	0.0000020	9588177			
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9588177			
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9588177			
Total Uranium (U)	mg/L	0.0152	0.0302	0.0000020	9588177			
Total Vanadium (V)	mg/L	0.00023	0.00032	0.00020	9588177			
Total Zinc (Zn)	mg/L	0.156	0.150	0.00010	9588177			
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9588177			
Total Calcium (Ca)	mg/L	104	103	0.050	9585018	102	0.25	9585018

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9979	WL9980			WL9981		
Sampling Date		2019/09/11 08:10	2019/09/11 10:05			2019/09/11 09:15		
COC Number		1 of 2	2 of 2			2 of 2		
	UNITS	3C	INFLUENT TANK 51	RDL	QC Batch	4A	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.6	16.3	0.050	9585018	16.1	0.25	9585018
Total Potassium (K)	mg/L	3.97	3.78	0.050	9585018	3.64	0.25	9585018
Total Sodium (Na)	mg/L	25.9	27.0	0.050	9585018	26.6	0.25	9585018
Total Sulphur (S)	mg/L	81.2	84.7	3.0	9585018	81.5	3.0	9585018
RDL = Reportable Detection Limit								



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BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9982	WL9983			WL9984	WL9985		
Sampling Date		2019/09/11 08:45	2019/09/11 08:15			2019/09/11 09:20	2019/09/11 08:50		
COC Number		2 of 2	2 of 2			2 of 2	2 of 2		
	UNITS	4B	4C	RDL	QC Batch	5A	5B	RDL	QC Batch

Calculated Parameters									
Total Hardness (CaCO ₃)	mg/L	332	335	0.50	9585940	315	319	0.50	9585940
Total Metals by ICPMS									
Total Aluminum (Al)	mg/L	0.00645	0.00304	0.00050	9588177				
Total Antimony (Sb)	mg/L	0.0195	0.0161	0.000020	9588177				
Total Arsenic (As)	mg/L	0.0424	0.0289	0.000020	9588177				
Total Barium (Ba)	mg/L	0.0568	0.0559	0.000020	9588177				
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9588177				
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9588177				
Total Boron (B)	mg/L	0.020	<0.010	0.010	9588177				
Total Cadmium (Cd)	mg/L	0.000609	0.000184	0.0000050	9588177				
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9588177				
Total Cobalt (Co)	mg/L	0.000144	0.0000469	0.0000050	9588177				
Total Copper (Cu)	mg/L	0.00369	0.00182	0.000050	9588177				
Total Iron (Fe)	mg/L	0.0071	0.0102	0.0010	9588177				
Total Lead (Pb)	mg/L	0.000808	0.000175	0.0000050	9588177				
Total Lithium (Li)	mg/L	0.0113	0.0115	0.00050	9588177				
Total Manganese (Mn)	mg/L	0.00729	0.00859	0.000050	9588177				
Total Molybdenum (Mo)	mg/L	0.00129	0.00111	0.000050	9588177				
Total Nickel (Ni)	mg/L	0.00678	0.00530	0.000020	9588177				
Total Selenium (Se)	mg/L	0.00640	0.00483	0.000040	9588177				
Total Silicon (Si)	mg/L	0.686	0.686	0.050	9588177				
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9588177				
Total Strontium (Sr)	mg/L	0.618	0.620	0.000050	9588177				
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9588177				
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9588177				
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9588177				
Total Uranium (U)	mg/L	0.0211	0.0105	0.0000020	9588177				
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9588177				
Total Zinc (Zn)	mg/L	0.106	0.0639	0.00010	9588177				
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9588177				
Total Calcium (Ca)	mg/L	105	106	0.050	9585018	100	101	0.25	9585018

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9982	WL9983			WL9984	WL9985		
Sampling Date		2019/09/11 08:45	2019/09/11 08:15			2019/09/11 09:20	2019/09/11 08:50		
COC Number		2 of 2	2 of 2			2 of 2	2 of 2		
	UNITS	4B	4C	RDL	QC Batch	5A	5B	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.8	16.9	0.050	9585018	15.8	16.3	0.25	9585018
Total Potassium (K)	mg/L	3.60	3.26	0.050	9585018	3.65	3.42	0.25	9585018
Total Sodium (Na)	mg/L	27.2	26.7	0.050	9585018	26.0	25.8	0.25	9585018
Total Sulphur (S)	mg/L	83.9	82.8	3.0	9585018	78.5	82.4	3.0	9585018
RDL = Reportable Detection Limit									



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BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9986	WL9987	WL9988	WL9989		
Sampling Date		2019/09/11 08:20	2019/09/11 09:25	2019/09/11 08:55	2019/09/11 08:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	5C	6A	6B	6C	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	333	330	327	329	0.50	9585940
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00304	0.0131	0.00401	0.00209	0.00050	9588177
Total Antimony (Sb)	mg/L	0.0171	0.0214	0.0206	0.0180	0.000020	9588177
Total Arsenic (As)	mg/L	0.0236	0.0589	0.0403	0.0315	0.000020	9588177
Total Barium (Ba)	mg/L	0.0563	0.0572	0.0552	0.0564	0.000020	9588177
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9588177
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9588177
Total Boron (B)	mg/L	<0.010	0.025	0.024	0.013	0.010	9588177
Total Cadmium (Cd)	mg/L	0.000362	0.00138	0.000376	0.000127	0.0000050	9588177
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9588177
Total Cobalt (Co)	mg/L	0.000309	0.00146	0.000266	0.0000768	0.0000050	9588177
Total Copper (Cu)	mg/L	0.00373	0.00848	0.00430	0.00255	0.000050	9588177
Total Iron (Fe)	mg/L	0.0403	0.0097	0.0088	0.0120	0.0010	9588177
Total Lead (Pb)	mg/L	0.000523	0.00207	0.000411	0.000175	0.0000050	9588177
Total Lithium (Li)	mg/L	0.0114	0.0115	0.0111	0.0110	0.00050	9588177
Total Manganese (Mn)	mg/L	0.0302	0.0331	0.0159	0.0125	0.000050	9588177
Total Molybdenum (Mo)	mg/L	0.00126	0.00167	0.00142	0.00118	0.000050	9588177
Total Nickel (Ni)	mg/L	0.00523	0.00743	0.00642	0.00507	0.000020	9588177
Total Selenium (Se)	mg/L	0.00369	0.00757	0.00548	0.00504	0.000040	9588177
Total Silicon (Si)	mg/L	0.711	0.716	0.674	0.648	0.050	9588177
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9588177
Total Strontium (Sr)	mg/L	0.603	0.611	0.610	0.612	0.000050	9588177
Total Thallium (Tl)	mg/L	<0.0000020	0.0000024	<0.0000020	<0.0000020	0.0000020	9588177
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9588177
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9588177
Total Uranium (U)	mg/L	0.00907	0.0299	0.0150	0.00897	0.0000020	9588177
Total Vanadium (V)	mg/L	<0.00020	0.00022	<0.00020	<0.00020	0.00020	9588177
Total Zinc (Zn)	mg/L	0.0494	0.131	0.0841	0.0521	0.00010	9588177
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9588177
Total Calcium (Ca)	mg/L	106	105	104	105	0.050	9585018

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WL9986	WL9987	WL9988	WL9989		
Sampling Date		2019/09/11 08:20	2019/09/11 09:25	2019/09/11 08:55	2019/09/11 08:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	5C	6A	6B	6C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.6	16.7	16.5	16.4	0.050	9585018
Total Potassium (K)	mg/L	3.29	3.82	3.57	3.53	0.050	9585018
Total Sodium (Na)	mg/L	26.2	26.0	25.8	25.4	0.050	9585018
Total Sulphur (S)	mg/L	80.7	83.5	83.9	82.8	3.0	9585018
RDL = Reportable Detection Limit							



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BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL9970
Sample ID: INFLUENT TANK 50
Matrix: Water

Collected: 2019/09/11
Shipped:
Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9970 Dup
Sample ID: INFLUENT TANK 50
Matrix: Water

Collected: 2019/09/11
Shipped:
Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An

BV Labs ID: WL9971
Sample ID: 1A
Matrix: Water

Collected: 2019/09/11
Shipped:
Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591170	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta



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BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL9972

Sample ID: 1B

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9973

Sample ID: 1C

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591436	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Report Automation Engine
Ion Balance	CALC	9585596	N/A	2019/09/16	Report Automation Engine
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9974

Sample ID: 2A

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591436	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/16	Automated Statchk



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BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL9974

Sample ID: 2A

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9975

Sample ID: 2B

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591436	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9976

Sample ID: 2C

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk



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BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL9976

Sample ID: 2C

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9977

Sample ID: 3A

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9978

Sample ID: 3B

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta



BUREAU
VERITAS

BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL9979

Sample ID: 3C

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Report Automation Engine
Ion Balance	CALC	9585596	N/A	2019/09/13	Report Automation Engine
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9979 Dup

Sample ID: 3C

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9980

Sample ID: INFLUENT TANK 51

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta



BUREAU
VERITAS

BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL9981

Sample ID: 4A

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Report Automation Engine
Ion Balance	CALC	9585596	N/A	2019/09/13	Report Automation Engine
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9591269	2019/09/17	2019/09/17	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9982

Sample ID: 4B

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591436	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9982 Dup

Sample ID: 4B

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591436	N/A	2019/09/17	Serena Tian



BUREAU
VERITAS

BV Labs Job #: B976638

Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL9983

Sample ID: 4C

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9984

Sample ID: 5A

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9591269	2019/09/17	2019/09/17	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9985

Sample ID: 5B

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO ₃)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591178	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WL9985
Sample ID: 5B
Matrix: Water

Collected: 2019/09/11
Shipped:
Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9591269	2019/09/17	2019/09/17	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9986
Sample ID: 5C
Matrix: Water

Collected: 2019/09/11
Shipped:
Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9987
Sample ID: 6A
Matrix: Water

Collected: 2019/09/11
Shipped:
Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Report Automation Engine
Ion Balance	CALC	9585596	N/A	2019/09/13	Report Automation Engine
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Report Automation Engine



TEST SUMMARY

BV Labs ID: WL9987

Sample ID: 6A

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9988

Sample ID: 6B

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Report Automation Engine
Ion Balance	CALC	9585596	N/A	2019/09/13	Report Automation Engine
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta

BV Labs ID: WL9989

Sample ID: 6C

Matrix: Water

Collected: 2019/09/11

Shipped:

Received: 2019/09/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9587236	N/A	2019/09/13	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9587469	N/A	2019/09/13	Zafar Iqbal
Hardness Total (calculated as CaCO3)	CALC	9585940	N/A	2019/09/17	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9585876	N/A	2019/09/17	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9585596	N/A	2019/09/13	Automated Statchk
Sum of cations, anions	CALC	9585597	N/A	2019/09/17	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9585877	N/A	2019/09/17	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9587636	N/A	2019/09/16	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9585018	N/A	2019/09/17	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9588177	N/A	2019/09/16	Andrew An
Nitrate and Nitrite - Low Level	CALC	9585411	N/A	2019/09/17	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9585412	N/A	2019/09/17	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9586301	N/A	2019/09/14	Parniyan Roosta



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C
Package 2	4.7°C

Sample WL9981 [4A] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample WL9984 [5A] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample WL9985 [5B] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Results relate only to the items tested.



BV Labs Job #: B976638
Report Date: 2019/09/19

QUALITY ASSURANCE REPORT

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9586301	Dissolved Nitrate (N)	2019/09/14	102	80 - 120	101	80 - 120	<0.0030	mg/L	0.69	20
9586301	Dissolved Nitrite (N)	2019/09/14	99	80 - 120	99	80 - 120	<0.0030	mg/L	0.55	20
9587236	Alkalinity (PP as CaCO3)	2019/09/13					<0.50	mg/L	NC	20
9587236	Alkalinity (Total as CaCO3)	2019/09/13			93	80 - 120	<0.50	mg/L	0.76	20
9587236	Bicarbonate (HCO3)	2019/09/13					<0.50	mg/L	0.76	20
9587236	Carbonate (CO3)	2019/09/13					<0.50	mg/L	NC	20
9587236	Hydioxide (OH)	2019/09/13					<0.50	mg/L	NC	20
9587469	Dissolved Chloride (Cl)	2019/09/13	99	80 - 120	104	80 - 120	<0.50	mg/L	6.2	20
9587469	Dissolved Sulphate (SO4)	2019/09/13	102	80 - 120	103	80 - 120	<0.50	mg/L	0.32	20
9587636	Dissolved Aluminum (Al)	2019/09/16	98	80 - 120	102	80 - 120	<0.00050	mg/L	3.5	20
9587636	Dissolved Antimony (Sb)	2019/09/16	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.31	20
9587636	Dissolved Arsenic (As)	2019/09/16	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.098	20
9587636	Dissolved Barium (Ba)	2019/09/16	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.49	20
9587636	Dissolved Beryllium (Be)	2019/09/16	95	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9587636	Dissolved Bismuth (Bi)	2019/09/16	94	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9587636	Dissolved Boron (B)	2019/09/16	97	80 - 120	99	80 - 120	<0.010	mg/L	0.19	20
9587636	Dissolved Cadmium (Cd)	2019/09/16	96	80 - 120	101	80 - 120	<0.0000050	mg/L	2.5	20
9587636	Dissolved Chromium (Cr)	2019/09/16	98	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9587636	Dissolved Cobalt (Co)	2019/09/16	93	80 - 120	98	80 - 120	<0.0000050	mg/L	1.6	20
9587636	Dissolved Copper (Cu)	2019/09/16	86	80 - 120	97	80 - 120	<0.000050	mg/L	0.11	20
9587636	Dissolved Iron (Fe)	2019/09/16	97	80 - 120	103	80 - 120	<0.0010	mg/L	2.8	20
9587636	Dissolved Lead (Pb)	2019/09/16	98	80 - 120	105	80 - 120	<0.0000050	mg/L	0.11	20
9587636	Dissolved Lithium (Li)	2019/09/16	99	80 - 120	102	80 - 120	<0.00050	mg/L	0.91	20
9587636	Dissolved Manganese (Mn)	2019/09/16	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.97	20
9587636	Dissolved Molybdenum (Mo)	2019/09/16	108	80 - 120	102	80 - 120	<0.000050	mg/L	1.8	20
9587636	Dissolved Nickel (Ni)	2019/09/16	90	80 - 120	99	80 - 120	<0.000020	mg/L	1.8	20
9587636	Dissolved Selenium (Se)	2019/09/16	106	80 - 120	100	80 - 120	<0.000040	mg/L	2.3	20
9587636	Dissolved Silicon (Si)	2019/09/16	98	80 - 120	103	80 - 120	<0.050	mg/L	0.73	20
9587636	Dissolved Silver (Ag)	2019/09/16	97	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9587636	Dissolved Strontium (Sr)	2019/09/16	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.45	20
9587636	Dissolved Thallium (Tl)	2019/09/16	101	80 - 120	105	80 - 120	<0.0000020	mg/L	18	20
9587636	Dissolved Tin (Sn)	2019/09/16	99	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20



BV Labs Job #: B976638
Report Date: 2019/09/19

QUALITY ASSURANCE REPORT(CONT'D)

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9587636	Dissolved Titanium (Ti)	2019/09/16	102	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9587636	Dissolved Uranium (U)	2019/09/16	102	80 - 120	105	80 - 120	<0.0000020	mg/L	0.78	20
9587636	Dissolved Vanadium (V)	2019/09/16	100	80 - 120	100	80 - 120	<0.00020	mg/L	16	20
9587636	Dissolved Zinc (Zn)	2019/09/16	NC	80 - 120	104	80 - 120	<0.00010	mg/L	0.18	20
9587636	Dissolved Zirconium (Zr)	2019/09/16	110	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9588177	Total Aluminum (Al)	2019/09/16	100	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9588177	Total Antimony (Sb)	2019/09/16	100	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9588177	Total Arsenic (As)	2019/09/16	101	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9588177	Total Barium (Ba)	2019/09/16	98	80 - 120	102	80 - 120	<0.000020	mg/L	2.0	20
9588177	Total Beryllium (Be)	2019/09/16	97	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9588177	Total Bismuth (Bi)	2019/09/16	100	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9588177	Total Boron (B)	2019/09/16	98	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9588177	Total Cadmium (Cd)	2019/09/16	102	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9588177	Total Chromium (Cr)	2019/09/16	100	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9588177	Total Cobalt (Co)	2019/09/16	98	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9588177	Total Copper (Cu)	2019/09/16	97	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9588177	Total Iron (Fe)	2019/09/16	101	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
9588177	Total Lead (Pb)	2019/09/16	101	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9588177	Total Lithium (Li)	2019/09/16	97	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9588177	Total Manganese (Mn)	2019/09/16	100	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9588177	Total Molybdenum (Mo)	2019/09/16	102	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9588177	Total Nickel (Ni)	2019/09/16	99	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9588177	Total Selenium (Se)	2019/09/16	102	80 - 120	99	80 - 120	<0.000040	mg/L	NC	20
9588177	Total Silicon (Si)	2019/09/16	96	80 - 120	102	80 - 120	<0.050	mg/L	NC	20
9588177	Total Silver (Ag)	2019/09/16	101	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9588177	Total Strontium (Sr)	2019/09/16	96	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9588177	Total Thallium (Tl)	2019/09/16	101	80 - 120	105	80 - 120	<0.0000020	mg/L	NC	20
9588177	Total Tin (Sn)	2019/09/16	99	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9588177	Total Titanium (Ti)	2019/09/16	102	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9588177	Total Uranium (U)	2019/09/16	101	80 - 120	105	80 - 120	<0.0000020	mg/L	NC	20
9588177	Total Vanadium (V)	2019/09/16	100	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9588177	Total Zinc (Zn)	2019/09/16	109	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20



BV Labs Job #: B976638
Report Date: 2019/09/19

QUALITY ASSURANCE REPORT(CONT'D)

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9588177	Total Zirconium (Zr)	2019/09/16	101	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9591269	Total Aluminum (Al)	2019/09/17	101	80 - 120	99	80 - 120	<0.0030	mg/L	0.26	20
9591269	Total Antimony (Sb)	2019/09/17	102	80 - 120	101	80 - 120	<0.000020	mg/L	4.2	20
9591269	Total Arsenic (As)	2019/09/17	103	80 - 120	101	80 - 120	<0.000020	mg/L	2.5	20
9591269	Total Barium (Ba)	2019/09/17	101	80 - 120	99	80 - 120	<0.000050	mg/L	0.98	20
9591269	Total Beryllium (Be)	2019/09/17	101	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9591269	Total Bismuth (Bi)	2019/09/17	103	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9591269	Total Boron (B)	2019/09/17	104	80 - 120	104	80 - 120	<0.010	mg/L	NC	20
9591269	Total Cadmium (Cd)	2019/09/17	103	80 - 120	102	80 - 120	<0.0000050	mg/L	11	20
9591269	Total Chromium (Cr)	2019/09/17	102	80 - 120	100	80 - 120	<0.00010	mg/L	15	20
9591269	Total Cobalt (Co)	2019/09/17	102	80 - 120	100	80 - 120	<0.000010	mg/L	18	20
9591269	Total Copper (Cu)	2019/09/17	102	80 - 120	100	80 - 120	<0.00010	mg/L	3.1	20
9591269	Total Iron (Fe)	2019/09/17	104	80 - 120	103	80 - 120	<0.0050	mg/L	0.48	20
9591269	Total Lead (Pb)	2019/09/17	103	80 - 120	101	80 - 120	<0.000020	mg/L	2.5	20
9591269	Total Lithium (Li)	2019/09/17	97	80 - 120	95	80 - 120	<0.00050	mg/L	NC	20
9591269	Total Manganese (Mn)	2019/09/17	101	80 - 120	100	80 - 120	<0.00010	mg/L	0.41	20
9591269	Total Molybdenum (Mo)	2019/09/17	108	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9591269	Total Nickel (Ni)	2019/09/17	103	80 - 120	100	80 - 120	<0.00010	mg/L	5.3	20
9591269	Total Phosphorus (P)	2019/09/17	102	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
9591269	Total Selenium (Se)	2019/09/17	104	80 - 120	103	80 - 120	<0.000040	mg/L	NC	20
9591269	Total Silicon (Si)	2019/09/17	109	80 - 120	105	80 - 120	<0.050	mg/L	0.81	20
9591269	Total Silver (Ag)	2019/09/17	102	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9591269	Total Strontium (Sr)	2019/09/17	NC	80 - 120	100	80 - 120	<0.000050	mg/L	1.0	20
9591269	Total Sulphur (S)	2019/09/17	100	80 - 120	99	80 - 120	<0.60	mg/L	NC	20
9591269	Total Thallium (Tl)	2019/09/17	104	80 - 120	102	80 - 120	<0.0000020	mg/L	18	20
9591269	Total Tin (Sn)	2019/09/17	103	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9591269	Total Titanium (Ti)	2019/09/17	101	80 - 120	100	80 - 120	<0.0020	mg/L	NC	20
9591269	Total Uranium (U)	2019/09/17	103	80 - 120	104	80 - 120	<0.0000050	mg/L	1.7	20
9591269	Total Vanadium (V)	2019/09/17	101	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9591269	Total Zinc (Zn)	2019/09/17	104	80 - 120	103	80 - 120	<0.0010	mg/L	5.5	20
9591269	Total Zirconium (Zr)	2019/09/17	103	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9591436	Dissolved Chloride (Cl)	2019/09/17	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.15	20



QUALITY ASSURANCE REPORT(CONT'D)

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9591436	Dissolved Sulphate (SO4)	2019/09/17	NC	80 - 120	99	80 - 120	<0.50	mg/L	0.81	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.										
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.										
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.										
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.										
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)										
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).										



BUREAU
VERITAS

BV Labs Job #: B976638
Report Date: 2019/09/19

BMC MINERAL (NO. 1) LTD.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

COC #:

BBY FCD-00077/05
Page 1 of 5

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEKCO ENVIRONMENTAL	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses) ☐ Rush TAT (Surcharges will be applied)	
Contact Name:		Contact Name:	Mary Mioska, Renate Vanderhorst	P.O. #/AFEH:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:	530-1130 WEST PENDER ST Vancouver, BC V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitby, ON N2Y 2V3	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)	
Phone:		Phone:	(867) 668-6463	Site Location:	Kudzu Zee Kayah	Same Day 1 Day 2 Days 3 Days	
Email:		Email:	mmioska@alexcoenv.com	Site #:		Date Required:	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil	☐ BC CSR Water	☐ Return Cooler				LABORATORY USE ONLY	
☐ CCME (Specify)	☐ Other (Specify)	☐ Ship Sample Bottles (Please Specify)				CUSTODY SEAL - V	
☐ Drinking Water	☐ BC Water Quality	USE SCENARIO # 12485				COOLER TEMPERATURES	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM				# OF CONTAINERS SUBMITTED			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Alkalinity
1 Influent Tank 50		11-Sep-19	10:00	Water	X	X	X
2 1A		11-Sep-19	9:00	Water	X	X	X
3 1B		11-Sep-19	8:30	Water	X	X	X
4 1C		11-Sep-19	8:00	Water	X	X	X
5 2A		11-Sep-19	9:05	Water	X	X	X
6 2B		11-Sep-19	8:35	Water	X	X	X
7 2C		11-Sep-19	8:05	Water	X	X	X
8 3A		11-Sep-19	9:10	Water	X	X	X
9 3B		11-Sep-19	8:40	Water	X	X	X
10 3C		11-Sep-19	8:10	Water	X	X	X
REQUISITIONED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Tanner Webb		2019/09/11	12:00	Tina Wurtz		2019/09/17	09:00

Safam Matter
B976638

JEM INS-0209



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 1 of 2, 2 of 2

Attention: KAI WOLOSHYN
 ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/09/23
 Report #: R2785101
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B977477

Received: 2019/09/13, 11:49

Sample Matrix: Water
 # Samples Received: 20

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	8	N/A	2019/09/19	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level	4	N/A	2019/09/16	AB SOP-00005	SM 23 2320 B m
Alkalinity - Low Level	15	N/A	2019/09/18	AB SOP-00005	SM 23 2320 B m
Alkalinity - Low Level	1	N/A	2019/09/20	AB SOP-00005	SM 23 2320 B m
Biochemical Oxygen Demand	8	2019/09/15	2019/09/20	AB SOP-00017	SM 23 5210B m
Low level chloride/sulphate by AC	20	N/A	2019/09/17	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
COD by Colorimeter	8	N/A	2019/09/19	AB SOP-00016	SM 23 5220D m
Carbon (DOC) (2)	7	N/A	2019/09/17	AB SOP-00087	MMCW 119 1996 m
Carbon (DOC) (2)	1	N/A	2019/09/18	AB SOP-00087	MMCW 119 1996 m
Hardness Total (calculated as CaCO ₃) (1, 3)	18	N/A	2019/09/18	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	2	N/A	2019/09/19	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	20	N/A	2019/09/19	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	20	N/A	2019/09/17		Auto Calc
Ion Balance	8	N/A	2019/09/15		Auto Calc
Ion Balance	12	N/A	2019/09/16		Auto Calc
Sum of cations, anions	20	N/A	2019/09/19		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	20	N/A	2019/09/19	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	20	N/A	2019/09/18	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	18	N/A	2019/09/18	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	2	N/A	2019/09/19	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	20	N/A	2019/09/18	BBY7SOP-00002	EPA 6020b R2 m
Nitrate and Nitrite - Low Level	20	N/A	2019/09/19		Auto Calc
Nitrate + Nitrite-N (calculated) Low Lev	20	N/A	2019/09/19		Auto Calc
Nitrogen (Nitrite - Nitrate) Low Level	20	N/A	2019/09/16	AB SOP-00023	SM 23 4110 B m
Filter and HNO ₃ Preserve for Metals (1)	20	N/A	2019/09/16	BBY7 WI-00004	SM 23 3030B m
Carbon (Total Organic) (4)	8	N/A	2019/09/17	AB SOP-00087	MMCW 119 1996 m
Total Suspended Solids (NFR)	8	2019/09/15	2019/09/15	AB SOP-00061	SM 23 2540 D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 1 of 2, 2 of 2

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/09/23

Report #: R2785101

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B977477

Received: 2019/09/13, 11:49

by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WM4565			WM4566		WM4567		
Sampling Date		2019/09/13 10:00			2019/09/13 09:00		2019/09/13 08:30		
COC Number		1 of 2			1 of 2		1 of 2		
	UNITS	INFLUENT TANK 54	RDL	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.0	N/A	9588565	7.8	9588565	7.9	N/A	9589113
Cation Sum	meq/L	7.7	N/A	9588565	7.7	9588565	7.8	N/A	9589113
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.97	0.010	9591180	0.99	9591180	0.99	0.010	9591180
Ion Balance (% Difference)	%	1.5	N/A	9588556	0.72	9588556	0.48	N/A	9589112
Dissolved Nitrate (NO ₃)	mg/L	1.4	0.013	9589114	1.8	9589114	2.1	0.013	9589114
Nitrate plus Nitrite (N)	mg/L	0.31	0.0042	9589115	0.59	9589115	0.63	0.0042	9589115
Dissolved Nitrite (NO ₂)	mg/L	0.013	0.0099	9589114	0.61	9589114	0.48	0.0099	9589114
Demand Parameters									
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9589333					
Chemical Oxygen Demand	mg/L	<10	10	9594785					
Misc. Inorganics									
Dissolved Organic Carbon (C)	mg/L	2.7	0.50	9591829					
Acidity (pH 4.5)	mg/L	<1.0	1.0	9596595					
Alkalinity (Total as CaCO ₃)	mg/L	69.4	0.50	9585744	63.6	9585744	62.9	0.50	9585744
Total Organic Carbon (C)	mg/L	2.4	0.50	9590877					
Acidity (pH 8.3)	mg/L	19.2	1.0	9596595					
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9585744	<0.50	9585744	<0.50	0.50	9585744
Bicarbonate (HCO ₃)	mg/L	84.7	0.50	9585744	77.5	9585744	76.7	0.50	9585744
Carbonate (CO ₃)	mg/L	<0.50	0.50	9585744	<0.50	9585744	<0.50	0.50	9585744
Hydroxide (OH)	mg/L	<0.50	0.50	9585744	<0.50	9585744	<0.50	0.50	9585744
Total Suspended Solids	mg/L	1.6	1.0	9589251					
Anions									
Dissolved Chloride (Cl)	mg/L	58	0.50	9591440	58	9591440	58	0.50	9591440
Dissolved Sulphate (SO ₄)	mg/L	240 (1)	1.0	9591440	230 (1)	9591440	240 (1)	1.0	9591440
Nutrients									
Dissolved Nitrite (N)	mg/L	0.0040	0.0030	9590592	0.19	9590592	0.15	0.0030	9590592
Dissolved Nitrate (N)	mg/L	0.31	0.0030	9590592	0.40	9590592	0.48	0.0030	9590592
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WM4568			WM4569	WM4570			WM4571		
Sampling Date		2019/09/13 08:00			2019/09/13 09:05	2019/09/13 08:35			2019/09/13 08:05		
COC Number		1 of 2			1 of 2	1 of 2			1 of 2		
	UNITS	1C	RDL	QC Batch	2A	2B	RDL	QC Batch	2C	RDL	QC Batch

Calculated Parameters											
Anion Sum	meq/L	7.5	N/A	9589113	8.0	7.7	N/A	9589113	7.7	N/A	9589113
Cation Sum	meq/L	7.9	N/A	9589113	7.8	7.8	N/A	9589113	7.8	N/A	9589113
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9591180	0.97	1.0	0.010	9591180	1.0	0.010	9591180
Ion Balance (% Difference)	%	2.4	N/A	9589112	1.6	0.48	N/A	9589112	0.49	N/A	9589112
Dissolved Nitrate (NO3)	mg/L	2.4	0.013	9589114	1.4	1.8	0.013	9589114	1.2	0.013	9589114
Nitrate plus Nitrite (N)	mg/L	0.65	0.0042	9589115	0.44	0.46	0.0042	9589115	0.28	0.0042	9589115
Dissolved Nitrite (NO2)	mg/L	0.39	0.0099	9589114	0.37	0.20	0.0099	9589114	0.064	0.0099	9589114

Demand Parameters											
Biochemical Oxygen Demand	mg/L	<2.0 (1)	2.0	9589333					<2.0 (1)	2.0	9589333
Chemical Oxygen Demand	mg/L	<10	10	9594785					<10	10	9594785

Misc. Inorganics											
Dissolved Organic Carbon (C)	mg/L	2.4	0.50	9590886					2.4	0.50	9590886
Acidity (pH 4.5)	mg/L	<1.0	1.0	9596595					<1.0	1.0	9596595
Alkalinity (Total as CaCO3)	mg/L	58.4	0.50	9585744	71.0	65.3	0.50	9593135	58.4	0.50	9593135
Total Organic Carbon (C)	mg/L	2.3	0.50	9590877					2.4	0.50	9590877
Acidity (pH 8.3)	mg/L	14.2	1.0	9596595					9.5	1.0	9596595
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9585744	<0.50	<0.50	0.50	9593135	<0.50	0.50	9593135
Bicarbonate (HCO3)	mg/L	71.3	0.50	9585744	86.6	79.7	0.50	9593135	71.3	0.50	9593135
Carbonate (CO3)	mg/L	<0.50	0.50	9585744	<0.50	<0.50	0.50	9593135	<0.50	0.50	9593135
Hydroxide (OH)	mg/L	<0.50	0.50	9585744	<0.50	<0.50	0.50	9593135	<0.50	0.50	9593135
Total Suspended Solids	mg/L	<1.0	1.0	9589251					1.1	1.0	9589251

Anions											
Dissolved Chloride (Cl)	mg/L	55	0.50	9591440	60	56	0.50	9591440	57	0.50	9591440
Dissolved Sulphate (SO4)	mg/L	230 (2)	1.0	9591440	240 (2)	230 (2)	1.0	9591440	240 (2)	1.0	9591440

Nutrients											
Dissolved Nitrite (N)	mg/L	0.12	0.0030	9590592	0.11	0.061	0.0030	9590592	0.020	0.0030	9590592
Dissolved Nitrate (N)	mg/L	0.53	0.0030	9590592	0.33	0.40	0.0030	9590592	0.26	0.0030	9590592

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WM4572	WM4573			WM4574	WM4575		
Sampling Date		2019/09/13 09:10	2019/09/13 08:40			2019/09/13 08:10	2019/09/13 10:05		
COC Number		1 of 2	1 of 2			1 of 2	2 of 2		
	UNITS	3A	3B	RDL	QC Batch	3C	INFLUENT TANK 55	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.8	7.8	N/A	9589113	7.9	7.7	N/A	9589113
Cation Sum	meq/L	7.9	7.8	N/A	9589113	7.7	7.8	N/A	9589113
Filter and HNO ₃ Preservation	N/A	FIELD	FIELD		ONSITE	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	1.0	0.010	9591180	0.97	1.0	0.010	9591180
Ion Balance (% Difference)	%	0.63	0.19	N/A	9589112	1.6	0.73	N/A	9589112
Dissolved Nitrate (NO ₃)	mg/L	1.4	1.2	0.013	9589114	1.0	1.3	0.013	9589114
Nitrate plus Nitrite (N)	mg/L	0.46	0.35	0.0042	9589115	0.29	0.28	0.0042	9589115
Dissolved Nitrite (NO ₂)	mg/L	0.51	0.28	0.0099	9589114	0.18	<0.0099	0.0099	9589114

Demand Parameters

Biochemical Oxygen Demand	mg/L					<2.0 (1)	<2.0	2.0	9589333
Chemical Oxygen Demand	mg/L					<10	<10	10	9594785

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L					2.4	2.6	0.50	9590886
Acidity (pH 4.5)	mg/L					<1.0	<1.0	1.0	9596595
Alkalinity (Total as CaCO ₃)	mg/L	69.6	71.9	0.50	9593135	80.7	66.2	0.50	9593135
Total Organic Carbon (C)	mg/L					2.4	2.4	0.50	9590877
Acidity (pH 8.3)	mg/L					14.3	14.4	1.0	9596595
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	0.50	9593135	<0.50	<0.50	0.50	9593135
Bicarbonate (HCO ₃)	mg/L	84.9	87.7	0.50	9593135	98.5	80.8	0.50	9593135
Carbonate (CO ₃)	mg/L	<0.50	<0.50	0.50	9593135	<0.50	<0.50	0.50	9593135
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9593135	<0.50	<0.50	0.50	9593135
Total Suspended Solids	mg/L					1.3	1.9	1.0	9589251

Anions

Dissolved Chloride (Cl)	mg/L	56	53	0.50	9591440	56	56	0.50	9591440
Dissolved Sulphate (SO ₄)	mg/L	230 (2)	230 (2)	1.0	9591440	230 (2)	230 (2)	1.0	9591440

Nutrients

Dissolved Nitrite (N)	mg/L	0.16	0.085	0.0030	9590592	0.055	<0.0030	0.0030	9590592
Dissolved Nitrate (N)	mg/L	0.31	0.27	0.0030	9590592	0.24	0.28	0.0030	9590592

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

BUREAU
VERITASBV Labs Job #: B977477
Report Date: 2019/09/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WM4576	WM4577			WM4578			WM4579		
Sampling Date		2019/09/13 09:15	2019/09/13 08:45			2019/09/13 08:15			2019/09/13 09:20		
COC Number		2 of 2	2 of 2			2 of 2			2 of 2		
	UNITS	4A	4B	RDL	QC Batch	4C	RDL	QC Batch	5A	RDL	QC Batch

Calculated Parameters											
Anion Sum	meq/L	8.0	8.0	N/A	9589113	8.2	N/A	9589113	7.9	N/A	9589113
Cation Sum	meq/L	7.7	8.0	N/A	9589113	8.1	N/A	9589113	7.9	N/A	9589113
Filter and HNO3 Preservation	N/A	FIELD	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.96	1.0	0.010	9591180	0.99	0.010	9591180	1.0	0.010	9591180
Ion Balance (% Difference)	%	1.9	0.25	N/A	9589112	0.64	N/A	9589112	0.29	N/A	9589112
Dissolved Nitrate (NO3)	mg/L	1.3	0.29	0.013	9589114	<0.013	0.013	9589114	1.0	0.013	9589114
Nitrate plus Nitrite (N)	mg/L	0.32	0.072	0.0042	9589115	<0.0042	0.0042	9589115	0.28	0.0042	9589115
Dissolved Nitrite (NO2)	mg/L	0.10	0.019	0.0099	9589114	<0.0099	0.0099	9589114	0.16	0.0099	9589114

Demand Parameters											
Biochemical Oxygen Demand	mg/L					<2.0 (1)	2.0	9589333			
Chemical Oxygen Demand	mg/L					<10	10	9594785			

Misc. Inorganics											
Dissolved Organic Carbon (C)	mg/L					2.5	0.50	9590886			
Acidity (pH 4.5)	mg/L					<1.0	1.0	9596595			
Alkalinity (Total as CaCO3)	mg/L	77.8	79.5	0.50	9593135	75.7	0.50	9593135	72.4	0.50	9593135
Total Organic Carbon (C)	mg/L					2.7	0.50	9590877			
Acidity (pH 8.3)	mg/L					18.5	1.0	9596595			
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	9593135	<0.50	0.50	9593135	<0.50	0.50	9593135
Bicarbonate (HCO3)	mg/L	95.0	97.0	0.50	9593135	92.4	0.50	9593135	88.3	0.50	9593135
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	9593135	<0.50	0.50	9593135	<0.50	0.50	9593135
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9593135	<0.50	0.50	9593135	<0.50	0.50	9593135
Total Suspended Solids	mg/L					2.1	1.0	9589251			

Anions											
Dissolved Chloride (Cl)	mg/L	56	57	0.50	9591440	58	0.50	9591440	56	0.50	9591440
Dissolved Sulphate (SO4)	mg/L	230 (2)	230 (2)	1.0	9591440	240 (2)	1.0	9591440	230 (2)	1.0	9591440

Nutrients											
Dissolved Nitrite (N)	mg/L	0.031	0.0058	0.0030	9590592	<0.0030	0.0030	9590592	0.048	0.0030	9590592
Dissolved Nitrate (N)	mg/L	0.29	0.066	0.0030	9590592	<0.0030	0.0030	9590592	0.23	0.0030	9590592

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WM4580			WM4581			WM4582		
Sampling Date		2019/09/13 08:50			2019/09/13 08:20			2019/09/13 09:25		
COC Number		2 of 2			2 of 2			2 of 2		
	UNITS	5B	RDL	QC Batch	5C	RDL	QC Batch	6A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.2	N/A	9589113	8.2	N/A	9589113	7.9	N/A	9589113
Cation Sum	meq/L	7.9	N/A	9589113	8.1	N/A	9589113	7.8	N/A	9589113
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.97	0.010	9591180	0.99	0.010	9591180	0.99	0.010	9591180
Ion Balance (% Difference)	%	1.4	N/A	9589112	0.57	N/A	9589112	0.33	N/A	9589112
Dissolved Nitrate (NO3)	mg/L	0.13	0.013	9589114	0.065	0.013	9589114	1.1	0.013	9589114
Nitrate plus Nitrite (N)	mg/L	0.035	0.0042	9589115	0.039	0.0042	9589115	0.44	0.0042	9589115
Dissolved Nitrite (NO2)	mg/L	0.017	0.0099	9589114	0.079	0.0099	9589114	0.62	0.0099	9589114

Demand Parameters

Biochemical Oxygen Demand	mg/L				<2.0 (1)	2.0	9589333			
Chemical Oxygen Demand	mg/L				<10	10	9594785			

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L				2.7	0.50	9590886			
Acidity (pH 4.5)	mg/L				<1.0	1.0	9596595			
Alkalinity (Total as CaCO3)	mg/L	76.0	0.50	9593135	82.9	0.50	9593135	61.9	0.50	9596077
Total Organic Carbon (C)	mg/L				2.7	0.50	9590877			
Acidity (pH 8.3)	mg/L				16.6	1.0	9596595			
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9593135	<0.50	0.50	9593135	<0.50	0.50	9596077
Bicarbonate (HCO3)	mg/L	92.8	0.50	9593135	101	0.50	9593135	75.6	0.50	9596077
Carbonate (CO3)	mg/L	<0.50	0.50	9593135	<0.50	0.50	9593135	<0.50	0.50	9596077
Hydroxide (OH)	mg/L	<0.50	0.50	9593135	<0.50	0.50	9593135	<0.50	0.50	9596077
Total Suspended Solids	mg/L				2.7	1.0	9589251			

Anions

Dissolved Chloride (Cl)	mg/L	57	0.50	9591440	57	0.50	9591440	58	0.50	9591440
Dissolved Sulphate (SO4)	mg/L	240 (2)	1.0	9591440	240 (2)	1.0	9591440	240 (2)	1.0	9591440

Nutrients

Dissolved Nitrite (N)	mg/L	0.0053	0.0030	9590592	0.024	0.0030	9590592	0.19	0.0030	9590592
Dissolved Nitrate (N)	mg/L	0.030	0.0030	9590592	0.015	0.0030	9590592	0.25	0.0030	9590592

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B977477

Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WM4583			WM4584		
Sampling Date		2019/09/13 08:55			2019/09/13 08:25		
COC Number		2 of 2			2 of 2		
	UNITS	6B	RDL	QC Batch	6C	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	8.1	N/A	9589113	8.3	N/A	9589113
Cation Sum	meq/L	7.8	N/A	9589113	8.1	N/A	9589113
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.96	0.010	9591180	0.98	0.010	9591180
Ion Balance (% Difference)	%	1.9	N/A	9589112	1.2	N/A	9589112
Dissolved Nitrate (NO3)	mg/L	0.34	0.013	9589114	<0.013	0.013	9589114
Nitrate plus Nitrite (N)	mg/L	0.12	0.0042	9589115	<0.0042	0.0042	9589115
Dissolved Nitrite (NO2)	mg/L	0.14	0.0099	9589114	<0.0099	0.0099	9589114
Demand Parameters							
Biochemical Oxygen Demand	mg/L				<2.0 (1)	2.0	9589333
Chemical Oxygen Demand	mg/L				<10	10	9594785
Misc. Inorganics							
Dissolved Organic Carbon (C)	mg/L				2.7	0.50	9590886
Acidity (pH 4.5)	mg/L				<1.0	1.0	9596595
Alkalinity (Total as CaCO3)	mg/L	77.7	0.50	9593135	80.7	0.50	9593135
Total Organic Carbon (C)	mg/L				2.8	0.50	9590877
Acidity (pH 8.3)	mg/L				12.3	1.0	9596595
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9593135	<0.50	0.50	9593135
Bicarbonate (HCO3)	mg/L	94.8	0.50	9593135	98.5	0.50	9593135
Carbonate (CO3)	mg/L	<0.50	0.50	9593135	<0.50	0.50	9593135
Hydroxide (OH)	mg/L	<0.50	0.50	9593135	<0.50	0.50	9593135
Total Suspended Solids	mg/L				<1.0	1.0	9589251
Anions							
Dissolved Chloride (Cl)	mg/L	55	0.50	9591440	56	0.50	9591440
Dissolved Sulphate (SO4)	mg/L	240 (2)	1.0	9591440	240 (2)	1.0	9591440
Nutrients							
Dissolved Nitrite (N)	mg/L	0.044	0.0030	9590592	<0.0030	0.0030	9590592
Dissolved Nitrate (N)	mg/L	0.076	0.0030	9590592	<0.0030	0.0030	9590592
RDL = Reportable Detection Limit							
N/A = Not Applicable							
(1) Sample analyzed past hold time. Sample analysis is recommended within 48 hours of sampling.							
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.							

**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WM4565	WM4566	WM4567	WM4568		
Sampling Date		2019/09/13 10:00	2019/09/13 09:00	2019/09/13 08:30	2019/09/13 08:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	INFLUENT TANK 54	1A	1B	1C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	327	325	330	334	0.50	9589097
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0166	0.0109	0.00408	0.00187	0.00050	9591874
Dissolved Antimony (Sb)	mg/L	0.0202	0.0191	0.0199	0.0197	0.000020	9591874
Dissolved Arsenic (As)	mg/L	0.0601	0.0557	0.0558	0.0518	0.000020	9591874
Dissolved Barium (Ba)	mg/L	0.0556	0.0539	0.0561	0.0561	0.000020	9591874
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9591874
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Boron (B)	mg/L	0.033	0.034	0.034	0.034	0.010	9591874
Dissolved Cadmium (Cd)	mg/L	0.00194	0.00181	0.00166	0.00122	0.0000050	9591874
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591874
Dissolved Cobalt (Co)	mg/L	0.00258	0.00113	0.000151	0.0000604	0.0000050	9591874
Dissolved Copper (Cu)	mg/L	0.0242	0.0184	0.00799	0.00495	0.000050	9591874
Dissolved Iron (Fe)	mg/L	0.0017	0.0027	0.0026	0.0050	0.0010	9591874
Dissolved Lead (Pb)	mg/L	0.0158	0.00693	0.000664	0.000244	0.0000050	9591874
Dissolved Lithium (Li)	mg/L	0.00937	0.00971	0.00965	0.0101	0.00050	9591874
Dissolved Manganese (Mn)	mg/L	0.0493	0.0262	0.00491	0.00375	0.000050	9591874
Dissolved Molybdenum (Mo)	mg/L	0.00156	0.00146	0.00153	0.00144	0.000050	9591874
Dissolved Nickel (Ni)	mg/L	0.00763	0.00764	0.00735	0.00723	0.000020	9591874
Dissolved Selenium (Se)	mg/L	0.00740	0.00679	0.00734	0.00707	0.000040	9591874
Dissolved Silicon (Si)	mg/L	0.703 (1)	0.600	0.534	0.598	0.050	9591874
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Strontium (Sr)	mg/L	0.596	0.573	0.584	0.588	0.000050	9591874
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000028	0.0000020	0.0000022	0.0000020	9591874
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591874
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9591874
Dissolved Uranium (U)	mg/L	0.0296	0.0265	0.0248	0.0207	0.0000020	9591874
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591874
Dissolved Zinc (Zn)	mg/L	0.169	0.160	0.162	0.164	0.00010	9591874
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591874

RDL = Reportable Detection Limit

(1) Matrix Spike outside acceptance criteria due to sample matrix interference.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WM4565	WM4566	WM4567	WM4568		
Sampling Date		2019/09/13 10:00	2019/09/13 09:00	2019/09/13 08:30	2019/09/13 08:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	INFLUENT TANK 54	1A	1B	1C	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	104	103	105	106	0.050	9589102
Dissolved Magnesium (Mg)	mg/L	16.6	16.5	16.7	17.1	0.050	9589102
Dissolved Potassium (K)	mg/L	3.70	3.72	3.71	3.77	0.050	9589102
Dissolved Sodium (Na)	mg/L	25.5	25.5	26.0	26.1	0.050	9589102
Dissolved Sulphur (S)	mg/L	84.7	77.7	83.2	87.2	3.0	9589102
RDL = Reportable Detection Limit							



BUREAU
VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WM4569	WM4570	WM4571	WM4572	WM4573		
Sampling Date		2019/09/13 09:05	2019/09/13 08:35	2019/09/13 08:05	2019/09/13 09:10	2019/09/13 08:40		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2A	2B	2C	3A	3B	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	328	327	326	333	331	0.50	9589097
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0137	0.00442	0.00159	0.0106	0.00456	0.00050	9591874
Dissolved Antimony (Sb)	mg/L	0.0203	0.0203	0.0196	0.0207	0.0213	0.000020	9591874
Dissolved Arsenic (As)	mg/L	0.0581	0.0577	0.0525	0.0612	0.0572	0.000020	9591874
Dissolved Barium (Ba)	mg/L	0.0554	0.0564	0.0550	0.0561	0.0573	0.000020	9591874
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9591874
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Boron (B)	mg/L	0.032	0.029	0.033	0.035	0.034	0.010	9591874
Dissolved Cadmium (Cd)	mg/L	0.00180	0.00139	0.000927	0.00190	0.00150	0.0000050	9591874
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591874
Dissolved Cobalt (Co)	mg/L	0.00179	0.000134	0.0000612	0.00100	0.000121	0.0000050	9591874
Dissolved Copper (Cu)	mg/L	0.0190	0.00615	0.00374	0.0176	0.00750	0.000050	9591874
Dissolved Iron (Fe)	mg/L	0.0031	0.0021	0.0056	0.0022	0.0028	0.0010	9591874
Dissolved Lead (Pb)	mg/L	0.00944	0.000556	0.000156	0.00389	0.000479	0.0000050	9591874
Dissolved Lithium (Li)	mg/L	0.00952	0.00972	0.00922	0.00925	0.00962	0.00050	9591874
Dissolved Manganese (Mn)	mg/L	0.0366	0.00371	0.00297	0.0253	0.00534	0.000050	9591874
Dissolved Molybdenum (Mo)	mg/L	0.00152	0.00157	0.00136	0.00159	0.00158	0.000050	9591874
Dissolved Nickel (Ni)	mg/L	0.00743	0.00692	0.00721	0.00797	0.00776	0.000020	9591874
Dissolved Selenium (Se)	mg/L	0.00712	0.00729	0.00699	0.00760	0.00734	0.000040	9591874
Dissolved Silicon (Si)	mg/L	0.615	0.606	0.593	0.665	0.655	0.050	9591874
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Strontium (Sr)	mg/L	0.585	0.577	0.580	0.590	0.588	0.000050	9591874
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000021	0.0000020	0.0000022	<0.0000020	0.0000020	9591874
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591874
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9591874
Dissolved Uranium (U)	mg/L	0.0301	0.0309	0.0197	0.0274	0.0235	0.0000020	9591874
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591874
Dissolved Zinc (Zn)	mg/L	0.151	0.138	0.151	0.166	0.166	0.00010	9591874
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591874
Dissolved Calcium (Ca)	mg/L	104	103	103	106	105	0.050	9589102

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WM4569	WM4570	WM4571	WM4572	WM4573		
Sampling Date		2019/09/13 09:05	2019/09/13 08:35	2019/09/13 08:05	2019/09/13 09:10	2019/09/13 08:40		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2A	2B	2C	3A	3B	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.5	16.8	16.7	16.8	16.7	0.050	9589102
Dissolved Potassium (K)	mg/L	3.76	3.79	3.80	3.82	3.81	0.050	9589102
Dissolved Sodium (Na)	mg/L	25.9	26.3	26.3	26.1	25.9	0.050	9589102
Dissolved Sulphur (S)	mg/L	80.3	84.5	84.4	85.5	85.4	3.0	9589102
RDL = Reportable Detection Limit								

**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WM4574	WM4575	WM4576	WM4577		
Sampling Date		2019/09/13 08:10	2019/09/13 10:05	2019/09/13 09:15	2019/09/13 08:45		
COC Number		1 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3C	INFLUENT TANK 55	4A	4B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	324	331	323	337	0.50	9589097
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00144	0.0181	0.00846	0.00315	0.00050	9591874
Dissolved Antimony (Sb)	mg/L	0.0200	0.0206	0.0200	0.0191	0.000020	9591874
Dissolved Arsenic (As)	mg/L	0.0527	0.0604	0.0559	0.0424	0.000020	9591874
Dissolved Barium (Ba)	mg/L	0.0549	0.0563	0.0546	0.0554	0.000020	9591874
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9591874
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Boron (B)	mg/L	0.032	0.032	0.028	0.024	0.010	9591874
Dissolved Cadmium (Cd)	mg/L	0.000984	0.00195	0.00145	0.000677	0.0000050	9591874
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591874
Dissolved Cobalt (Co)	mg/L	0.0000437	0.00264	0.000774	0.000138	0.0000050	9591874
Dissolved Copper (Cu)	mg/L	0.00383	0.0295	0.0121	0.00446	0.000050	9591874
Dissolved Iron (Fe)	mg/L	0.0022	0.0022	0.0024	0.0021	0.0010	9591874
Dissolved Lead (Pb)	mg/L	0.000156	0.0179	0.00211	0.000320	0.0000050	9591874
Dissolved Lithium (Li)	mg/L	0.00892	0.00923	0.00919	0.00926	0.00050	9591874
Dissolved Manganese (Mn)	mg/L	0.00281	0.0515	0.0179	0.00623	0.000050	9591874
Dissolved Molybdenum (Mo)	mg/L	0.00141	0.00159	0.00156	0.00136	0.000050	9591874
Dissolved Nickel (Ni)	mg/L	0.00764	0.00768	0.00717	0.00705	0.000020	9591874
Dissolved Selenium (Se)	mg/L	0.00695	0.00751	0.00708	0.00608	0.000040	9591874
Dissolved Silicon (Si)	mg/L	0.691	0.690	0.677	0.698	0.050	9591874
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Strontium (Sr)	mg/L	0.562	0.589	0.576	0.597	0.000050	9591874
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9591874
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591874
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9591874
Dissolved Uranium (U)	mg/L	0.0176	0.0288	0.0278	0.0212	0.0000020	9591874
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591874
Dissolved Zinc (Zn)	mg/L	0.166	0.163	0.138	0.113	0.00010	9591874
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591874
Dissolved Calcium (Ca)	mg/L	102	105	102	107	0.050	9589102

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WM4574	WM4575	WM4576	WM4577		
Sampling Date		2019/09/13 08:10	2019/09/13 10:05	2019/09/13 09:15	2019/09/13 08:45		
COC Number		1 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3C	INFLUENT TANK 55	4A	4B	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.6	16.6	16.4	16.7	0.050	9589102
Dissolved Potassium (K)	mg/L	3.74	3.69	3.63	3.50	0.050	9589102
Dissolved Sodium (Na)	mg/L	25.4	25.9	25.5	26.1	0.050	9589102
Dissolved Sulphur (S)	mg/L	82.9	84.3	81.6	83.7	3.0	9589102
RDL = Reportable Detection Limit							



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BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WM4578	WM4579	WM4580	WM4581	WM4582		
Sampling Date		2019/09/13 08:15	2019/09/13 09:20	2019/09/13 08:50	2019/09/13 08:20	2019/09/13 09:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4C	5A	5B	5C	6A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	343	334	336	341	329	0.50	9589097
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00162	0.00980	0.00269	0.00179	0.00938	0.00050	9591874
Dissolved Antimony (Sb)	mg/L	0.0171	0.0219	0.0209	0.0188	0.0213	0.000020	9591874
Dissolved Arsenic (As)	mg/L	0.0309	0.0553	0.0345	0.0257	0.0600	0.000020	9591874
Dissolved Barium (Ba)	mg/L	0.0565	0.0554	0.0559	0.0571	0.0565	0.000020	9591874
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9591874
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Boron (B)	mg/L	0.014	0.030	0.019	0.011	0.031	0.010	9591874
Dissolved Cadmium (Cd)	mg/L	0.000217	0.00154	0.000393	0.000276	0.00149	0.0000050	9591874
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591874
Dissolved Cobalt (Co)	mg/L	0.0000519	0.00156	0.000414	0.000316	0.00144	0.0000050	9591874
Dissolved Copper (Cu)	mg/L	0.00198	0.0134	0.00455	0.00366	0.0137	0.000050	9591874
Dissolved Iron (Fe)	mg/L	0.0062	0.0058	0.0119	0.0342	0.0058	0.0010	9591874
Dissolved Lead (Pb)	mg/L	0.0000986	0.00256	0.000399	0.000334	0.00184	0.0000050	9591874
Dissolved Lithium (Li)	mg/L	0.00927	0.00962	0.00955	0.00968	0.00888	0.00050	9591874
Dissolved Manganese (Mn)	mg/L	0.0101	0.0368	0.0256	0.0328	0.0346	0.000050	9591874
Dissolved Molybdenum (Mo)	mg/L	0.00109	0.00159	0.00142	0.00126	0.00161	0.000050	9591874
Dissolved Nickel (Ni)	mg/L	0.00595	0.00773	0.00684	0.00577	0.00787	0.000020	9591874
Dissolved Selenium (Se)	mg/L	0.00482	0.00731	0.00548	0.00391	0.00721	0.000040	9591874
Dissolved Silicon (Si)	mg/L	0.712	0.710	0.720	0.741	0.696	0.050	9591874
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Strontium (Sr)	mg/L	0.597	0.593	0.596	0.607	0.607	0.000050	9591874
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9591874
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591874
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9591874
Dissolved Uranium (U)	mg/L	0.0113	0.0287	0.0177	0.0115	0.0264	0.0000020	9591874
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591874
Dissolved Zinc (Zn)	mg/L	0.0761	0.157	0.0840	0.0563	0.149	0.00010	9591874
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591874
Dissolved Calcium (Ca)	mg/L	109	106	106	108	104	0.050	9589102

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WM4578	WM4579	WM4580	WM4581	WM4582		
Sampling Date		2019/09/13 08:15	2019/09/13 09:20	2019/09/13 08:50	2019/09/13 08:20	2019/09/13 09:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4C	5A	5B	5C	6A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.3	17.0	17.1	17.1	16.8	0.050	9589102
Dissolved Potassium (K)	mg/L	3.25	3.62	3.53	3.31	3.78	0.050	9589102
Dissolved Sodium (Na)	mg/L	26.9	26.2	26.2	26.9	26.0	0.050	9589102
Dissolved Sulphur (S)	mg/L	87.1	84.9	84.4	85.1	85.3	3.0	9589102
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B977477
Report Date: 2019/09/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WM4583	WM4584		
Sampling Date		2019/09/13 08:55	2019/09/13 08:25		
COC Number		2 of 2	2 of 2		
	UNITS	6B	6C	RDL	QC Batch

Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	328	342	0.50	9589097
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00335	0.00469	0.00050	9591874
Dissolved Antimony (Sb)	mg/L	0.0218	0.0193	0.000020	9591874
Dissolved Arsenic (As)	mg/L	0.0437	0.0343	0.000020	9591874
Dissolved Barium (Ba)	mg/L	0.0571	0.0579	0.000020	9591874
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9591874
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Boron (B)	mg/L	0.028	0.018	0.010	9591874
Dissolved Cadmium (Cd)	mg/L	0.000525	0.000144	0.0000050	9591874
Dissolved Chromium (Cr)	mg/L	0.00028	<0.00010	0.00010	9591874
Dissolved Cobalt (Co)	mg/L	0.000425	0.0000719	0.0000050	9591874
Dissolved Copper (Cu)	mg/L	0.00461	0.00262	0.000050	9591874
Dissolved Iron (Fe)	mg/L	0.0085	0.0096	0.0010	9591874
Dissolved Lead (Pb)	mg/L	0.000353	0.000122	0.0000050	9591874
Dissolved Lithium (Li)	mg/L	0.00924	0.00935	0.00050	9591874
Dissolved Manganese (Mn)	mg/L	0.0197	0.0122	0.000050	9591874
Dissolved Molybdenum (Mo)	mg/L	0.00145	0.00128	0.000050	9591874
Dissolved Nickel (Ni)	mg/L	0.00711	0.00575	0.000020	9591874
Dissolved Selenium (Se)	mg/L	0.00590	0.00492	0.000040	9591874
Dissolved Silicon (Si)	mg/L	0.690	0.730	0.050	9591874
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9591874
Dissolved Strontium (Sr)	mg/L	0.586	0.598	0.000050	9591874
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9591874
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9591874
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9591874
Dissolved Uranium (U)	mg/L	0.0167	0.0117	0.0000020	9591874
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9591874
Dissolved Zinc (Zn)	mg/L	0.105	0.0648	0.00010	9591874
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9591874
Dissolved Calcium (Ca)	mg/L	104	109	0.050	9589102

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WM4583	WM4584		
Sampling Date		2019/09/13 08:55	2019/09/13 08:25		
COC Number		2 of 2	2 of 2		
	UNITS	6B	6C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.7	17.0	0.050	9589102
Dissolved Potassium (K)	mg/L	3.65	3.62	0.050	9589102
Dissolved Sodium (Na)	mg/L	26.0	26.2	0.050	9589102
Dissolved Sulphur (S)	mg/L	82.0	84.4	3.0	9589102
RDL = Reportable Detection Limit					



BUREAU
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BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WM4565	WM4566	WM4567	WM4568		
Sampling Date		2019/09/13 10:00	2019/09/13 09:00	2019/09/13 08:30	2019/09/13 08:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	INFLUENT TANK 54	1A	1B	1C	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	323	324	324	334	0.50	9589051
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0240	0.0179	0.00730	0.00445	0.00050	9591854
Total Antimony (Sb)	mg/L	0.0207	0.0204	0.0202	0.0202	0.000020	9591854
Total Arsenic (As)	mg/L	0.0583	0.0584	0.0549	0.0515	0.000020	9591854
Total Barium (Ba)	mg/L	0.0549	0.0549	0.0552	0.0557	0.000020	9591854
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9591854
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591854
Total Boron (B)	mg/L	0.039	0.040	0.037	0.039	0.010	9591854
Total Cadmium (Cd)	mg/L	0.00191	0.00191	0.00168	0.00125	0.0000050	9591854
Total Chromium (Cr)	mg/L	0.00012	0.00011	0.00010	<0.00010	0.00010	9591854
Total Cobalt (Co)	mg/L	0.00259	0.00116	0.000163	0.0000663	0.0000050	9591854
Total Copper (Cu)	mg/L	0.0250	0.0195	0.00859	0.00531	0.000050	9591854
Total Iron (Fe)	mg/L	0.0090	0.0088	0.0066	0.0091	0.0010	9591854
Total Lead (Pb)	mg/L	0.0190	0.00904	0.00135	0.000445	0.0000050	9591854
Total Lithium (Li)	mg/L	0.0113	0.0114	0.0111	0.0115	0.00050	9591854
Total Manganese (Mn)	mg/L	0.0494	0.0267	0.00513	0.00394	0.000050	9591854
Total Molybdenum (Mo)	mg/L	0.00152	0.00151	0.00146	0.00149	0.000050	9591854
Total Nickel (Ni)	mg/L	0.00734	0.00749	0.00747	0.00746	0.000020	9591854
Total Selenium (Se)	mg/L	0.00696	0.00697	0.00695	0.00688	0.000040	9591854
Total Silicon (Si)	mg/L	0.715	0.645	0.545	0.606	0.050	9591854
Total Silver (Ag)	mg/L	0.0000062	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591854
Total Strontium (Sr)	mg/L	0.600	0.620	0.597	0.608	0.000050	9591854
Total Thallium (Tl)	mg/L	0.0000041	0.0000033	0.0000029	0.0000029	0.0000020	9591854
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591854
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00065	<0.00050	0.00050	9591854
Total Uranium (U)	mg/L	0.0286	0.0256	0.0242	0.0200	0.0000020	9591854
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591854
Total Zinc (Zn)	mg/L	0.157	0.161	0.159	0.164	0.00010	9591854
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591854
Total Calcium (Ca)	mg/L	103	103	103	106	0.050	9589104

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WM4565	WM4566	WM4567	WM4568		
Sampling Date		2019/09/13 10:00	2019/09/13 09:00	2019/09/13 08:30	2019/09/13 08:00		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	INFLUENT TANK 54	1A	1B	1C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.2	16.1	16.2	16.6	0.050	9589104
Total Potassium (K)	mg/L	3.72	3.73	3.81	3.89	0.050	9589104
Total Sodium (Na)	mg/L	24.9	25.1	25.5	26.0	0.050	9589104
Total Sulphur (S)	mg/L	80.1	81.4	83.5	83.6	3.0	9589104
RDL = Reportable Detection Limit							



BUREAU
VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WM4569	WM4570	WM4571	WM4572	WM4573		
Sampling Date		2019/09/13 09:05	2019/09/13 08:35	2019/09/13 08:05	2019/09/13 09:10	2019/09/13 08:40		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2A	2B	2C	3A	3B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	324	323	332	332	330	0.50	9589096
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0186	0.00705	0.00336	0.0160	0.00754	0.00050	9591854
Total Antimony (Sb)	mg/L	0.0207	0.0208	0.0200	0.0211	0.0213	0.000020	9591854
Total Arsenic (As)	mg/L	0.0594	0.0594	0.0527	0.0606	0.0568	0.000020	9591854
Total Barium (Ba)	mg/L	0.0551	0.0561	0.0563	0.0554	0.0574	0.000020	9591854
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9591854
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591854
Total Boron (B)	mg/L	0.038	0.033	0.037	0.040	0.036	0.010	9591854
Total Cadmium (Cd)	mg/L	0.00182	0.00142	0.000937	0.00194	0.00151	0.0000050	9591854
Total Chromium (Cr)	mg/L	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591854
Total Cobalt (Co)	mg/L	0.00181	0.000150	0.0000474	0.00102	0.000123	0.0000050	9591854
Total Copper (Cu)	mg/L	0.0201	0.00658	0.00389	0.0187	0.00793	0.000050	9591854
Total Iron (Fe)	mg/L	0.0066	0.0048	0.0071	0.0069	0.0057	0.0010	9591854
Total Lead (Pb)	mg/L	0.0121	0.00130	0.000264	0.00536	0.000965	0.0000050	9591854
Total Lithium (Li)	mg/L	0.0111	0.0111	0.0114	0.0111	0.0112	0.00050	9591854
Total Manganese (Mn)	mg/L	0.0376	0.00433	0.00314	0.0258	0.00569	0.000050	9591854
Total Molybdenum (Mo)	mg/L	0.00154	0.00155	0.00141	0.00153	0.00158	0.000050	9591854
Total Nickel (Ni)	mg/L	0.00755	0.00686	0.00710	0.00792	0.00776	0.000020	9591854
Total Selenium (Se)	mg/L	0.00742	0.00722	0.00685	0.00742	0.00715	0.000040	9591854
Total Silicon (Si)	mg/L	0.627	0.612	0.608	0.692	0.689	0.050	9591854
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591854
Total Strontium (Sr)	mg/L	0.597	0.609	0.615	0.610	0.601	0.000050	9591854
Total Thallium (Tl)	mg/L	0.0000026	0.0000024	0.0000026	0.0000031	0.0000034	0.0000020	9591854
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591854
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9591854
Total Uranium (U)	mg/L	0.0309	0.0298	0.0194	0.0262	0.0231	0.0000020	9591854
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591854
Total Zinc (Zn)	mg/L	0.151	0.137	0.152	0.166	0.166	0.00010	9591854
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591854
Total Calcium (Ca)	mg/L	103	103	106	106	106	0.050	9589104

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WM4569	WM4570	WM4571	WM4572	WM4573		
Sampling Date		2019/09/13 09:05	2019/09/13 08:35	2019/09/13 08:05	2019/09/13 09:10	2019/09/13 08:40		
COC Number		1 of 2	1 of 2	1 of 2	1 of 2	1 of 2		
	UNITS	2A	2B	2C	3A	3B	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.0	16.1	16.3	16.4	16.2	0.050	9589104
Total Potassium (K)	mg/L	3.82	3.83	3.86	3.88	3.86	0.050	9589104
Total Sodium (Na)	mg/L	24.9	25.3	26.0	25.5	25.7	0.050	9589104
Total Sulphur (S)	mg/L	80.0	84.3	81.7	81.2	81.7	3.0	9589104
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B977477
Report Date: 2019/09/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WM4574	WM4575	WM4576	WM4577		
Sampling Date		2019/09/13 08:10	2019/09/13 10:05	2019/09/13 09:15	2019/09/13 08:45		
COC Number		1 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3C	INFLUENT TANK 55	4A	4B	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	330	331	334	332	0.50	9589096
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.00307	0.0294	0.0128	0.00539	0.00050	9591854
Total Antimony (Sb)	mg/L	0.0206	0.0210	0.0211	0.0193	0.000020	9591854
Total Arsenic (As)	mg/L	0.0545	0.0610	0.0572	0.0423	0.000020	9591854
Total Barium (Ba)	mg/L	0.0563	0.0555	0.0560	0.0560	0.000020	9591854
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9591854
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591854
Total Boron (B)	mg/L	0.039	0.037	0.033	0.026	0.010	9591854
Total Cadmium (Cd)	mg/L	0.00106	0.00197	0.00149	0.000671	0.0000050	9591854
Total Chromium (Cr)	mg/L	<0.00010	0.00011	0.00010	<0.00010	0.00010	9591854
Total Cobalt (Co)	mg/L	0.0000436	0.00268	0.000825	0.000139	0.0000050	9591854
Total Copper (Cu)	mg/L	0.00424	0.0308	0.0134	0.00491	0.000050	9591854
Total Iron (Fe)	mg/L	0.0046	0.0101	0.0085	0.0046	0.0010	9591854
Total Lead (Pb)	mg/L	0.000258	0.0211	0.00376	0.000643	0.0000050	9591854
Total Lithium (Li)	mg/L	0.0114	0.0112	0.0112	0.0111	0.00050	9591854
Total Manganese (Mn)	mg/L	0.00301	0.0541	0.0198	0.00676	0.000050	9591854
Total Molybdenum (Mo)	mg/L	0.00144	0.00162	0.00153	0.00134	0.000050	9591854
Total Nickel (Ni)	mg/L	0.00790	0.00788	0.00745	0.00712	0.000020	9591854
Total Selenium (Se)	mg/L	0.00700	0.00741	0.00716	0.00596	0.000040	9591854
Total Silicon (Si)	mg/L	0.724	0.737	0.721	0.713	0.050	9591854
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591854
Total Strontium (Sr)	mg/L	0.610	0.603	0.606	0.613	0.000050	9591854
Total Thallium (Tl)	mg/L	0.0000029	0.0000030	0.0000023	<0.0000020	0.0000020	9591854
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591854
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9591854
Total Uranium (U)	mg/L	0.0171	0.0287	0.0286	0.0207	0.0000020	9591854
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591854
Total Zinc (Zn)	mg/L	0.173	0.163	0.141	0.113	0.00010	9591854
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591854
Total Calcium (Ca)	mg/L	105	106	106	106	0.050	9589104

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WM4574	WM4575	WM4576	WM4577		
Sampling Date		2019/09/13 08:10	2019/09/13 10:05	2019/09/13 09:15	2019/09/13 08:45		
COC Number		1 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	3C	INFLUENT TANK 55	4A	4B	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.5	16.2	16.5	16.4	0.050	9589104
Total Potassium (K)	mg/L	3.92	3.76	3.77	3.57	0.050	9589104
Total Sodium (Na)	mg/L	25.6	25.4	25.6	25.8	0.050	9589104
Total Sulphur (S)	mg/L	81.5	85.1	82.0	84.3	3.0	9589104
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: B977477
Report Date: 2019/09/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WM4578	WM4579	WM4580	WM4581	WM4582		
Sampling Date		2019/09/13 08:15	2019/09/13 09:20	2019/09/13 08:50	2019/09/13 08:20	2019/09/13 09:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4C	5A	5B	5C	6A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	337	324	330	343	322	0.50	9589096
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00210	0.0137	0.00415	0.00357	0.0164	0.00050	9591854
Total Antimony (Sb)	mg/L	0.0171	0.0216	0.0213	0.0191	0.0211	0.000020	9591854
Total Arsenic (As)	mg/L	0.0306	0.0539	0.0351	0.0263	0.0584	0.000020	9591854
Total Barium (Ba)	mg/L	0.0568	0.0556	0.0561	0.0580	0.0553	0.000020	9591854
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9591854
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591854
Total Boron (B)	mg/L	0.015	0.035	0.022	0.013	0.035	0.010	9591854
Total Cadmium (Cd)	mg/L	0.000230	0.00153	0.000436	0.000377	0.00147	0.0000050	9591854
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591854
Total Cobalt (Co)	mg/L	0.0000573	0.00160	0.000434	0.000327	0.00143	0.0000050	9591854
Total Copper (Cu)	mg/L	0.00227	0.0146	0.00547	0.00506	0.0146	0.000050	9591854
Total Iron (Fe)	mg/L	0.0087	0.0138	0.0166	0.0484	0.0108	0.0010	9591854
Total Lead (Pb)	mg/L	0.000149	0.00429	0.000712	0.000558	0.00303	0.0000050	9591854
Total Lithium (Li)	mg/L	0.0115	0.0110	0.0114	0.0113	0.0109	0.00050	9591854
Total Manganese (Mn)	mg/L	0.0101	0.0381	0.0259	0.0324	0.0339	0.000050	9591854
Total Molybdenum (Mo)	mg/L	0.00109	0.00152	0.00142	0.00122	0.00157	0.000050	9591854
Total Nickel (Ni)	mg/L	0.00571	0.00755	0.00705	0.00592	0.00765	0.000020	9591854
Total Selenium (Se)	mg/L	0.00465	0.00716	0.00537	0.00388	0.00695	0.000040	9591854
Total Silicon (Si)	mg/L	0.724	0.713	0.716	0.763	0.706	0.050	9591854
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9591854
Total Strontium (Sr)	mg/L	0.624	0.595	0.616	0.624	0.608	0.000050	9591854
Total Thallium (Tl)	mg/L	<0.0000020	0.0000023	<0.0000020	<0.0000020	0.0000028	0.0000020	9591854
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591854
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9591854
Total Uranium (U)	mg/L	0.0113	0.0279	0.0176	0.0110	0.0251	0.0000020	9591854
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9591854
Total Zinc (Zn)	mg/L	0.0774	0.154	0.0854	0.0598	0.146	0.00010	9591854
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9591854
Total Calcium (Ca)	mg/L	108	103	105	109	103	0.050	9589104

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WM4578	WM4579	WM4580	WM4581	WM4582		
Sampling Date		2019/09/13 08:15	2019/09/13 09:20	2019/09/13 08:50	2019/09/13 08:20	2019/09/13 09:25		
COC Number		2 of 2	2 of 2	2 of 2	2 of 2	2 of 2		
	UNITS	4C	5A	5B	5C	6A	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.5	16.3	16.7	17.4	16.0	0.050	9589104
Total Potassium (K)	mg/L	3.39	3.69	3.58	3.36	3.77	0.050	9589104
Total Sodium (Na)	mg/L	26.3	25.3	26.2	26.7	25.2	0.050	9589104
Total Sulphur (S)	mg/L	84.5	81.6	82.5	88.2	82.4	3.0	9589104
RDL = Reportable Detection Limit								



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BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WM4583	WM4584		
Sampling Date		2019/09/13 08:55	2019/09/13 08:25		
COC Number		2 of 2	2 of 2		
	UNITS	6B	6C	RDL	QC Batch

Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	341	343	0.50	9589096
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00541	0.00430	0.00050	9592997
Total Antimony (Sb)	mg/L	0.0212	0.0188	0.000020	9592997
Total Arsenic (As)	mg/L	0.0446	0.0348	0.000020	9592997
Total Barium (Ba)	mg/L	0.0559	0.0570	0.000020	9592997
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9592997
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9592997
Total Boron (B)	mg/L	0.033	0.020	0.010	9592997
Total Cadmium (Cd)	mg/L	0.000533	0.000153	0.0000050	9592997
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9592997
Total Cobalt (Co)	mg/L	0.000421	0.0000767	0.0000050	9592997
Total Copper (Cu)	mg/L	0.00520	0.00310	0.000050	9592997
Total Iron (Fe)	mg/L	0.0101	0.0130	0.0010	9592997
Total Lead (Pb)	mg/L	0.000656	0.000181	0.0000050	9592997
Total Lithium (Li)	mg/L	0.0117 (1)	0.0113	0.00050	9592997
Total Manganese (Mn)	mg/L	0.0195	0.0122	0.000050	9592997
Total Molybdenum (Mo)	mg/L	0.00140	0.00127	0.000050	9592997
Total Nickel (Ni)	mg/L	0.00696	0.00563	0.000020	9592997
Total Selenium (Se)	mg/L	0.00586	0.00486	0.000040	9592997
Total Silicon (Si)	mg/L	0.778 (1)	0.762	0.050	9592997
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9592997
Total Strontium (Sr)	mg/L	0.586	0.596	0.000050	9592997
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9592997
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9592997
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9592997
Total Uranium (U)	mg/L	0.0172	0.0117	0.0000020	9592997
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9592997
Total Zinc (Zn)	mg/L	0.103	0.0651	0.00010	9592997
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9592997

RDL = Reportable Detection Limit

(1) Matrix Spike outside acceptance criteria due to sample matrix interference.



BUREAU
VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WM4583	WM4584		
Sampling Date		2019/09/13 08:55	2019/09/13 08:25		
COC Number		2 of 2	2 of 2		
	UNITS	6B	6C	RDL	QC Batch
Total Calcium (Ca)	mg/L	109	108	0.050	9589104
Total Magnesium (Mg)	mg/L	16.9	17.6	0.050	9589104
Total Potassium (K)	mg/L	3.56	3.58	0.050	9589104
Total Sodium (Na)	mg/L	26.0	26.9	0.050	9589104
Total Sulphur (S)	mg/L	84.7	87.6	3.0	9589104
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: B977477

Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4565
Sample ID: INFLUENT TANK 54
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan
Alkalinity - Low Level	AT/ALK	9585744	N/A	2019/09/16	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9591829	N/A	2019/09/18	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9589051	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9588556	N/A	2019/09/15	Automated Statchk
Sum of cations, anions	CALC	9588565	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera

BV Labs ID: WM4565 Dup
Sample ID: INFLUENT TANK 54
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9591829	N/A	2019/09/18	Kayla Ghanem
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An

BV Labs ID: WM4566
Sample ID: 1A
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9585744	N/A	2019/09/16	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9589051	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9588556	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9588565	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4566
Sample ID: 1A
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4567
Sample ID: 1B
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9585744	N/A	2019/09/16	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589051	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4568
Sample ID: 1C
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan
Alkalinity - Low Level	AT/ALK	9585744	N/A	2019/09/16	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9590886	N/A	2019/09/17	Kayla Ghanem
Hardness Total (calculated as CaCO3)	CALC	9589051	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Report Automation Engine
Ion Balance	CALC	9589112	N/A	2019/09/15	Report Automation Engine
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk



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VERITAS

BV Labs Job #: B977477

Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4568

Sample ID: 1C

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera

BV Labs ID: WM4568 Dup

Sample ID: 1C

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian

BV Labs ID: WM4569

Sample ID: 2A

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4570

Sample ID: 2B

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4570
Sample ID: 2B
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4571
Sample ID: 2C
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9590886	N/A	2019/09/17	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/15	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera

BV Labs ID: WM4571 Dup
Sample ID: 2C
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem



BUREAU
VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4572
Sample ID: 3A
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4572 Dup
Sample ID: 3A
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta

BV Labs ID: WM4573
Sample ID: 3B
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu



BUREAU
VERITAS

BV Labs Job #: B977477

Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4574

Sample ID: 3C

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9590886	N/A	2019/09/17	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/15	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera

BV Labs ID: WM4575

Sample ID: INFLUENT TANK 55

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9590886	N/A	2019/09/17	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/15	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu



BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4575
Sample ID: INFLUENT TANK 55
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera

BV Labs ID: WM4575 Dup
Sample ID: INFLUENT TANK 55
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria

BV Labs ID: WM4576
Sample ID: 4A
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4577
Sample ID: 4B
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk

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BV Labs Job #: B977477

Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4577

Sample ID: 4B

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4578

Sample ID: 4C

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9590886	N/A	2019/09/17	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9589096	N/A	2019/09/18	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/15	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera

BV Labs ID: WM4579

Sample ID: 5A

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Report Automation Engine
Ion Balance	CALC	9589112	N/A	2019/09/16	Report Automation Engine
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Report Automation Engine



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BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4579
Sample ID: 5A
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Report Automation Engine
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Report Automation Engine
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4580
Sample ID: 5B
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Report Automation Engine
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4581
Sample ID: 5C
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9590886	N/A	2019/09/17	Kayla Ghanem
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/15	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4581
Sample ID: 5C
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera

BV Labs ID: WM4581 Dup
Sample ID: 5C
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan

BV Labs ID: WM4582
Sample ID: 6A
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9596077	N/A	2019/09/20	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO3)	CALC	9589096	N/A	2019/09/18	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/18	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4582 Dup
Sample ID: 6A
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9596077	N/A	2019/09/20	Ilonka Kovac
Elements by ICPMS Low Level (total)	ICP/CRCM	9591854	N/A	2019/09/18	Andrew An



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VERITAS

BV Labs Job #: B977477

Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4583

Sample ID: 6B

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
Hardness Total (calculated as CaCO ₃)	CALC	9589096	N/A	2019/09/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/16	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9592997	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu

BV Labs ID: WM4583 Dup

Sample ID: 6B

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9592997	N/A	2019/09/18	Andrew An

BV Labs ID: WM4584

Sample ID: 6C

Matrix: Water

Collected: 2019/09/13

Shipped:

Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9596595	N/A	2019/09/19	Kristoffer Ryan
Alkalinity - Low Level	AT/ALK	9593135	N/A	2019/09/18	Ilonka Kovac
Biochemical Oxygen Demand	DO/PROB	9589333	2019/09/15	2019/09/20	Preetleen Kathuria
Low level chloride/sulphate by AC	KONE	9591440	N/A	2019/09/17	Serena Tian
COD by Colorimeter	M/PROB	9594785	N/A	2019/09/19	Preetleen Kathuria
Carbon (DOC)	TECH	9590886	N/A	2019/09/17	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9589096	N/A	2019/09/19	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9589097	N/A	2019/09/19	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9591180	N/A	2019/09/17	Automated Statchk
Ion Balance	CALC	9589112	N/A	2019/09/15	Automated Statchk
Sum of cations, anions	CALC	9589113	N/A	2019/09/19	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9589102	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9591874	N/A	2019/09/18	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9589104	N/A	2019/09/19	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9592997	N/A	2019/09/18	Andrew An
Nitrate and Nitrite - Low Level	CALC	9589114	N/A	2019/09/19	Automated Statchk
Nitrate + Nitrite-N (calculated) Low Lev	CALC	9589115	N/A	2019/09/19	Automated Statchk
Nitrogen (Nitrite - Nitrate) Low Level	IC/UV	9590592	N/A	2019/09/16	Parniyan Roosta



BUREAU
VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WM4584
Sample ID: 6C
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/09/16	James (Wingchung) Liu
Carbon (Total Organic)	TECH	9590877	N/A	2019/09/17	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera

BV Labs ID: WM4584 Dup
Sample ID: 6C
Matrix: Water

Collected: 2019/09/13
Shipped:
Received: 2019/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Suspended Solids (NFR)	BAL	9589251	2019/09/15	2019/09/15	Eliza Javier Herrera



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	19.3°C
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Results relate only to the items tested.



BV Labs Job #: B977477
Report Date: 2019/09/23

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9585744	Alkalinity (PP as CaCO3)	2019/09/16					<0.50	mg/L	NC	20
9585744	Alkalinity (Total as CaCO3)	2019/09/16			98	80 - 120	<0.50	mg/L	1.8	20
9585744	Bicarbonate (HCO3)	2019/09/16					<0.50	mg/L	1.8	20
9585744	Carbonate (CO3)	2019/09/16					<0.50	mg/L	NC	20
9585744	Hydroxide (OH)	2019/09/16					<0.50	mg/L	NC	20
9589251	Total Suspended Solids	2019/09/15	95	80 - 120	97	80 - 120	<1.0	mg/L	NC	20
9589333	Biochemical Oxygen Demand	2019/09/20			94	85 - 115	<2.0	mg/L	NC	20
9590592	Dissolved Nitrate (N)	2019/09/16	103	80 - 120	103	80 - 120	<0.0030	mg/L	1.4	20
9590592	Dissolved Nitrite (N)	2019/09/16	101	80 - 120	102	80 - 120	<0.0030	mg/L	1.4	20
9590877	Total Organic Carbon (C)	2019/09/17	96	80 - 120	101	80 - 120	<0.50	mg/L	5.0	20
9590886	Dissolved Organic Carbon (C)	2019/09/17	98	80 - 120	103	80 - 120	<0.50	mg/L	NC	20
9591440	Dissolved Chloride (Cl)	2019/09/17	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.59	20
9591440	Dissolved Sulphate (SO4)	2019/09/17	NC	80 - 120	97	80 - 120	<0.50	mg/L	0.95	20
9591829	Dissolved Organic Carbon (C)	2019/09/18	98	80 - 120	110	80 - 120	<0.50	mg/L	1.5	20
9591854	Total Aluminium (Al)	2019/09/18	100	80 - 120	99	80 - 120	<0.00050	mg/L	0.099	20
9591854	Total Antimony (Sb)	2019/09/18	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.45	20
9591854	Total Arsenic (As)	2019/09/18	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.62	20
9591854	Total Barium (Ba)	2019/09/18	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.43	20
9591854	Total Beryllium (Be)	2019/09/18	99	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9591854	Total Bismuth (Bi)	2019/09/18	101	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9591854	Total Boron (B)	2019/09/18	103	80 - 120	106	80 - 120	<0.010	mg/L	1.7	20
9591854	Total Cadmium (Cd)	2019/09/18	101	80 - 120	100	80 - 120	<0.000050	mg/L	2.4	20
9591854	Total Chromium (Cr)	2019/09/18	101	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9591854	Total Cobalt (Co)	2019/09/18	98	80 - 120	98	80 - 120	<0.000050	mg/L	0.34	20
9591854	Total Copper (Cu)	2019/09/18	95	80 - 120	98	80 - 120	<0.000050	mg/L	1.5	20
9591854	Total Iron (Fe)	2019/09/18	103	80 - 120	102	80 - 120	<0.0010	mg/L	0.067	20
9591854	Total Lead (Pb)	2019/09/18	102	80 - 120	102	80 - 120	<0.000050	mg/L	0.61	20
9591854	Total Lithium (Li)	2019/09/18	99	80 - 120	100	80 - 120	<0.00050	mg/L	0.90	20
9591854	Total Manganese (Mn)	2019/09/18	98	80 - 120	98	80 - 120	<0.000050	mg/L	1.1	20
9591854	Total Molybdenum (Mo)	2019/09/18	110	80 - 120	101	80 - 120	<0.000050	mg/L	3.6	20
9591854	Total Nickel (Ni)	2019/09/18	97	80 - 120	99	80 - 120	<0.000020	mg/L	1.5	20
9591854	Total Selenium (Se)	2019/09/18	102	80 - 120	100	80 - 120	<0.000040	mg/L	1.8	20



BV Labs Job #: B977477
Report Date: 2019/09/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9591854	Total Silicon (Si)	2019/09/18	107	80 - 120	106	80 - 120	<0.050	mg/L	0.65	20
9591854	Total Silver (Ag)	2019/09/18	101	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9591854	Total Strontium (Sr)	2019/09/18	NC	80 - 120	100	80 - 120	<0.000050	mg/L	2.0	20
9591854	Total Thallium (Tl)	2019/09/18	103	80 - 120	102	80 - 120	<0.0000020	mg/L	15	20
9591854	Total Tin (Sn)	2019/09/18	102	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9591854	Total Titanium (Ti)	2019/09/18	104	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9591854	Total Uranium (U)	2019/09/18	108	80 - 120	106	80 - 120	0.0000032, RDL=0.0000020 (1)	mg/L	0.66	20
9591854	Total Vanadium (V)	2019/09/18	102	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9591854	Total Zinc (Zn)	2019/09/18	NC	80 - 120	99	80 - 120	<0.00010	mg/L	1.1	20
9591854	Total Zirconium (Zr)	2019/09/18	110	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9591874	Dissolved Aluminum (Al)	2019/09/18	109	80 - 120	101	80 - 120	<0.00050	mg/L	0.62	20
9591874	Dissolved Antimony (Sb)	2019/09/18	NC	80 - 120	99	80 - 120	<0.000020	mg/L	1.5	20
9591874	Dissolved Arsenic (As)	2019/09/18	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.30	20
9591874	Dissolved Barium (Ba)	2019/09/18	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.29	20
9591874	Dissolved Beryllium (Be)	2019/09/18	103	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9591874	Dissolved Bismuth (Bi)	2019/09/18	104	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9591874	Dissolved Boron (B)	2019/09/18	97	80 - 120	93	80 - 120	<0.010	mg/L	4.8	20
9591874	Dissolved Cadmium (Cd)	2019/09/18	106	80 - 120	98	80 - 120	<0.0000050	mg/L	0.016	20
9591874	Dissolved Chromium (Cr)	2019/09/18	105	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9591874	Dissolved Cobalt (Co)	2019/09/18	104	80 - 120	100	80 - 120	<0.0000050	mg/L	0.81	20
9591874	Dissolved Copper (Cu)	2019/09/18	99	80 - 120	98	80 - 120	<0.000050	mg/L	0.37	20
9591874	Dissolved Iron (Fe)	2019/09/18	107	80 - 120	103	80 - 120	<0.0010	mg/L	2.6	20
9591874	Dissolved Lead (Pb)	2019/09/18	108	80 - 120	100	80 - 120	<0.0000050	mg/L	0.82	20
9591874	Dissolved Lithium (Li)	2019/09/18	93	80 - 120	95	80 - 120	<0.00050	mg/L	2.9	20
9591874	Dissolved Manganese (Mn)	2019/09/18	103	80 - 120	100	80 - 120	<0.000050	mg/L	0.69	20
9591874	Dissolved Molybdenum (Mo)	2019/09/18	115	80 - 120	101	80 - 120	<0.000050	mg/L	1.2	20
9591874	Dissolved Nickel (Ni)	2019/09/18	100	80 - 120	99	80 - 120	<0.000020	mg/L	1.0	20
9591874	Dissolved Selenium (Se)	2019/09/18	110	80 - 120	98	80 - 120	<0.000040	mg/L	1.5	20
9591874	Dissolved Silicon (Si)	2019/09/18	76 (2)	80 - 120	103	80 - 120	<0.050	mg/L	0.40	20
9591874	Dissolved Silver (Ag)	2019/09/18	104	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9591874	Dissolved Strontium (Sr)	2019/09/18	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.49	20



BV Labs Job #: B977477
Report Date: 2019/09/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9591874	Dissolved Thallium (Tl)	2019/09/18	111	80 - 120	102	80 - 120	<0.0000020	mg/L	4.9	20
9591874	Dissolved Tin (Sn)	2019/09/18	110	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9591874	Dissolved Titanium (Ti)	2019/09/18	109	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9591874	Dissolved Uranium (U)	2019/09/18	111	80 - 120	102	80 - 120	<0.0000020	mg/L	0.55	20
9591874	Dissolved Vanadium (V)	2019/09/18	107	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9591874	Dissolved Zinc (Zn)	2019/09/18	NC	80 - 120	101	80 - 120	<0.00010	mg/L	1.2	20
9591874	Dissolved Zirconium (Zr)	2019/09/18	115	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9592997	Total Aluminum (Al)	2019/09/18	115	80 - 120	105	80 - 120	<0.00050	mg/L	11	20
9592997	Total Antimony (Sb)	2019/09/18	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.47	20
9592997	Total Arsenic (As)	2019/09/18	112	80 - 120	98	80 - 120	<0.000020	mg/L	0.40	20
9592997	Total Barium (Ba)	2019/09/18	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.74	20
9592997	Total Beryllium (Be)	2019/09/18	115	80 - 120	108	80 - 120	<0.000010	mg/L	NC	20
9592997	Total Bismuth (Bi)	2019/09/18	107	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9592997	Total Boron (B)	2019/09/18	110	80 - 120	107	80 - 120	<0.010	mg/L	0.94	20
9592997	Total Cadmium (Cd)	2019/09/18	106	80 - 120	98	80 - 120	<0.0000050	mg/L	0.34	20
9592997	Total Chromium (Cr)	2019/09/18	106	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9592997	Total Cobalt (Co)	2019/09/18	106	80 - 120	102	80 - 120	<0.0000050	mg/L	2.3	20
9592997	Total Copper (Cu)	2019/09/18	100	80 - 120	99	80 - 120	<0.000050	mg/L	2.3	20
9592997	Total Iron (Fe)	2019/09/18	110	80 - 120	103	80 - 120	<0.0010	mg/L	0.43	20
9592997	Total Lead (Pb)	2019/09/18	110	80 - 120	101	80 - 120	<0.0000050	mg/L	2.2	20
9592997	Total Lithium (Li)	2019/09/18	122 (2)	80 - 120	118	80 - 120	<0.00050	mg/L	1.4	20
9592997	Total Manganese (Mn)	2019/09/18	108	80 - 120	101	80 - 120	<0.000050	mg/L	2.6	20
9592997	Total Molybdenum (Mo)	2019/09/18	118	80 - 120	99	80 - 120	<0.000050	mg/L	1.0	20
9592997	Total Nickel (Ni)	2019/09/18	102	80 - 120	101	80 - 120	<0.000020	mg/L	2.6	20
9592997	Total Selenium (Se)	2019/09/18	111	80 - 120	96	80 - 120	<0.000040	mg/L	0.39	20
9592997	Total Silicon (Si)	2019/09/18	72 (2)	80 - 120	112	80 - 120	<0.050	mg/L	2.9	20
9592997	Total Silver (Ag)	2019/09/18	105	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9592997	Total Strontium (Sr)	2019/09/18	NC	80 - 120	98	80 - 120	<0.000050	mg/L	1.9	20
9592997	Total Thallium (Tl)	2019/09/18	112	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9592997	Total Tin (Sn)	2019/09/18	110	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9592997	Total Titanium (Ti)	2019/09/18	114	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9592997	Total Uranium (U)	2019/09/18	112	80 - 120	102	80 - 120	<0.0000020	mg/L	0.72	20



BV Labs Job #: B977477
Report Date: 2019/09/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9592997	Total Vanadium (V)	2019/09/18	108	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9592997	Total Zinc (Zn)	2019/09/18	NC	80 - 120	101	80 - 120	<0.00010	mg/L	1.9	20
9592997	Total Zirconium (Zr)	2019/09/18	116	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9593135	Alkalinity (PP as CaCO3)	2019/09/18					<0.50	mg/L		
9593135	Alkalinity (Total as CaCO3)	2019/09/18			93	80 - 120	<0.50	mg/L		
9593135	Bicarbonate (HCO3)	2019/09/18					<0.50	mg/L		
9593135	Carbonate (CO3)	2019/09/18					<0.50	mg/L		
9593135	Hydioxide (OH)	2019/09/18					<0.50	mg/L		
9594785	Chemical Oxygen Demand	2019/09/19	112	80 - 120	99	80 - 120	<10	mg/L	NC	20
9596077	Alkalinity (PP as CaCO3)	2019/09/20					<0.50	mg/L	NC	20
9596077	Alkalinity (Total as CaCO3)	2019/09/20			92	80 - 120	<0.50	mg/L	4.7	20
9596077	Bicarbonate (HCO3)	2019/09/20					<0.50	mg/L	4.7	20
9596077	Carbonate (CO3)	2019/09/20					<0.50	mg/L	NC	20
9596077	Hydioxide (OH)	2019/09/20					<0.50	mg/L	NC	20
9596595	Acidity (pH 4.5)	2019/09/19					<1.0	mg/L	NC	20
9596595	Acidity (pH 8.3)	2019/09/19			108	80 - 120	<1.0	mg/L	2.3	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for U - 2X RDL acceptable for low level metals determination.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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VERITAS

BV Labs Job #: B977477
Report Date: 2019/09/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

COC #:

BBY FCD-00077/05
Page ____ of ____

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required											
Company Name: BMC MINERALS LTD.				Company Name: ALEKCO ENVIRONMENTAL				Quotation #: B60751				☒ Regular TAT 5 days (Most analyses) ☐ Rush TAT (Surcharges will be applied)											
Contact Name: _____				Contact Name: Mary Mitoska, Renate Vanderhorst				P.O. #/AFER: _____				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Rush TAT (Surcharges will be applied) Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days ☐											
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02															
Vancouver, BC PC: V6E 4A4				Whitehorse, YK PC: V1A 2V3				Site location: Kudze Kayah															
Phone: _____				Phone: (667) 668-6463				Site #: _____															
Email: _____				Email: mmioska@alexcoenv.com				Sampled by: _____				Date Required: _____											
Regulatory Criteria				Special Instructions				Analysis Requested				Rush Confirmation #:											
☐ BC CSR Soil ☐ BC CSR Water ☐ Return Cooler ☐ CCME (Specify) ☐ Other (Specify) ☐ Ship Sample Bottles (Please Specify) ☐ Drinking Water ☐ BC Water Quality USE SCENARIO # 12485																							
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Acidity	BOD	TSS	COD/TOC	DOC	# OF CONTAINERS SUBMITTED	COMMENTS								
1 Influent Tank 54		13-Sep-19	10:00	Water	X	X	X	X	X	X	X	X	X	9	Metals preserved with HNO3, dissolved								
2 1A		13-Sep-19	9:00	Water	X	X	X	X						5	Metals and DOC field filtered								
3 1B		13-Sep-19	8:30	Water	X	X	X	X						5	Metals field filtered								
4 1C		13-Sep-19	8:00	Water	X	X	X	X	X	X	X	X		9	Metals preserved with HNO3, dissolved								
5 2A		13-Sep-19	9:05	Water	X	X	X	X						5	Metals preserved with HNO3, dissolved								
6 2B		13-Sep-19	8:35	Water	X	X	X	X						5	Metals field filtered								
7 2C		13-Sep-19	8:05	Water	X	X	X	X	X	X	X	X		9	Metals preserved with HNO3, dissolved								
8 3A		13-Sep-19	9:10	Water	X	X	X	X						5	Metals preserved with HNO3, dissolved								
9 3B		13-Sep-19	8:40	Water	X	X	X	X						5	Metals field filtered								
10 3C		13-Sep-19	8:10	Water	X	X	X	X	X	X	X	X		9	Metals preserved with HNO3, dissolved								
REUNQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)				RECEIVED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)			
Tanner Mill				2019/09/13				18:00				T.M. LUCIOTIS				2019/09/14				09:00			
Tanner Web																							

Received by: **mmioska**
By: **Leah Newland**
SEP 13 2019 11:49



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08473027, 08473031

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/10/11
 Report #: R2795688
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B985408

Received: 2019/10/04, 14:31

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	13	N/A	2019/10/10	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC	13	N/A	2019/10/08	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (2)	13	N/A	2019/10/09	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	13	N/A	2019/10/08	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	13	N/A	2019/10/08	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	13	N/A	2019/10/08	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	13	N/A	2019/10/09	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	13	N/A	2019/10/09	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved) (1)	13	N/A	2019/10/09	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level)	13	N/A	2019/10/08	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level)	13	N/A	2019/10/08	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc	13	N/A	2019/10/08	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals	13	N/A	2019/10/05	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08473027, 08473031

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Unit 3 Calcite Business Centre
151 Industrial Road
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BV LABS JOB #: B985408

Received: 2019/10/04, 14:31

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Calgary Environmental

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WQ4891		WQ4892		WQ4893		WQ4894	WQ4895		
Sampling Date		2019/10/04 13:30		2019/10/04 08:00		2019/10/04 10:45		2019/10/04 13:15	2019/10/04 08:00		
COC Number		08473027		08473027		08473027		08473027	08473027		
	UNITS	INFLUENT	RDL	1A	QC Batch	1B	RDL	1C	3A	RDL	QC Batch

Calculated Parameters

Filter and HNO3 Preservation	N/A	FIELD		FIELD	ONSITE	FIELD		FIELD	FIELD		ONSITE
Nitrate (N)	mg/L	0.533	0.0020	0.0568	9616580	0.0447	0.0020	<0.0020	<0.0020	0.0020	9616580

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	55.6	0.50	63.9	9621618	70.0	0.50	79.3	72.1	0.50	9621618
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	9621618	<0.50	0.50	<0.50	<0.50	0.50	9621618
Bicarbonate (HCO3)	mg/L	67.8	0.50	77.9	9621618	85.4	0.50	96.8	87.9	0.50	9621618
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	9621618	<0.50	0.50	<0.50	<0.50	0.50	9621618
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	9621618	<0.50	0.50	<0.50	<0.50	0.50	9621618

Anions

Dissolved Chloride (Cl)	mg/L	59	0.50	60	9621179	63	0.50	63	60	0.50	9621176
Dissolved Sulphate (SO4)	mg/L	220 (1)	5.0	190	9621179	200	0.50	250 (1)	250 (1)	5.0	9621176

Nutrients

Total Ammonia (N)	mg/L	0.034	0.0050	0.031	9620561	0.038	0.0050	0.030	0.022	0.0050	9620561
Nitrate plus Nitrite (N)	mg/L	1.02	0.0020	0.0907	9619811	0.0496	0.0020	<0.0020	<0.0020	0.0020	9619811
Nitrite (N)	mg/L	0.491	0.0020	0.0339	9619812	0.0049	0.0020	<0.0020	<0.0020	0.0020	9619812

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WQ4896	WQ4897	WQ4898	WQ4899	WQ4900		
Sampling Date		2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:45		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Calculated Parameters								
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD		ONSITE
Nitrate (N)	mg/L	<0.0020	0.0030	<0.0020	<0.0020	0.0087	0.0020	9616580
Misc. Inorganics								
Alkalinity (Total as CaCO ₃)	mg/L	80.0	89.5	78.5	90.1	113	0.50	9621618
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9621618
Bicarbonate (HCO ₃)	mg/L	97.6	109	95.8	110	138	0.50	9621618
Carbonate (CO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9621618
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9621618
Anions								
Dissolved Chloride (Cl)	mg/L	63	67	67	70	76	0.50	9621176
Dissolved Sulphate (SO ₄)	mg/L	250 (1)	240 (1)	260 (1)	270 (1)	230 (1)	5.0	9621176
Nutrients								
Total Ammonia (N)	mg/L	0.028	0.038	0.030	0.046	0.046	0.0050	9620561
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0030	<0.0020	<0.0020	0.0087	0.0020	9619811
Nitrite (N)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	9619812
RDL = Reportable Detection Limit								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WQ4901	WQ4902	WQ4903		
Sampling Date		2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:15		
COC Number		08473031	08473031	08473031		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD		ONSITE
Nitrate (N)	mg/L	0.0138	<0.0020	0.0408	0.0020	9616580
Misc. Inorganics						
Alkalinity (Total as CaCO ₃)	mg/L	78.7	91.3	102	0.50	9621618
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	<0.50	0.50	9621618
Bicarbonate (HCO ₃)	mg/L	96.1	111	124	0.50	9621618
Carbonate (CO ₃)	mg/L	<0.50	<0.50	<0.50	0.50	9621618
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	0.50	9621618
Anions						
Dissolved Chloride (Cl)	mg/L	65	69	72	0.50	9621179
Dissolved Sulphate (SO ₄)	mg/L	220 (1)	200 (1)	230 (1)	5.0	9621179
Nutrients						
Total Ammonia (N)	mg/L	0.048	0.016	0.039	0.0050	9620561
Nitrate plus Nitrite (N)	mg/L	0.0138	<0.0020	0.0408	0.0020	9619811
Nitrite (N)	mg/L	<0.0020 (2)	0.0024	<0.0020	0.0020	9619812
RDL = Reportable Detection Limit						
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.						
(2) Matrix spike exceeds acceptance limits due to suspected matrix interference.						



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BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ4891	WQ4892	WQ4893	WQ4894	WQ4895		
Sampling Date		2019/10/04 13:30	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	INFLUENT	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters								
Dissolved Hardness (CaCO ₃)	mg/L	341	370	376	401	381	0.50	9616421
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0203	0.00424	0.00325	0.00106	0.00462	0.00050	9618076
Dissolved Antimony (Sb)	mg/L	0.0196	0.0169	0.0148	0.0128	0.0117	0.000020	9618076
Dissolved Arsenic (As)	mg/L	0.0601	0.0518	0.0408	0.0287	0.0395	0.000020	9618076
Dissolved Barium (Ba)	mg/L	0.0564	0.0632	0.0656	0.0643	0.0639	0.000020	9618076
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9618076
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618076
Dissolved Boron (B)	mg/L	0.030	0.031	0.025	0.022	0.019	0.010	9618076
Dissolved Cadmium (Cd)	mg/L	0.00195	0.000631	0.000505	0.000429	0.000199	0.0000050	9618076
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9618076
Dissolved Cobalt (Co)	mg/L	0.00249	0.000379	0.0000543	0.0000355	0.000609	0.0000050	9618076
Dissolved Copper (Cu)	mg/L	0.0153	0.0106	0.00899	0.00633	0.00446	0.000050	9618076
Dissolved Iron (Fe)	mg/L	0.0014	0.0096	0.0084	0.0112	0.0124	0.0010	9618076
Dissolved Lead (Pb)	mg/L	0.0156	0.000973	0.0000738	0.0000095	0.000654	0.0000050	9618076
Dissolved Lithium (Li)	mg/L	0.0120	0.0130	0.0138	0.0146	0.0133	0.00050	9618076
Dissolved Manganese (Mn)	mg/L	0.0489	0.0155	0.00168	0.00173	0.0294	0.000050	9618076
Dissolved Molybdenum (Mo)	mg/L	0.00155	0.00155	0.00161	0.00147	0.00121	0.000050	9618076
Dissolved Nickel (Ni)	mg/L	0.00752	0.00430	0.00486	0.00536	0.00555	0.000020	9618076
Dissolved Selenium (Se)	mg/L	0.00713	0.00552	0.00446	0.00395	0.00273	0.000040	9618076
Dissolved Silicon (Si)	mg/L	0.651	0.690	0.122	0.258	2.02	0.050	9618076
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618076
Dissolved Strontium (Sr)	mg/L	0.628	0.705	0.717	0.699	0.692	0.000050	9618076
Dissolved Thallium (Tl)	mg/L	0.0000021	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9618076
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9618076
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9618076
Dissolved Uranium (U)	mg/L	0.0287	0.0232	0.0341	0.0275	0.0184	0.0000020	9618076
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9618076
Dissolved Zinc (Zn)	mg/L	0.150	0.0664	0.0513	0.0620	0.0313	0.00010	9618076
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9618076
Dissolved Calcium (Ca)	mg/L	109	118	121	129	122	0.050	9616424
Dissolved Magnesium (Mg)	mg/L	16.8	18.4	18.1	19.4	18.6	0.050	9616424

RDL = Reportable Detection Limit



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BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ4891	WQ4892	WQ4893	WQ4894	WQ4895		
Sampling Date		2019/10/04 13:30	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	INFLUENT	1A	1B	1C	3A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.67	4.72	5.89	6.94	3.92	0.050	9616424
Dissolved Sodium (Na)	mg/L	25.9	27.9	28.2	30.0	28.4	0.050	9616424
Dissolved Sulphur (S)	mg/L	85.3	93.0	91.1	95.5	91.7	3.0	9616424
RDL = Reportable Detection Limit								



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BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ4896	WQ4897	WQ4898	WQ4899	WQ4900		
Sampling Date		2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:45		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	388	412	408	430	496	0.50	9616421
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00266	0.00082	0.00407	0.00117	0.00117	0.00050	9618076
Dissolved Antimony (Sb)	mg/L	0.0102	0.0101	0.00551	0.00320	0.00349	0.000020	9618076
Dissolved Arsenic (As)	mg/L	0.0352	0.0285	0.0275	0.0165	0.0109	0.000020	9618076
Dissolved Barium (Ba)	mg/L	0.0646	0.0693	0.0656	0.0647	0.0717	0.000020	9618076
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9618076
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618076
Dissolved Boron (B)	mg/L	0.017	0.013	0.019	<0.010	<0.010	0.010	9618076
Dissolved Cadmium (Cd)	mg/L	0.000451	0.000272	0.000104	0.0000362	0.0000069	0.0000050	9618076
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9618076
Dissolved Cobalt (Co)	mg/L	0.0000489	0.0000348	0.000286	0.0000386	0.0000461	0.0000050	9618076
Dissolved Copper (Cu)	mg/L	0.00759	0.00485	0.00220	0.00139	0.000553	0.000050	9618076
Dissolved Iron (Fe)	mg/L	0.0049	0.0077	0.0132	0.0051	0.0165	0.0010	9618076
Dissolved Lead (Pb)	mg/L	0.0000518	0.0000493	0.000378	0.0000358	0.0000102	0.0000050	9618076
Dissolved Lithium (Li)	mg/L	0.0145	0.0150	0.0144	0.0157	0.0182	0.00050	9618076
Dissolved Manganese (Mn)	mg/L	0.00148	0.00224	0.0191	0.00235	0.0147	0.000050	9618076
Dissolved Molybdenum (Mo)	mg/L	0.00113	0.00108	0.000597	0.000192	0.000097	0.000050	9618076
Dissolved Nickel (Ni)	mg/L	0.00619	0.00637	0.00535	0.00463	0.00469	0.000020	9618076
Dissolved Selenium (Se)	mg/L	0.00202	0.00192	0.00139	0.000703	0.000519	0.000040	9618076
Dissolved Silicon (Si)	mg/L	1.55	1.52	2.08	1.87	1.69	0.050	9618076
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618076
Dissolved Strontium (Sr)	mg/L	0.687	0.798	0.736	0.752	0.839	0.000050	9618076
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9618076
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9618076
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9618076
Dissolved Uranium (U)	mg/L	0.0264	0.0304	0.0102	0.00981	0.00942	0.0000020	9618076
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9618076
Dissolved Zinc (Zn)	mg/L	0.0546	0.0597	0.0211	0.0101	0.00686	0.00010	9618076
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9618076
Dissolved Calcium (Ca)	mg/L	124	132	131	138	160	0.050	9616424
Dissolved Magnesium (Mg)	mg/L	19.3	20.1	19.8	20.9	23.5	0.050	9616424

RDL = Reportable Detection Limit



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BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ4896	WQ4897	WQ4898	WQ4899	WQ4900		
Sampling Date		2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:45		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	5.80	6.13	3.45	4.13	3.89	0.050	9616424
Dissolved Sodium (Na)	mg/L	29.7	30.6	29.7	31.5	35.2	0.050	9616424
Dissolved Sulphur (S)	mg/L	94.8	95.6	98.5	102	113	3.0	9616424
RDL = Reportable Detection Limit								



BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ4901	WQ4902		WQ4903		
Sampling Date		2019/10/04 08:00	2019/10/04 10:45		2019/10/04 13:15		
COC Number		08473031	08473031		08473031		
	UNITS	6A	6B	QC Batch	6C	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	390	419	9616421	429	0.50	9616421
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00542	0.00134	9618076	0.00097	0.00050	9618076
Dissolved Antimony (Sb)	mg/L	0.00446	0.00445	9618076	0.00388	0.000020	9618076
Dissolved Arsenic (As)	mg/L	0.0228	0.0183	9618076	0.0141	0.000020	9618076
Dissolved Barium (Ba)	mg/L	0.0664	0.0660	9618076	0.0708	0.000020	9618076
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9618076	<0.000010	0.000010	9618076
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9618076	<0.0000050	0.0000050	9618076
Dissolved Boron (B)	mg/L	0.019	<0.010	9618076	<0.010	0.010	9618076
Dissolved Cadmium (Cd)	mg/L	0.000102	0.0000450	9618076	0.0000155	0.0000050	9618076
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9618076	<0.00010	0.00010	9618076
Dissolved Cobalt (Co)	mg/L	0.00131	0.0000682	9618076	0.0000487	0.0000050	9618076
Dissolved Copper (Cu)	mg/L	0.00270	0.00148	9618076	0.000845	0.000050	9618076
Dissolved Iron (Fe)	mg/L	0.109	0.0087	9618076	0.0177	0.0010	9618076
Dissolved Lead (Pb)	mg/L	0.000989	0.0000423	9618076	0.0000082	0.0000050	9624592
Dissolved Lithium (Li)	mg/L	0.0140	0.0157	9618076	0.0168	0.00050	9618076
Dissolved Manganese (Mn)	mg/L	0.0758	0.00556	9618076	0.00841	0.000050	9618076
Dissolved Molybdenum (Mo)	mg/L	0.000584	0.000338	9618076	0.000302	0.000050	9618076
Dissolved Nickel (Ni)	mg/L	0.00504	0.00492	9618076	0.00415	0.000020	9618076
Dissolved Selenium (Se)	mg/L	0.000975	0.000655	9618076	0.000502	0.000040	9618076
Dissolved Silicon (Si)	mg/L	2.09	1.77	9618076	1.52	0.050	9618076
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9618076	0.0000089	0.0000050	9618076
Dissolved Strontium (Sr)	mg/L	0.696	0.724	9618076	0.761	0.000050	9618076
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9618076	<0.0000020	0.0000020	9618076
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9618076	<0.00020	0.00020	9618076
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9618076	<0.00050	0.00050	9618076
Dissolved Uranium (U)	mg/L	0.0138	0.0129	9618076	0.0131	0.0000020	9618076
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9618076	<0.00020	0.00020	9618076
Dissolved Zinc (Zn)	mg/L	0.0118	0.0134	9618076	0.0104	0.00010	9618076
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9618076	<0.00010	0.00010	9618076
Dissolved Calcium (Ca)	mg/L	125	134	9616424	137	0.050	9616424
Dissolved Magnesium (Mg)	mg/L	19.2	20.6	9616424	21.2	0.050	9616424
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WQ4901	WQ4902		WQ4903		
Sampling Date		2019/10/04 08:00	2019/10/04 10:45		2019/10/04 13:15		
COC Number		08473031	08473031		08473031		
	UNITS	6A	6B	QC Batch	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.32	5.79	9616424	6.90	0.050	9616424
Dissolved Sodium (Na)	mg/L	29.2	31.4	9616424	32.8	0.050	9616424
Dissolved Sulphur (S)	mg/L	92.3	97.0	9616424	98.0	3.0	9616424
RDL = Reportable Detection Limit							



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BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WQ4891	WQ4892	WQ4893	WQ4894	WQ4895		
Sampling Date		2019/10/04 13:30	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	INFLUENT	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	343	361	376	406	384	0.50	9616420
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0629	0.00514	0.00403	0.00157	0.00536	0.00050	9618333
Total Antimony (Sb)	mg/L	0.0216	0.0168	0.0151	0.0131	0.0117	0.000020	9618333
Total Arsenic (As)	mg/L	0.0617	0.0500	0.0408	0.0283	0.0392	0.000020	9618333
Total Barium (Ba)	mg/L	0.0566	0.0699	0.0861	0.0655	0.0622	0.000020	9618333
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9618333
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618333
Total Boron (B)	mg/L	0.040	0.039	0.034	0.031	0.028	0.010	9618333
Total Cadmium (Cd)	mg/L	0.00202	0.000642	0.000552	0.000433	0.000208	0.0000050	9618333
Total Chromium (Cr)	mg/L	0.00014	<0.00010	0.00013	<0.00010	<0.00010	0.00010	9618333
Total Cobalt (Co)	mg/L	0.00266	0.000373	0.0000578	0.0000379	0.000654	0.0000050	9618333
Total Copper (Cu)	mg/L	0.0209	0.0110	0.00969	0.00656	0.00520	0.000050	9618333
Total Iron (Fe)	mg/L	0.0354	0.0109	0.0127	0.0151	0.0161	0.0010	9618333
Total Lead (Pb)	mg/L	0.0306	0.00142	0.000659	0.0000113	0.000917	0.0000050	9618333
Total Lithium (Li)	mg/L	0.0127	0.0130	0.0142	0.0153	0.0140	0.00050	9618333
Total Manganese (Mn)	mg/L	0.0580	0.0164	0.00354	0.00186	0.0324	0.000050	9618333
Total Molybdenum (Mo)	mg/L	0.00159	0.00174	0.00168	0.00150	0.00124	0.000050	9618333
Total Nickel (Ni)	mg/L	0.00782	0.00424	0.00503	0.00552	0.00566	0.000020	9618333
Total Selenium (Se)	mg/L	0.00713	0.00565	0.00491	0.00416	0.00276	0.000040	9618333
Total Silicon (Si)	mg/L	0.757	0.685	0.124	0.260	2.04	0.050	9618333
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618333
Total Strontium (Sr)	mg/L	0.623	0.702	0.753	0.708	0.706	0.000050	9618333
Total Thallium (Tl)	mg/L	0.0000025	0.0000021	0.0000024	0.0000023	<0.0000020	0.0000020	9618333
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9618333
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9618333
Total Uranium (U)	mg/L	0.0292	0.0250	0.0353	0.0283	0.0195	0.0000020	9618333
Total Vanadium (V)	mg/L	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9618333
Total Zinc (Zn)	mg/L	0.160	0.0641	0.0522	0.0629	0.0311	0.00010	9618333
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9618333
Total Calcium (Ca)	mg/L	109	115	120	130	123	0.050	9616425
Total Magnesium (Mg)	mg/L	17.0	17.9	18.6	19.9	18.8	0.050	9616425

RDL = Reportable Detection Limit



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BV Labs Job #: B985408

Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WQ4891	WQ4892	WQ4893	WQ4894	WQ4895		
Sampling Date		2019/10/04 13:30	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	INFLUENT	1A	1B	1C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.73	4.68	5.99	7.03	3.96	0.050	9616425
Total Sodium (Na)	mg/L	26.0	27.5	28.9	30.0	28.8	0.050	9616425
Total Sulphur (S)	mg/L	80.2	86.9	90.3	92.9	89.4	3.0	9616425

RDL = Reportable Detection Limit

BUREAU
VERITASBV Labs Job #: B985408
Report Date: 2019/10/11ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WQ4896	WQ4897	WQ4898	WQ4899	WQ4900		
Sampling Date		2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:45		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	398	415	412	442	503	0.50	9616420
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00264	0.00597	0.00454	0.00139	0.00434	0.00050	9618333
Total Antimony (Sb)	mg/L	0.0104	0.0104	0.00550	0.00325	0.00361	0.000020	9618333
Total Arsenic (As)	mg/L	0.0354	0.0283	0.0281	0.0163	0.0110	0.000020	9618333
Total Barium (Ba)	mg/L	0.0652	0.0695	0.0666	0.0651	0.0723	0.000020	9618333
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9618333
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618333
Total Boron (B)	mg/L	0.026	0.022	0.029	0.014	<0.010	0.010	9618333
Total Cadmium (Cd)	mg/L	0.000461	0.000279	0.000107	0.0000363	0.0000083	0.0000050	9618333
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9618333
Total Cobalt (Co)	mg/L	0.0000549	0.0000391	0.000324	0.0000433	0.0000517	0.0000050	9618333
Total Copper (Cu)	mg/L	0.00905	0.00518	0.00263	0.00149	0.000666	0.000050	9618333
Total Iron (Fe)	mg/L	0.0423	0.0228	0.0168	0.0071	0.0263	0.0010	9618333
Total Lead (Pb)	mg/L	0.000162	0.000171	0.000482	0.0000481	0.0000349	0.0000050	9618333
Total Lithium (Li)	mg/L	0.0152	0.0156	0.0146	0.0159	0.0182	0.00050	9618333
Total Manganese (Mn)	mg/L	0.00187	0.00284	0.0220	0.00285	0.0165	0.000050	9618333
Total Molybdenum (Mo)	mg/L	0.00122	0.00113	0.000688	0.000224	0.000125	0.000050	9618333
Total Nickel (Ni)	mg/L	0.00750	0.00654	0.00544	0.00493	0.00479	0.000020	9618333
Total Selenium (Se)	mg/L	0.00218	0.00214	0.00143	0.000740	0.000485	0.000040	9618333
Total Silicon (Si)	mg/L	1.63	1.53	2.09	1.91	1.70	0.050	9618333
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618333
Total Strontium (Sr)	mg/L	0.719	0.810	0.769	0.769	0.858	0.000050	9618333
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9618333
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9618333
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9618333
Total Uranium (U)	mg/L	0.0296	0.0326	0.0109	0.0103	0.0102	0.0000020	9618333
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9618333
Total Zinc (Zn)	mg/L	0.0566	0.0620	0.0210	0.0108	0.0114	0.00010	9618333
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9618333
Total Calcium (Ca)	mg/L	127	133	131	141	161	0.050	9616425
Total Magnesium (Mg)	mg/L	19.6	20.2	20.4	21.5	24.5	0.050	9616425

RDL = Reportable Detection Limit



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BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WQ4896	WQ4897	WQ4898	WQ4899	WQ4900		
Sampling Date		2019/10/04 10:45	2019/10/04 13:15	2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:45		
COC Number		08473027	08473027	08473027	08473027	08473027		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	5.91	6.16	3.61	4.27	3.97	0.050	9616425
Total Sodium (Na)	mg/L	30.5	31.2	30.6	32.4	37.2	0.050	9616425
Total Sulphur (S)	mg/L	93.4	93.9	97.4	99.9	111	3.0	9616425
RDL = Reportable Detection Limit								



BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WQ4901	WQ4902	WQ4903		
Sampling Date		2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:15		
COC Number		08473031	08473031	08473031		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	404	419	435	0.50	9616420
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00558	0.00247	0.00120	0.00050	9618333
Total Antimony (Sb)	mg/L	0.00458	0.00443	0.00388	0.000020	9618333
Total Arsenic (As)	mg/L	0.0235	0.0179	0.0136	0.000020	9618333
Total Barium (Ba)	mg/L	0.0674	0.0632	0.0680	0.000020	9618333
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9618333
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9618333
Total Boron (B)	mg/L	0.027	0.017	<0.010	0.010	9618333
Total Cadmium (Cd)	mg/L	0.000113	0.0000465	0.0000136	0.0000050	9618333
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9618333
Total Cobalt (Co)	mg/L	0.00141	0.0000689	0.0000484	0.0000050	9618333
Total Copper (Cu)	mg/L	0.00307	0.00156	0.000891	0.000050	9618333
Total Iron (Fe)	mg/L	0.125	0.0107	0.0179	0.0010	9618333
Total Lead (Pb)	mg/L	0.00112	0.0000585	0.0000159	0.0000050	9618333
Total Lithium (Li)	mg/L	0.0143	0.0157	0.0169	0.00050	9618333
Total Manganese (Mn)	mg/L	0.0832	0.00617	0.00876	0.000050	9618333
Total Molybdenum (Mo)	mg/L	0.000636	0.000371	0.000344	0.000050	9618333
Total Nickel (Ni)	mg/L	0.00523	0.00514	0.00432	0.000020	9618333
Total Selenium (Se)	mg/L	0.00105	0.000655	0.000526	0.000040	9618333
Total Silicon (Si)	mg/L	2.12	1.78	1.51	0.050	9618333
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000099	0.0000050	9618333
Total Strontium (Sr)	mg/L	0.733	0.738	0.751	0.000050	9618333
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9618333
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9618333
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9618333
Total Uranium (U)	mg/L	0.0145	0.0134	0.0136	0.0000020	9618333
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9618333
Total Zinc (Zn)	mg/L	0.0178	0.0210	0.0109	0.00010	9618333
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9618333
Total Calcium (Ca)	mg/L	129	134	138	0.050	9616425
Total Magnesium (Mg)	mg/L	20.0	20.6	22.1	0.050	9616425
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WQ4901	WQ4902	WQ4903		
Sampling Date		2019/10/04 08:00	2019/10/04 10:45	2019/10/04 13:15		
COC Number		08473031	08473031	08473031		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Potassium (K)	mg/L	4.63	5.88	6.87	0.050	9616425
Total Sodium (Na)	mg/L	30.3	31.7	33.3	0.050	9616425
Total Sulphur (S)	mg/L	95.1	94.7	96.4	3.0	9616425
RDL = Reportable Detection Limit						



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BV Labs Job #: B985408

Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WQ4891
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621179	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4891 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An

BV Labs ID: WQ4892
Sample ID: 1A
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621179	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4893
Sample ID: 1B
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo



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VERITAS

BV Labs Job #: B985408

Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WQ4893

Sample ID: 1B

Matrix: Water

Collected: 2019/10/04

Shipped:

Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Low level chloride/sulphate by AC	KONE	9621176	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4894

Sample ID: 1C

Matrix: Water

Collected: 2019/10/04

Shipped:

Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621176	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4895

Sample ID: 3A

Matrix: Water

Collected: 2019/10/04

Shipped:

Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621176	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling



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VERITAS

BV Labs Job #: B985408

Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WQ4895

Sample ID: 3A

Matrix: Water

Collected: 2019/10/04

Shipped:

Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahnne Cris Roy

BV Labs ID: WQ4896

Sample ID: 3B

Matrix: Water

Collected: 2019/10/04

Shipped:

Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621176	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahnne Cris Roy

BV Labs ID: WQ4897

Sample ID: 3C

Matrix: Water

Collected: 2019/10/04

Shipped:

Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621176	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahnne Cris Roy



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BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WQ4898
Sample ID: 4A
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621176	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4899
Sample ID: 4B
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621176	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4900
Sample ID: 4C
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621176	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An



BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WQ4900
Sample ID: 4C
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4900 Dup
Sample ID: 4C
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling

BV Labs ID: WQ4901
Sample ID: 6A
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621179	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4901 Dup
Sample ID: 6A
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621179	N/A	2019/10/08	Balwinder Bassi
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin



BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WQ4902
Sample ID: 6B
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621179	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4903
Sample ID: 6C
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9621618	N/A	2019/10/10	Coco Guo
Low level chloride/sulphate by AC	KONE	9621179	N/A	2019/10/08	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9616420	N/A	2019/10/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9616421	N/A	2019/10/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9616424	N/A	2019/10/08	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9618076	N/A	2019/10/08	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9616425	N/A	2019/10/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9620561	N/A	2019/10/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9619811	N/A	2019/10/08	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9619812	N/A	2019/10/08	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9616580	N/A	2019/10/08	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/05	Juvahne Cris Roy

BV Labs ID: WQ4903 Dup
Sample ID: 6C
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9618333	N/A	2019/10/09	Andrew An



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.3°C
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Sample WQ4891 [INFLUENT] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4892 [1A] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4893 [1B] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4894 [1C] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4895 [3A] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4896 [3B] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4897 [3C] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4898 [4A] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4899 [4B] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4900 [4C] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4901 [6A] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4902 [6B] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).

Sample WQ4903 [6C] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level).



BUREAU
VERITAS

BV Labs Job #: B985408

Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sample WQ4903, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B985408
Report Date: 2019/10/11

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9618076	Dissolved Aluminum (Al)	2019/10/08	102	80 - 120	98	80 - 120	<0.00050	mg/L	0.23	20
9618076	Dissolved Antimony (Sb)	2019/10/08	NC	80 - 120	97	80 - 120	<0.000020	mg/L	1.6	20
9618076	Dissolved Arsenic (As)	2019/10/08	NC	80 - 120	99	80 - 120	0.000023, RDL=0.000020 (1)	mg/L	0.43	20
9618076	Dissolved Barium (Ba)	2019/10/08	NC	80 - 120	100	80 - 120	<0.000020	mg/L	1.6	20
9618076	Dissolved Beryllium (Be)	2019/10/08	103	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9618076	Dissolved Bismuth (Bi)	2019/10/08	98	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9618076	Dissolved Boron (B)	2019/10/08	111	80 - 120	104	80 - 120	<0.010	mg/L	0.52	20
9618076	Dissolved Cadmium (Cd)	2019/10/08	102	80 - 120	98	80 - 120	<0.0000050	mg/L	0.68	20
9618076	Dissolved Chromium (Cr)	2019/10/08	97	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9618076	Dissolved Cobalt (Co)	2019/10/08	101	80 - 120	96	80 - 120	<0.0000050	mg/L	2.4	20
9618076	Dissolved Copper (Cu)	2019/10/08	91	80 - 120	95	80 - 120	<0.000050	mg/L	1.6	20
9618076	Dissolved Iron (Fe)	2019/10/08	105	80 - 120	99	80 - 120	<0.0010	mg/L	3.6	20
9618076	Dissolved Lead (Pb)	2019/10/08	106	80 - 120	103	80 - 120	<0.0000050	mg/L	1.3	20
9618076	Dissolved Lithium (Li)	2019/10/08	109	80 - 120	105	80 - 120	<0.00050	mg/L	0.0066	20
9618076	Dissolved Manganese (Mn)	2019/10/08	110	80 - 120	95	80 - 120	<0.000050	mg/L	1.3	20
9618076	Dissolved Molybdenum (Mo)	2019/10/08	111	80 - 120	99	80 - 120	<0.000050	mg/L	1.8	20
9618076	Dissolved Nickel (Ni)	2019/10/08	95	80 - 120	99	80 - 120	<0.000020	mg/L	0.072	20
9618076	Dissolved Selenium (Se)	2019/10/08	98	80 - 120	96	80 - 120	<0.000040	mg/L	1.6	20
9618076	Dissolved Silicon (Si)	2019/10/08	116	80 - 120	100	80 - 120	<0.050	mg/L	0.33	20
9618076	Dissolved Silver (Ag)	2019/10/08	104	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9618076	Dissolved Strontium (Sr)	2019/10/08	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.81	20
9618076	Dissolved Thallium (Tl)	2019/10/08	102	80 - 120	98	80 - 120	<0.0000020	mg/L	9.1	20
9618076	Dissolved Tin (Sn)	2019/10/08	98	80 - 120	91	80 - 120	<0.00020	mg/L	NC	20
9618076	Dissolved Titanium (Ti)	2019/10/08	105	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9618076	Dissolved Uranium (U)	2019/10/08	106	80 - 120	101	80 - 120	<0.0000020	mg/L	0.77	20
9618076	Dissolved Vanadium (V)	2019/10/08	100	80 - 120	95	80 - 120	<0.00020	mg/L	NC	20
9618076	Dissolved Zinc (Zn)	2019/10/08	NC	80 - 120	99	80 - 120	<0.00010	mg/L	0.64	20
9618076	Dissolved Zirconium (Zr)	2019/10/08	110	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9618333	Total Aluminum (Al)	2019/10/09	98	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9618333	Total Antimony (Sb)	2019/10/09	95	80 - 120	100	80 - 120	<0.000020	mg/L	0.77	20
9618333	Total Arsenic (As)	2019/10/09	100	80 - 120	98	80 - 120	<0.000020	mg/L	0.57	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9618333	Total Barium (Ba)	2019/10/09	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.56	20
9618333	Total Beryllium (Be)	2019/10/09	99	80 - 120	100	80 - 120	<0.000010	mg/L	NC	20
9618333	Total Bismuth (Bi)	2019/10/09	101	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9618333	Total Boron (B)	2019/10/09	101	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
9618333	Total Cadmium (Cd)	2019/10/09	100	80 - 120	101	80 - 120	<0.0000050	mg/L	2.2	20
9618333	Total Chromium (Cr)	2019/10/09	96	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9618333	Total Cobalt (Co)	2019/10/09	92	80 - 120	98	80 - 120	<0.0000050	mg/L	4.4	20
9618333	Total Copper (Cu)	2019/10/09	89	80 - 120	99	80 - 120	<0.000050	mg/L	0.94	20
9618333	Total Iron (Fe)	2019/10/09	101	80 - 120	101	80 - 120	<0.0010	mg/L	1.1	20
9618333	Total Lead (Pb)	2019/10/09	106	80 - 120	106	80 - 120	<0.0000050	mg/L	3.7	20
9618333	Total Lithium (Li)	2019/10/09	102	80 - 120	105	80 - 120	<0.00050	mg/L	0.83	20
9618333	Total Manganese (Mn)	2019/10/09	97	80 - 120	102	80 - 120	<0.000050	mg/L	0.95	20
9618333	Total Molybdenum (Mo)	2019/10/09	108	80 - 120	104	80 - 120	<0.000050	mg/L	0.85	20
9618333	Total Nickel (Ni)	2019/10/09	94	80 - 120	109	80 - 120	<0.000020	mg/L	2.5	20
9618333	Total Selenium (Se)	2019/10/09	98	80 - 120	98	80 - 120	<0.000040	mg/L	2.9	20
9618333	Total Silicon (Si)	2019/10/09	107	80 - 120	100	80 - 120	<0.050	mg/L	1.1	20
9618333	Total Silver (Ag)	2019/10/09	101	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9618333	Total Strontium (Sr)	2019/10/09	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.51	20
9618333	Total Thallium (Tl)	2019/10/09	104	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9618333	Total Tin (Sn)	2019/10/09	101	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9618333	Total Titanium (Ti)	2019/10/09	101	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9618333	Total Uranium (U)	2019/10/09	108	80 - 120	106	80 - 120	<0.0000020	mg/L	0.82	20
9618333	Total Vanadium (V)	2019/10/09	96	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9618333	Total Zinc (Zn)	2019/10/09	91	80 - 120	100	80 - 120	<0.00010	mg/L	0.75	20
9618333	Total Zirconium (Zr)	2019/10/09	109	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9619811	Nitrate plus Nitrite (N)	2019/10/08	101	80 - 120	106	80 - 120	<0.0020	mg/L	15	25
9619812	Nitrite (N)	2019/10/08	79 (2)	80 - 120	101	80 - 120	<0.0020	mg/L	NC	25
9620561	Total Ammonia (N)	2019/10/09	92	80 - 120	98	80 - 120	<0.0050	mg/L	2.3	20
9621176	Dissolved Chloride (Cl)	2019/10/08	98	80 - 120	106	80 - 120	<0.50	mg/L	2.0	20
9621176	Dissolved Sulphate (SO4)	2019/10/08	117	80 - 120	104	80 - 120	<0.50	mg/L	7.2	20
9621179	Dissolved Chloride (Cl)	2019/10/08	NC	80 - 120	103	80 - 120	<0.50	mg/L	1.0	20
9621179	Dissolved Sulphate (SO4)	2019/10/08	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.79	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9621618	Alkalinity (PP as CaCO3)	2019/10/10					<0.50	mg/L	NC	20
9621618	Alkalinity (Total as CaCO3)	2019/10/10	NC	80 - 120	98	80 - 120	<0.50	mg/L	0.46	20
9621618	Bicarbonate (HCO3)	2019/10/10					<0.50	mg/L	0.46	20
9621618	Carbonate (CO3)	2019/10/10					<0.50	mg/L	NC	20
9621618	Hydioxide (OH)	2019/10/10					<0.50	mg/L	NC	20
9624592	Dissolved Lead (Pb)	2019/10/11			106	80 - 120	<0.0000050	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for As- 2X RDL acceptable for low level metals determination.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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BV Labs Job #: B985408
Report Date: 2019/10/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Harry (Peng) Liang, Senior Analyst

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY R

COC #: 08473031

BBV FCD-00077/05

Page 1 of 1

Invoice Information Company Name: BMC MINERALS LTD. Contact Name: _____ Address: 530-1130 WEST PENDER ST Vancouver, BC V6E 4A4 Phone: _____ Email: _____		Report Information (if differs from invoice) Company Name: ALEXCO ENVIRONMENTAL Contact Name: Mary Mitoska, Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK Y1A 2V3 Phone: (867) 668-6463 Email: mmitoska@alexcoenv.com		Project Information (where applicable) Quotation #: B60751 P.O. # / A/F #: _____ Project #: BMC-18-02 Site Location: Kudz Ze Kayah Site #: _____ Sampled By: _____		Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analyses) Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days			
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		Analysis Requested		Rush Confirmation #:			
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM		Sample Identification Lab Identification Date Sampled (YYYY/MM/DD) Time Sampled (HH:MM) Matrix		Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity Ammonia		# OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE COMMENTS:			
1	6A	04-Oct-19	8:00	Water	X	X	X	7	Metals preserved with HNO3, dissolved metals field filtered Metals preserved with HNO3, dissolved metals field filtered Metals preserved with HNO3, dissolved metals field filtered
2	6B	04-Oct-19	10:45	Water	X	X	X	7	
3	6C	04-Oct-19	1:15	Water	X	X	X	7	
4									
5									
6									
7									
8									
9									
10									
RELINQUISHED BY: (Signature/Print) DATE: (YYYY/MM/DD) TIME: (HH:MM)		RECEIVED BY: (Signature/Print) DATE: (YYYY/MM/DD) TIME: (HH:MM)		DATE: (YYYY/MM/DD) TIME: (HH:MM)		B985408_COC			

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Temp: 19.19 °C ... W. PEDRO TRK 2019/10/05 15:16

CHAIN OF CUSTODY R

COC #: 08473027

BBY FCD-00077/05
Page 31 of 31

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required			
Company Name: BMC MINERALS LTD.				Company Name: ALEXCO ENVIRONMENTAL				Quotation #: 860751				☒ Regular TAT 5 days (Most analyses) Rush TAT (Surcharge will be applied)			
Contact Name: _____				Contact Name: Mary Mioska, Renate Vanderhorst				P.O. # / A/E/F: _____				☐ Same Day ☐ 1 Day ☐ 2 Days ☐ 3 Days			
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS			
Vancouver, BC V6E 4A4				Whitehorse, YK V1A 2V3				Site Location: Kutuz Ze Kayah				Rush TAT (Surcharge will be applied)			
Phone: _____				Phone: (867) 668-6463				Site #: _____				Rush TAT (Surcharge will be applied)			
Email: _____				Email: mmioska@alexcoenvy.com				Sampled By: _____				Rush TAT (Surcharge will be applied)			
Regulatory Criteria				Special Instructions				Analysis Requested				Rush Confirmation #:			
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485								LABORATORY USE ONLY CUSTODY SEAL: Y / N COOLER TEMPERATURES Freezer: _____ Moist: _____ Temp: _____ Date: _____ Signature: _____			
SAMPLES MUST BE KEPT COOL (< 10 C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												LABORATORY USE ONLY COMMENTS: _____ COOLING MEDIA PRESENT: Y / N			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Ammonia	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS			
1 Influent	1:30	04-Oct-19		Water	X	X	X	X	X	7		Metals preserved with HNO3, dissolved metals field filtered			
2 1A	8:00	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
3 1B	10:45	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
4 1C	11:15	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
5 3A	8:00	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
6 3B	10:45	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
7 3C	1:15	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
8 4A	8:00	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
9 4B	10:45	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
10 4C	1:45	04-Oct-19		Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved metals field filtered			
RELINQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)				RECEIVED BY: (Signature/Print)			
_____				Oct 4/19				_____				_____			
_____				_____				_____				_____			

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B985408_COC





Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08474026, 08474078

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/10/28
 Report #: R2802494
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B990448

Received: 2019/10/21, 14:16

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	13	N/A	2019/10/23	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	10	N/A	2019/10/22	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	3	N/A	2019/10/23	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1, 2)	13	N/A	2019/10/24	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	13	N/A	2019/10/24	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	13	N/A	2019/10/24	BBY WI-00033	Auto Calc
Ion Balance (1)	13	N/A	2019/10/24	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	13	N/A	2019/10/24	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	13	N/A	2019/10/24	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	13	N/A	2019/10/23	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	13	N/A	2019/10/24	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	13	N/A	2019/10/23	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	11	N/A	2019/10/24	AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N Low Level (Preserved)	2	N/A	2019/10/25	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	13	N/A	2019/10/22	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	13	N/A	2019/10/22	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	13	N/A	2019/10/23	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	13	N/A	2019/10/22	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08474026, 08474078

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/10/28
Report #: R2802494
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B990448

Received: 2019/10/21, 14:16

use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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VERITAS

BV Labs Job #: B990448

Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WT3471		WT3472			WT3473	WT3474		
Sampling Date		2019/10/21 11:30		2019/10/21 11:00			2019/10/21 10:30	2019/10/21 09:00		
COC Number		08474026		08474026			08474026	08474026		
	UNITS	INFLUENT	RDL	1A	RDL	QC Batch	1B	1C	RDL	QC Batch

Calculated Parameters										
Anion Sum	meq/L	7.3	N/A	7.2	N/A	9637997	9.9	7.6	N/A	9637997
Cation Sum	meq/L	7.7	N/A	8.1	N/A	9637997	8.2	8.7	N/A	9637997
Filter and HNO3 Preservation	N/A	FIELD		FIELD		ONSITE	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	1.1	0.010	9637995	0.83	1.1	0.010	9637995
Ion Balance (% Difference)	%	3.4	N/A	6.1	N/A	9637996	9.2	6.4	N/A	9637996
Nitrate (N)	mg/L	0.399	0.0020	0.0682	0.0020	9638000	0.0043	<0.0020	0.0020	9638000

Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	61.0	0.50	64.2	0.50	9640091	69.5	75.3	0.50	9640091
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	9640091	<0.50	<0.50	0.50	9640091
Bicarbonate (HCO3)	mg/L	74.4	0.50	78.3	0.50	9640091	84.8	91.9	0.50	9640091
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	9640091	<0.50	<0.50	0.50	9640091
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	9640091	<0.50	<0.50	0.50	9640091

Anions										
Dissolved Chloride (Cl)	mg/L	62	0.50	66	0.50	9639835	65	69	0.50	9639835
Dissolved Sulphate (SO4)	mg/L	210 (1)	5.0	190	0.50	9639835	320 (1)	200 (1)	5.0	9639835

Nutrients										
Total Ammonia (N)	mg/L	0.88	0.0050	0.11	0.0050	9642724	0.037	0.022	0.0050	9641114
Nitrate plus Nitrite (N)	mg/L	0.399	0.0020	0.0755	0.0020	9638832	0.0043	<0.0020	0.0020	9638832
Nitrite (N)	mg/L	<0.0020	0.0020	0.0073	0.0020	9638834	<0.0020	<0.0020	0.0020	9638834

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B990448
Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WT3475			WT3476			WT3477	WT3478		
Sampling Date		2019/10/21 11:05			2019/10/21 10:35			2019/10/21 09:05	2019/10/21 11:50		
COC Number		08474026			08474026			08474026	08474026		
	UNITS	3A	RDL	QC Batch	3B	RDL	QC Batch	3C	4A	RDL	QC Batch
Calculated Parameters											
Anion Sum	meq/L	6.8	N/A	9637997	8.7	N/A	9637997	6.8	6.9	N/A	9637997
Cation Sum	meq/L	8.3	N/A	9637997	8.6	N/A	9637997	8.8	8.9	N/A	9637997
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.2	0.010	9637995	0.99	0.010	9637995	1.3	1.3	0.010	9637995
Ion Balance (% Difference)	%	10	N/A	9637996	0.42	N/A	9637996	13	13	N/A	9637996
Nitrate (N)	mg/L	0.0139	0.0020	9638000	<0.0020	0.0020	9638000	<0.0020	<0.0020	0.0020	9638000
Misc. Inorganics											
Alkalinity (Total as CaCO3)	mg/L	69.4	0.50	9640091	69.2	0.50	9640101	83.2	74.4	0.50	9640091
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9640091	<0.50	0.50	9640101	<0.50	<0.50	0.50	9640091
Bicarbonate (HCO3)	mg/L	84.7	0.50	9640091	84.4	0.50	9640101	102	90.8	0.50	9640091
Carbonate (CO3)	mg/L	<0.50	0.50	9640091	<0.50	0.50	9640101	<0.50	<0.50	0.50	9640091
Hydroxide (OH)	mg/L	<0.50	0.50	9640091	<0.50	0.50	9640101	<0.50	<0.50	0.50	9640091
Anions											
Dissolved Chloride (Cl)	mg/L	68	0.50	9639835	73	0.50	9639835	73	73	0.50	9639835
Dissolved Sulphate (SO4)	mg/L	170	0.50	9639835	250 (1)	5.0	9639835	150	160	0.50	9639835
Nutrients											
Total Ammonia (N)	mg/L	0.042	0.0050	9641114	0.034	0.0050	9641114	0.043	0.040	0.0050	9641114
Nitrate plus Nitrite (N)	mg/L	0.0139	0.0020	9638832	<0.0020	0.0020	9638832	<0.0020	<0.0020	0.0020	9638832
Nitrite (N)	mg/L	<0.0020	0.0020	9638834	<0.0020	0.0020	9638834	<0.0020	<0.0020	0.0020	9638834
RDL = Reportable Detection Limit											
N/A = Not Applicable											
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.											



BUREAU
VERITAS

BV Labs Job #: B990448

Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WT3479		WT3480		WT3482		WT3483		
Sampling Date		2019/10/21 10:40		2019/10/21 09:10		2019/10/21 11:55		2019/10/21 10:45		
COC Number		08474026		08474026		08474078		08474078		
	UNITS	4B	QC Batch	4C	RDL	6A	RDL	6B	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	9.4	9637997	9.8	N/A	7.6	N/A	8.0	N/A	9637997
Cation Sum	meq/L	9.3	9637997	10	N/A	8.5	N/A	9.2	N/A	9637997
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD		FIELD		FIELD		ONSITE
Ion Balance	N/A	0.99	9637995	1.1	0.010	1.1	0.010	1.1	0.010	9637995
Ion Balance (% Difference)	%	0.71	9637996	3.0	N/A	5.5	N/A	6.7	N/A	9637996
Nitrate (N)	mg/L	<0.0020	9638000	<0.0020	0.0020	0.0021	0.0020	0.0093	0.0020	9638000
Misc. Inorganics										
Alkalinity (Total as CaCO ₃)	mg/L	86.9	9640091	107	0.50	75.2	0.50	83.0	0.50	9640091
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	9640091	<0.50	0.50	<0.50	0.50	<0.50	0.50	9640091
Bicarbonate (HCO ₃)	mg/L	106	9640091	131	0.50	91.8	0.50	101	0.50	9640091
Carbonate (CO ₃)	mg/L	<0.50	9640091	<0.50	0.50	<0.50	0.50	<0.50	0.50	9640091
Hydroxide (OH)	mg/L	<0.50	9640091	<0.50	0.50	<0.50	0.50	<0.50	0.50	9640091
Anions										
Dissolved Chloride (Cl)	mg/L	74	9639835	82	0.50	71	0.50	74	0.50	9639835
Dissolved Sulphate (SO ₄)	mg/L	270 (1)	9639835	260 (1)	5.0	200	0.50	210 (1)	5.0	9639835
Nutrients										
Total Ammonia (N)	mg/L	0.036	9641114	0.026	0.0050	0.042	0.0050	0.024	0.0050	9641114
Nitrate plus Nitrite (N)	mg/L	<0.0020	9638832	<0.0020	0.0020	0.0021	0.0020	0.0093	0.0020	9638934
Nitrite (N)	mg/L	<0.0020	9638834	<0.0020	0.0020	<0.0020	0.0020	<0.0020	0.0020	9638935
RDL = Reportable Detection Limit										
N/A = Not Applicable										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WT3484		
Sampling Date		2019/10/21 09:15		
COC Number		08474078		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	8.5	N/A	9637997
Cation Sum	meq/L	9.6	N/A	9637997
Filter and HNO3 Preservation	N/A	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	9637995
Ion Balance (% Difference)	%	6.5	N/A	9637996
Nitrate (N)	mg/L	<0.0020	0.0020	9638000
Misc. Inorganics				
Alkalinity (Total as CaCO3)	mg/L	97.2	0.50	9640091
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9640091
Bicarbonate (HCO3)	mg/L	119	0.50	9640091
Carbonate (CO3)	mg/L	<0.50	0.50	9640091
Hydroxide (OH)	mg/L	<0.50	0.50	9640091
Anions				
Dissolved Chloride (Cl)	mg/L	78	0.50	9639835
Dissolved Sulphate (SO4)	mg/L	210 (1)	5.0	9639835
Nutrients				
Total Ammonia (N)	mg/L	0.049	0.0050	9641114
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9638934
Nitrite (N)	mg/L	<0.0020	0.0020	9638935
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.				



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BV Labs Job #: B990448
Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WT3471	WT3472	WT3473	WT3474	WT3475		
Sampling Date		2019/10/21 11:30	2019/10/21 11:00	2019/10/21 10:30	2019/10/21 09:00	2019/10/21 11:05		
COC Number		08474026	08474026	08474026	08474026	08474026		
	UNITS	INFLUENT	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	325	340	343	362	350	0.50	9637994
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0166	0.00352	0.00324	0.00271	0.00417	0.00050	9638696
Dissolved Antimony (Sb)	mg/L	0.0196	0.0106	0.00954	0.00944	0.0101	0.000020	9638696
Dissolved Arsenic (As)	mg/L	0.0580	0.0446	0.0333	0.0245	0.0373	0.000020	9638696
Dissolved Barium (Ba)	mg/L	0.0529	0.0545	0.0552	0.0590	0.0568	0.000020	9638696
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9638696
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9638696
Dissolved Boron (B)	mg/L	0.036	0.034	0.029	0.025	0.022	0.010	9638696
Dissolved Cadmium (Cd)	mg/L	0.00200	0.000269	0.000374	0.000250	0.000126	0.0000050	9638696
Dissolved Chromium (Cr)	mg/L	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9638696
Dissolved Cobalt (Co)	mg/L	0.00268	0.000387	0.0000646	0.0000468	0.000625	0.0000050	9638696
Dissolved Copper (Cu)	mg/L	0.0204	0.00542	0.00823	0.00489	0.00375	0.000050	9638696
Dissolved Iron (Fe)	mg/L	0.0274	0.0091	0.0095	0.0118	0.0118	0.0010	9638696
Dissolved Lead (Pb)	mg/L	0.0144	0.000944	0.000119	0.0000186	0.000966	0.0000050	9638696
Dissolved Lithium (Li)	mg/L	0.0117	0.0117	0.0117	0.0126	0.0122	0.00050	9638696
Dissolved Manganese (Mn)	mg/L	0.0516	0.0124	0.00182	0.00224	0.0224	0.000050	9638696
Dissolved Molybdenum (Mo)	mg/L	0.00156	0.00141	0.00134	0.00127	0.00131	0.000050	9638696
Dissolved Nickel (Ni)	mg/L	0.00807	0.00386	0.00389	0.00387	0.00479	0.000020	9638696
Dissolved Selenium (Se)	mg/L	0.00781	0.00373	0.00245	0.00228	0.00259	0.000040	9638696
Dissolved Silicon (Si)	mg/L	0.684	1.43	1.08	0.888	2.22	0.050	9638696
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9638696
Dissolved Strontium (Sr)	mg/L	0.603	0.625	0.628	0.663	0.641	0.000050	9638696
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9638696
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9638696
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9638696
Dissolved Uranium (U)	mg/L	0.0290	0.0175	0.0212	0.0225	0.0156	0.0000020	9638696
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9638696
Dissolved Zinc (Zn)	mg/L	0.161	0.0404	0.0476	0.0398	0.0256	0.00010	9638696
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9638696
Dissolved Calcium (Ca)	mg/L	102	107	109	115	110	0.050	9638081

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WT3471	WT3472	WT3473	WT3474	WT3475		
Sampling Date		2019/10/21 11:30	2019/10/21 11:00	2019/10/21 10:30	2019/10/21 09:00	2019/10/21 11:05		
COC Number		08474026	08474026	08474026	08474026	08474026		
	UNITS	INFLUENT	1A	1B	1C	3A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.8	17.7	17.5	18.1	18.1	0.050	9638081
Dissolved Potassium (K)	mg/L	3.76	5.03	6.58	7.74	4.73	0.050	9638081
Dissolved Sodium (Na)	mg/L	26.1	27.2	27.4	28.0	28.1	0.050	9638081
Dissolved Sulphur (S)	mg/L	85.7	89.0	88.7	91.9	93.3	3.0	9638081
RDL = Reportable Detection Limit								



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BV Labs Job #: B990448
Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WT3476	WT3477	WT3478	WT3479	WT3480		
Sampling Date		2019/10/21 10:35	2019/10/21 09:05	2019/10/21 11:50	2019/10/21 10:40	2019/10/21 09:10		
COC Number		08474026	08474026	08474026	08474026	08474026		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	359	370	374	391	439	0.50	9637994
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00214	0.00065	0.00309	0.00134	0.00127	0.00050	9638696
Dissolved Antimony (Sb)	mg/L	0.00783	0.00660	0.00451	0.00347	0.00402	0.000020	9638696
Dissolved Arsenic (As)	mg/L	0.0292	0.0236	0.0232	0.0137	0.00838	0.000020	9638696
Dissolved Barium (Ba)	mg/L	0.0594	0.0613	0.0597	0.0625	0.0660	0.000020	9638696
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9638696
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9638696
Dissolved Boron (B)	mg/L	0.018	0.012	0.025	<0.010	<0.010	0.010	9638696
Dissolved Cadmium (Cd)	mg/L	0.000234	0.000161	0.0000789	0.0000280	<0.0000050	0.0000050	9638696
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9638696
Dissolved Cobalt (Co)	mg/L	0.0000625	0.0000606	0.000407	0.0000643	0.0000636	0.0000050	9638696
Dissolved Copper (Cu)	mg/L	0.00509	0.00452	0.00171	0.00114	0.000665	0.000050	9638696
Dissolved Iron (Fe)	mg/L	0.0046	0.0056	0.0133	0.0044	0.0114	0.0010	9638696
Dissolved Lead (Pb)	mg/L	0.0000976	0.0000151	0.000615	0.0000838	0.0000414	0.0000050	9638696
Dissolved Lithium (Li)	mg/L	0.0127	0.0128	0.0128	0.0133	0.0149	0.00050	9638696
Dissolved Manganese (Mn)	mg/L	0.000571	0.000399	0.0175	0.00172	0.00825	0.000050	9638696
Dissolved Molybdenum (Mo)	mg/L	0.00105	0.000935	0.000588	0.000190	0.000102	0.000050	9638696
Dissolved Nickel (Ni)	mg/L	0.00406	0.00440	0.00469	0.00400	0.00375	0.000020	9638696
Dissolved Selenium (Se)	mg/L	0.00151	0.00117	0.00109	0.000695	0.000502	0.000040	9638696
Dissolved Silicon (Si)	mg/L	2.26	2.31	2.05	1.91	1.65	0.050	9638696
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9638696
Dissolved Strontium (Sr)	mg/L	0.650	0.655	0.664	0.689	0.763	0.000050	9638696
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9638696
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9638696
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9638696
Dissolved Uranium (U)	mg/L	0.0186	0.0222	0.00712	0.00652	0.00731	0.0000020	9638696
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9638696
Dissolved Zinc (Zn)	mg/L	0.0268	0.0352	0.0134	0.00864	0.00534	0.00010	9638696
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9638696
Dissolved Calcium (Ca)	mg/L	113	117	118	124	139	0.050	9638081

RDL = Reportable Detection Limit



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BV Labs Job #: B990448
Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WT3476	WT3477	WT3478	WT3479	WT3480		
Sampling Date		2019/10/21 10:35	2019/10/21 09:05	2019/10/21 11:50	2019/10/21 10:40	2019/10/21 09:10		
COC Number		08474026	08474026	08474026	08474026	08474026		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	18.4	18.7	19.2	19.7	22.3	0.050	9638081
Dissolved Potassium (K)	mg/L	6.33	6.94	4.10	5.56	5.62	0.050	9638081
Dissolved Sodium (Na)	mg/L	28.7	29.1	29.3	30.4	34.1	0.050	9638081
Dissolved Sulphur (S)	mg/L	90.6	91.7	95.3	97.8	106	3.0	9638081
RDL = Reportable Detection Limit								



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BV Labs Job #: B990448

Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WT3482	WT3483	WT3484		
Sampling Date		2019/10/21 11:55	2019/10/21 10:45	2019/10/21 09:15		
COC Number		08474078	08474078	08474078		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	358	384	403	0.50	9637994
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00334	0.00142	0.00078	0.00050	9638696
Dissolved Antimony (Sb)	mg/L	0.00504	0.00507	0.00406	0.000020	9638696
Dissolved Arsenic (As)	mg/L	0.0222	0.0154	0.0113	0.000020	9638696
Dissolved Barium (Ba)	mg/L	0.0608	0.0630	0.0671	0.000020	9638696
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9638696
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9638696
Dissolved Boron (B)	mg/L	0.024	0.013	<0.010	0.010	9638696
Dissolved Cadmium (Cd)	mg/L	0.000116	0.0000415	0.0000092	0.0000050	9638696
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9638696
Dissolved Cobalt (Co)	mg/L	0.00114	0.0000794	0.0000630	0.0000050	9638696
Dissolved Copper (Cu)	mg/L	0.00243	0.00132	0.000735	0.000050	9638696
Dissolved Iron (Fe)	mg/L	0.0380	0.0068	0.0114	0.0010	9638696
Dissolved Lead (Pb)	mg/L	0.00103	0.0000641	0.0000119	0.0000050	9638696
Dissolved Lithium (Li)	mg/L	0.0124	0.0129	0.0140	0.00050	9638696
Dissolved Manganese (Mn)	mg/L	0.0520	0.00401	0.00488	0.000050	9638696
Dissolved Molybdenum (Mo)	mg/L	0.000595	0.000272	0.000274	0.000050	9638696
Dissolved Nickel (Ni)	mg/L	0.00436	0.00412	0.00330	0.000020	9638696
Dissolved Selenium (Se)	mg/L	0.00124	0.000725	0.000522	0.000040	9638696
Dissolved Silicon (Si)	mg/L	2.53	2.22	1.98	0.050	9638696
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9638696
Dissolved Strontium (Sr)	mg/L	0.648	0.674	0.708	0.000050	9638696
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9638696
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9638696
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9638696
Dissolved Uranium (U)	mg/L	0.0115	0.00790	0.00912	0.0000020	9638696
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9638696
Dissolved Zinc (Zn)	mg/L	0.0106	0.0136	0.00921	0.00010	9638696
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9638696
Dissolved Calcium (Ca)	mg/L	113	121	127	0.050	9638081
RDL = Reportable Detection Limit						



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WT3482	WT3483	WT3484		
Sampling Date		2019/10/21 11:55	2019/10/21 10:45	2019/10/21 09:15		
COC Number		08474078	08474078	08474078		
	UNITS	6A	6B	6C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	18.5	19.9	20.6	0.050	9638081
Dissolved Potassium (K)	mg/L	4.86	6.56	8.09	0.050	9638081
Dissolved Sodium (Na)	mg/L	28.0	30.3	31.5	0.050	9638081
Dissolved Sulphur (S)	mg/L	90.7	93.8	97.1	3.0	9638081
RDL = Reportable Detection Limit						

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VERITASBV Labs Job #: B990448
Report Date: 2019/10/28ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WT3471	WT3472	WT3473	WT3474	WT3475		
Sampling Date		2019/10/21 11:30	2019/10/21 11:00	2019/10/21 10:30	2019/10/21 09:00	2019/10/21 11:05		
COC Number		08474026	08474026	08474026	08474026	08474026		
	UNITS	INFLUENT	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	336	350	359	370	364	0.50	9637993
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0260	0.00491	0.0105	0.00149	0.00468	0.00050	9639787
Total Antimony (Sb)	mg/L	0.0195	0.0102	0.00955	0.00928	0.00990	0.000020	9639787
Total Arsenic (As)	mg/L	0.0579	0.0434	0.0327	0.0235	0.0367	0.000020	9639787
Total Barium (Ba)	mg/L	0.0516	0.0522	0.0545	0.0572	0.0558	0.000020	9639787
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9639787
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9639787
Total Boron (B)	mg/L	0.037	0.037	0.033	0.028	0.025	0.010	9639787
Total Cadmium (Cd)	mg/L	0.00196	0.000292	0.000396	0.000260	0.000141	0.0000050	9639787
Total Chromium (Cr)	mg/L	0.00017	<0.00010	0.00023	<0.00010	<0.00010	0.00010	9639787
Total Cobalt (Co)	mg/L	0.00254	0.000380	0.0000702	0.0000459	0.000634	0.0000050	9639787
Total Copper (Cu)	mg/L	0.0207	0.00579	0.0122	0.00486	0.00373	0.000050	9639787
Total Iron (Fe)	mg/L	0.0426	0.0123	0.0220	0.0134	0.0162	0.0010	9639787
Total Lead (Pb)	mg/L	0.0185	0.00118	0.000276	0.0000168	0.00128	0.0000050	9639787
Total Lithium (Li)	mg/L	0.0114	0.0119	0.0122	0.0125	0.0122	0.00050	9639787
Total Manganese (Mn)	mg/L	0.0520	0.0129	0.00254	0.00238	0.0237	0.000050	9639787
Total Molybdenum (Mo)	mg/L	0.00155	0.00137	0.00133	0.00125	0.00129	0.000050	9639787
Total Nickel (Ni)	mg/L	0.00777	0.00373	0.00473	0.00389	0.00493	0.000020	9639787
Total Selenium (Se)	mg/L	0.00758	0.00360	0.00237	0.00219	0.00257	0.000040	9639787
Total Silicon (Si)	mg/L	0.661	1.40	1.06	0.841	2.16	0.050	9639787
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000077	<0.0000050	<0.0000050	0.0000050	9639787
Total Strontium (Sr)	mg/L	0.579	0.614	0.626	0.632	0.630	0.000050	9639787
Total Thallium (Tl)	mg/L	<0.0000020	0.0000024	0.0000031	0.0000023	<0.0000020	0.0000020	9639787
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9639787
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9639787
Total Uranium (U)	mg/L	0.0287	0.0176	0.0215	0.0221	0.0158	0.0000020	9639787
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9639787
Total Zinc (Zn)	mg/L	0.159	0.0404	0.0548	0.0373	0.0257	0.00010	9639787
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9639787
Total Calcium (Ca)	mg/L	106	111	114	118	115	0.050	9638082

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B990448
Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WT3471	WT3472	WT3473	WT3474	WT3475		
Sampling Date		2019/10/21 11:30	2019/10/21 11:00	2019/10/21 10:30	2019/10/21 09:00	2019/10/21 11:05		
COC Number		08474026	08474026	08474026	08474026	08474026		
	UNITS	INFLUENT	1A	1B	1C	3A	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.9	17.4	17.9	18.3	18.7	0.050	9638082
Total Potassium (K)	mg/L	3.71	4.91	6.65	7.75	4.69	0.050	9638082
Total Sodium (Na)	mg/L	26.0	27.0	28.0	28.6	29.1	0.050	9638082
Total Sulphur (S)	mg/L	83.9	87.4	92.0	93.0	92.0	3.0	9638082
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B990448
Report Date: 2019/10/28ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WT3476	WT3477	WT3478	WT3479	WT3480		
Sampling Date		2019/10/21 10:35	2019/10/21 09:05	2019/10/21 11:50	2019/10/21 10:40	2019/10/21 09:10		
COC Number		08474026	08474026	08474026	08474026	08474026		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	374	390	387	420	470	0.50	9637993
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00360	0.00090	0.00381	0.00206	0.00131	0.00050	9639787
Total Antimony (Sb)	mg/L	0.00783	0.00659	0.00451	0.00351	0.00413	0.000020	9639787
Total Arsenic (As)	mg/L	0.0293	0.0234	0.0231	0.0137	0.00862	0.000020	9639787
Total Barium (Ba)	mg/L	0.0592	0.0612	0.0593	0.0623	0.0675	0.000020	9639787
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9639787
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9639787
Total Boron (B)	mg/L	0.021	0.015	0.027	0.011	<0.010	0.010	9639787
Total Cadmium (Cd)	mg/L	0.000234	0.000167	0.0000844	0.0000314	0.0000057	0.0000050	9639787
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9639787
Total Cobalt (Co)	mg/L	0.0000664	0.0000590	0.000422	0.0000732	0.0000657	0.0000050	9639787
Total Copper (Cu)	mg/L	0.00514	0.00449	0.00188	0.00120	0.000699	0.000050	9639787
Total Iron (Fe)	mg/L	0.0062	0.0061	0.0175	0.0068	0.0146	0.0010	9639787
Total Lead (Pb)	mg/L	0.000116	0.0000159	0.000748	0.000102	0.0000425	0.0000050	9639787
Total Lithium (Li)	mg/L	0.0129	0.0131	0.0129	0.0135	0.0155	0.00050	9639787
Total Manganese (Mn)	mg/L	0.000791	0.000397	0.0195	0.00261	0.00859	0.000050	9639787
Total Molybdenum (Mo)	mg/L	0.00103	0.000903	0.000554	0.000195	0.000094	0.000050	9639787
Total Nickel (Ni)	mg/L	0.00411	0.00451	0.00466	0.00401	0.00371	0.000020	9639787
Total Selenium (Se)	mg/L	0.00148	0.00117	0.00107	0.000664	0.000467	0.000040	9639787
Total Silicon (Si)	mg/L	2.23	2.30	2.00	1.91	1.68	0.050	9639787
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9639787
Total Strontium (Sr)	mg/L	0.642	0.656	0.650	0.709	0.782	0.000050	9639787
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9639787
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9639787
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9639787
Total Uranium (U)	mg/L	0.0183	0.0228	0.00691	0.00649	0.00730	0.0000020	9639787
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9639787
Total Zinc (Zn)	mg/L	0.0294	0.0358	0.0136	0.00837	0.00527	0.00010	9639787
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9639787
Total Calcium (Ca)	mg/L	119	125	124	135	150	0.050	9638082

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B990448
Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WT3476	WT3477	WT3478	WT3479	WT3480		
Sampling Date		2019/10/21 10:35	2019/10/21 09:05	2019/10/21 11:50	2019/10/21 10:40	2019/10/21 09:10		
COC Number		08474026	08474026	08474026	08474026	08474026		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	18.8	18.9	19.0	20.3	23.1	0.050	9638082
Total Potassium (K)	mg/L	6.40	7.15	4.14	5.72	5.87	0.050	9638082
Total Sodium (Na)	mg/L	29.3	29.1	28.8	31.2	35.2	0.050	9638082
Total Sulphur (S)	mg/L	93.7	92.6	95.0	101	111	3.0	9638082
RDL = Reportable Detection Limit								



BV Labs Job #: B990448
Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WT3482	WT3483	WT3484		
Sampling Date		2019/10/21 11:55	2019/10/21 10:45	2019/10/21 09:15		
COC Number		08474078	08474078	08474078		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	376	406	428	0.50	9637993
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00408	0.00618	0.00107	0.00050	9639787
Total Antimony (Sb)	mg/L	0.00521	0.00517	0.00415	0.000020	9639787
Total Arsenic (As)	mg/L	0.0232	0.0156	0.0113	0.000020	9639787
Total Barium (Ba)	mg/L	0.0605	0.0634	0.0670	0.000020	9639787
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9639787
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9639787
Total Boron (B)	mg/L	0.026	0.015	<0.010	0.010	9639787
Total Cadmium (Cd)	mg/L	0.000143	0.0000473	0.0000117	0.0000050	9639787
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9639787
Total Cobalt (Co)	mg/L	0.00110	0.000115	0.0000571	0.0000050	9639787
Total Copper (Cu)	mg/L	0.00305	0.00156	0.000733	0.000050	9639787
Total Iron (Fe)	mg/L	0.0674	0.0142	0.0126	0.0010	9639787
Total Lead (Pb)	mg/L	0.00141	0.000110	0.0000120	0.0000050	9639787
Total Lithium (Li)	mg/L	0.0126	0.0132	0.0148	0.00050	9639787
Total Manganese (Mn)	mg/L	0.0534	0.0108	0.00489	0.000050	9639787
Total Molybdenum (Mo)	mg/L	0.000613	0.000291	0.000279	0.000050	9639787
Total Nickel (Ni)	mg/L	0.00434	0.00422	0.00315	0.000020	9639787
Total Selenium (Se)	mg/L	0.00123	0.000777	0.000474	0.000040	9639787
Total Silicon (Si)	mg/L	2.51	2.23	2.04	0.050	9639787
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9639787
Total Strontium (Sr)	mg/L	0.660	0.689	0.719	0.000050	9639787
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9639787
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9639787
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9639787
Total Uranium (U)	mg/L	0.0115	0.00779	0.00901	0.0000020	9639787
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9639787
Total Zinc (Zn)	mg/L	0.0118	0.0144	0.00812	0.00010	9639787
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9639787
Total Calcium (Ca)	mg/L	120	130	137	0.050	9638082
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WT3482	WT3483	WT3484		
Sampling Date		2019/10/21 11:55	2019/10/21 10:45	2019/10/21 09:15		
COC Number		08474078	08474078	08474078		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	18.7	19.8	20.9	0.050	9638082
Total Potassium (K)	mg/L	4.95	6.78	8.43	0.050	9638082
Total Sodium (Na)	mg/L	28.1	30.2	32.2	0.050	9638082
Total Sulphur (S)	mg/L	92.6	96.4	101	3.0	9638082
RDL = Reportable Detection Limit						



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VERITAS

BV Labs Job #: B990448

Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.0°C
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Results relate only to the items tested.



BV Labs Job #: B990448
Report Date: 2019/10/28

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9638696	Dissolved Aluminum (Al)	2019/10/23	99	80 - 120	101	80 - 120	<0.00050	mg/L	1.5	20
9638696	Dissolved Antimony (Sb)	2019/10/23	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.047	20
9638696	Dissolved Arsenic (As)	2019/10/23	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.67	20
9638696	Dissolved Barium (Ba)	2019/10/23	NC	80 - 120	105	80 - 120	<0.000020	mg/L	0.27	20
9638696	Dissolved Beryllium (Be)	2019/10/23	95	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9638696	Dissolved Bismuth (Bi)	2019/10/23	96	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9638696	Dissolved Boron (B)	2019/10/23	95	80 - 120	100	80 - 120	<0.010	mg/L	0.21	20
9638696	Dissolved Cadmium (Cd)	2019/10/23	98	80 - 120	104	80 - 120	<0.0000050	mg/L	2.2	20
9638696	Dissolved Chromium (Cr)	2019/10/23	99	80 - 120	105	80 - 120	<0.00010	mg/L	0.98	20
9638696	Dissolved Cobalt (Co)	2019/10/23	97	80 - 120	104	80 - 120	<0.0000050	mg/L	0.40	20
9638696	Dissolved Copper (Cu)	2019/10/23	92	80 - 120	104	80 - 120	<0.000050	mg/L	0.33	20
9638696	Dissolved Iron (Fe)	2019/10/23	97	80 - 120	105	80 - 120	<0.0010	mg/L	0.96	20
9638696	Dissolved Lead (Pb)	2019/10/23	98	80 - 120	104	80 - 120	<0.0000050	mg/L	0.23	20
9638696	Dissolved Lithium (Li)	2019/10/23	93	80 - 120	101	80 - 120	<0.00050	mg/L	0.37	20
9638696	Dissolved Manganese (Mn)	2019/10/23	NC	80 - 120	105	80 - 120	<0.000050	mg/L	1.0	20
9638696	Dissolved Molybdenum (Mo)	2019/10/23	106	80 - 120	103	80 - 120	<0.000050	mg/L	0.26	20
9638696	Dissolved Nickel (Ni)	2019/10/23	95	80 - 120	104	80 - 120	<0.000020	mg/L	1.1	20
9638696	Dissolved Selenium (Se)	2019/10/23	104	80 - 120	104	80 - 120	<0.000040	mg/L	0.37	20
9638696	Dissolved Silicon (Si)	2019/10/23	96	80 - 120	102	80 - 120	<0.050	mg/L	0.29	20
9638696	Dissolved Silver (Ag)	2019/10/23	98	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9638696	Dissolved Strontium (Sr)	2019/10/23	NC	80 - 120	104	80 - 120	<0.000050	mg/L	0.59	20
9638696	Dissolved Thallium (Tl)	2019/10/23	99	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9638696	Dissolved Tin (Sn)	2019/10/23	92	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9638696	Dissolved Titanium (Ti)	2019/10/23	103	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
9638696	Dissolved Uranium (U)	2019/10/23	102	80 - 120	105	80 - 120	<0.0000020	mg/L	0.61	20
9638696	Dissolved Vanadium (V)	2019/10/23	102	80 - 120	104	80 - 120	<0.00020	mg/L	NC	20
9638696	Dissolved Zinc (Zn)	2019/10/23	NC	80 - 120	107	80 - 120	<0.00010	mg/L	0.49	20
9638696	Dissolved Zirconium (Zr)	2019/10/23	105	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9638832	Nitrate plus Nitrite (N)	2019/10/22			107	80 - 120	<0.0020	mg/L		
9638834	Nitrite (N)	2019/10/22			103	80 - 120	<0.0020	mg/L		
9638934	Nitrate plus Nitrite (N)	2019/10/22	109	80 - 120	107	80 - 120	<0.0020	mg/L	NC	25
9638935	Nitrite (N)	2019/10/22	105	80 - 120	102	80 - 120	<0.0020	mg/L	NC	25



BV Labs Job #: B990448
Report Date: 2019/10/28

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9639787	Total Aluminum (Al)	2019/10/23	105	80 - 120	101	80 - 120	<0.00050	mg/L	10	20
9639787	Total Antimony (Sb)	2019/10/23	101	80 - 120	98	80 - 120	<0.000020	mg/L	1.4	20
9639787	Total Arsenic (As)	2019/10/23	107	80 - 120	98	80 - 120	<0.000020	mg/L	0.90	20
9639787	Total Barium (Ba)	2019/10/23	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.41	20
9639787	Total Beryllium (Be)	2019/10/23	104	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9639787	Total Bismuth (Bi)	2019/10/23	100	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9639787	Total Boron (B)	2019/10/23	105	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9639787	Total Cadmium (Cd)	2019/10/23	104	80 - 120	101	80 - 120	<0.0000050	mg/L	0.85	20
9639787	Total Chromium (Cr)	2019/10/23	100	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9639787	Total Cobalt (Co)	2019/10/23	96	80 - 120	96	80 - 120	<0.0000050	mg/L	0.18	20
9639787	Total Copper (Cu)	2019/10/23	94	80 - 120	96	80 - 120	<0.000050	mg/L	1.0	20
9639787	Total Iron (Fe)	2019/10/23	106	80 - 120	98	80 - 120	<0.0010	mg/L	2.3	20
9639787	Total Lead (Pb)	2019/10/23	104	80 - 120	101	80 - 120	<0.0000050	mg/L	1.7	20
9639787	Total Lithium (Li)	2019/10/23	103	80 - 120	101	80 - 120	<0.00050	mg/L	0.65	20
9639787	Total Manganese (Mn)	2019/10/23	102	80 - 120	99	80 - 120	<0.000050	mg/L	1.7	20
9639787	Total Molybdenum (Mo)	2019/10/23	108	80 - 120	97	80 - 120	<0.000050	mg/L	3.2	20
9639787	Total Nickel (Ni)	2019/10/23	98	80 - 120	100	80 - 120	<0.000020	mg/L	1.4	20
9639787	Total Selenium (Se)	2019/10/23	105	80 - 120	98	80 - 120	<0.000040	mg/L	7.6	20
9639787	Total Silicon (Si)	2019/10/23	111	80 - 120	92	80 - 120	<0.050	mg/L	2.4	20
9639787	Total Silver (Ag)	2019/10/23	104	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9639787	Total Strontium (Sr)	2019/10/23	NC	80 - 120	95	80 - 120	<0.000050	mg/L	0.68	20
9639787	Total Thallium (Tl)	2019/10/23	104	80 - 120	98	80 - 120	<0.0000020	mg/L	NC	20
9639787	Total Tin (Sn)	2019/10/23	97	80 - 120	92	80 - 120	<0.000020	mg/L	NC	20
9639787	Total Titanium (Ti)	2019/10/23	105	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9639787	Total Uranium (U)	2019/10/23	108	80 - 120	101	80 - 120	<0.0000020	mg/L	0.47	20
9639787	Total Vanadium (V)	2019/10/23	104	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9639787	Total Zinc (Zn)	2019/10/23	97	80 - 120	103	80 - 120	<0.00010	mg/L	1.6	20
9639787	Total Zirconium (Zr)	2019/10/23	110	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9639835	Dissolved Chloride (Cl)	2019/10/22	NC	80 - 120	104	80 - 120	<0.50	mg/L	3.2	20
9639835	Dissolved Sulphate (SO4)	2019/10/22	NC	80 - 120	102	80 - 120	0.66, RDL=0.50	mg/L	2.2	20
9640091	Alkalinity (PP as CaCO3)	2019/10/23					<0.50	mg/L	NC	20
9640091	Alkalinity (Total as CaCO3)	2019/10/23	NC	80 - 120	95	80 - 120	<0.50	mg/L	0.11	20



BV Labs Job #: B990448
Report Date: 2019/10/28

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9640091	Bicarbonate (HCO3)	2019/10/23					<0.50	mg/L	0.11	20
9640091	Carbonate (CO3)	2019/10/23					<0.50	mg/L	NC	20
9640091	Hydroxide (OH)	2019/10/23					<0.50	mg/L	NC	20
9640101	Alkalinity (PP as CaCO3)	2019/10/23					<0.50	mg/L	NC	20
9640101	Alkalinity (Total as CaCO3)	2019/10/23	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.058	20
9640101	Bicarbonate (HCO3)	2019/10/23					<0.50	mg/L	0.058	20
9640101	Carbonate (CO3)	2019/10/23					<0.50	mg/L	NC	20
9640101	Hydroxide (OH)	2019/10/23					<0.50	mg/L	NC	20
9641114	Total Ammonia (N)	2019/10/24	105	80 - 120	110	80 - 120	<0.0050	mg/L	5.9	20
9642724	Total Ammonia (N)	2019/10/25	85	80 - 120	104	80 - 120	<0.0050	mg/L	14	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



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BV Labs Job #: B990448
Report Date: 2019/10/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY

COC#

08474026

BBV FCD-00077/05

Page 1 of 2

Invoice Information Company Name: <u>BMC MINERALS LTD.</u> Contact Name: _____ Address: <u>530-1130 WEST PENDEK ST</u> Vancouver, BC V6E 4A4 Phone: _____ Email: _____		Report Information (if differs from Invoice) Company Name: <u>ALEKO ENVIRONMENTAL</u> Contact Name: <u>Mary Mloska; Renate Vanderhorst</u> Address: <u>UNIT 3 1151 INDUSTRIAL RD</u> Whitehorse, BC V1A 2V3 Phone: <u>(867) 668-6463</u> Email: <u>mmloska@alekoenv.com</u>		Project Information (where applicable) Quotation #: <u>B60751</u> P.O. # / A/E/R: _____ Project #: <u>BMC-18-02</u> Site Location: <u>Kudzu Ze Kayah</u> Site #: _____ Sampled By: _____		Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analyses) Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days	
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) <u>USE SCENARIO # 22485</u>		Analysis Requested		Rush Confirmation #:	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM		Sample Identification Lab Identification: _____ Date Sampled (YYYY/MM/DD): _____ Time Sampled (HH:MM): _____ Matrix: _____		Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity Ammonia		# OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE COMMENTS: _____	
1	Influent	21-Oct-19	11:30	Water	X	X	X
2	1A	21-Oct-19	11:00	Water	X	X	X
3	1B	21-Oct-19	10:30	Water	X	X	X
4	1C	21-Oct-19	9:00	Water	X	X	X
5	3A	21-Oct-19	11:05	Water	X	X	X
6	3B	21-Oct-19	10:35	Water	X	X	X
7	3C	21-Oct-19	9:05	Water	X	X	X
8	4A	21-Oct-19	11:50	Water	X	X	X
9	4B	21-Oct-19	10:40	Water	X	X	X
10	4C	21-Oct-19	9:10	Water	X	X	X
RELINQUISHED BY: (Signature/Print) <u>Brian Roberts</u>		DATE: (YYYY/MM/DD) <u>2019/10/21</u>		TIME: (HH:MM) <u>15:50</u>		RECEIVED BY: (Signature/Print) <u>BV: Kadean Vanderhorst</u>	
DATE: (YYYY/MM/DD) <u>2019/10/22</u>		TIME: (HH:MM) <u>8:20</u>		COMMENTS: <u>ADJUTANT</u>		COMMENTS: <u>ADJUTANT</u>	

966

Temp: 17.1/16.1/15

B990448_COC



Burnaby: 4506 Canada Way, Burnaby, BC V5G 1K5, Toll Free (800) 665-8566

CHAIN OF CUSTODY RE

08.47.4078

BBY FCD-00077/05
Page 2 of 2

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required									
Company Name: BMC MINERALS LTD.				Company Name: ALECO ENVIRONMENTAL				Quotation #: B60751				☒ Regular TAT 5 days (short analysis)									
Contact Name: _____				Contact Name: Mary Miodak, Renate Vanderhorst				P.O. #/ A/F #: _____				Rush TAT (Surcharges will be applied)									
Address: 530-1130 WEST PENDEB ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02				Same Day									
Warehouse: BC PC: V6E 4A4				Warehouse: WV PC: V1A 2V3				Site Location: Kudze Kayah				1 Day									
Phone: _____				Phone: (867) 668-6463				Site #: _____				2 Days									
Email: _____				Email: mmioska@alecoenv.com				Sampled By: _____				3 Days									
Regulatory Criteria				Special Instructions				Analysis Requested				Rush Confirmation #:									
☐ BC CSR Soil ☐ BC CSR Water				☐ Return Cooler								☐ Laboratory Use Only									
☐ CCME (Specify) ☐ Other (Specify)				☐ Ship Sample Bottles (Please Specify)								☐ OXIDIZER TEMPERATURES									
☐ Drinking Water ☐ BC Water Quality				USE SCENARIO # 12485								☐ Present ☐ Infected									
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																					
Sample Identification		Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals		Low Level Total Metals		Anions (SO ₄ , NO ₂ , NO ₃ , Cl)		Alkalinity		Ammonia		# OF CONTAINERS SUBMITTED		HOLD - DO NOT ANALYZE		COMMENTS	
1	6A		21-Oct-19	10:55	Water	X	X	X	X	X							7			Metals preserved with HNO ₃ , dissolved metals field filtered, ammonia preserved	
2	6B		21-Oct-19	10:45	Water	X	X	X	X	X							7			Metals preserved with HNO ₃ , dissolved metals field filtered, ammonia preserved	
3	6C		21-Oct-19	9:15	Water	X	X	X	X	X							7			Metals preserved with HNO ₃ , dissolved metals field filtered, ammonia preserved	
4																					
5																					
6																					
7																					
8																					
9																					
10																					
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)														
<i>Brian Richards</i>		2019/10/21		<i>ABDUMOTE A</i>		2019/10/22	8:20														

B990448_COC





Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08474499, 08474503

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/11/14
 Report #: R2810917
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B996415

Received: 2019/11/06, 15:33

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	5	N/A	2019/11/08	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	13	N/A	2019/11/08	BBY6SOP-00026	SM 22 2320 B m
Biochemical Oxygen Demand (1)	5	2019/11/08	2019/11/13	BBY6SOP-00045	SM 23 5210 B m
Low level chloride/sulphate by AC (1)	13	N/A	2019/11/08	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
COD by Colorimeter (1)	5	N/A	2019/11/14	BBY6SOP-00024	SM 23 5220 D m
Carbon (DOC) (2)	1	N/A	2019/11/12	AB SOP-00087	MMCW 119 1996 m
Carbon (DOC) (2)	4	N/A	2019/11/13	AB SOP-00087	MMCW 119 1996 m
Hardness Total (calculated as CaCO ₃) (1, 3)	13	N/A	2019/11/12	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	13	N/A	2019/11/09	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	13	N/A	2019/11/12	BBY WI-00033	Auto Calc
Ion Balance (1)	13	N/A	2019/11/12	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	13	N/A	2019/11/12	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	13	N/A	2019/11/09	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	13	N/A	2019/11/08	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	13	N/A	2019/11/12	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	13	N/A	2019/11/09	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	10	N/A	2019/11/13	AB SOP-00007	SM 23 4500 NH ₃ A G m
Ammonia-N Low Level (Preserved)	3	N/A	2019/11/14	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	13	N/A	2019/11/08	BBY6SOP-00010	SM 23 4500-NO ₃ -I m
Nitrite (N) (low level) (1)	13	N/A	2019/11/08	BBY6SOP-00010	SM 23 4500-NO ₃ -I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	13	N/A	2019/11/08	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	13	N/A	2019/11/07	BBY7 WI-00004	SM 23 3030B m
Carbon (Total Organic) (4)	5	N/A	2019/11/13	AB SOP-00087	MMCW 119 1996 m
Total Suspended Solids (NFR)	5	2019/11/12	2019/11/12	AB SOP-00061	SM 23 2540 D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08474499, 08474503

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/11/14
Report #: R2810917
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B996415

Received: 2019/11/06, 15:33

data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by BV Labs Vancouver
- (2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
- (4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WW8473			WW8474		WW8475		
Sampling Date		2019/11/06 15:30			2019/11/06 13:30		2019/11/06 10:30		
COC Number		08474499			08474499		08474499		
	UNITS	INFL-61	RDL	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.0	N/A	9662620	8.0	9662620	8.2	N/A	9662620
Cation Sum	meq/L	7.9	N/A	9662620	7.9	9662620	8.2	N/A	9662620
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.99	0.010	9662616	1.0	9662616	1.0	0.010	9662616
Ion Balance (% Difference)	%	0.60	N/A	9662618	0.033	9662618	0.086	N/A	9662618
Nitrate (N)	mg/L	0.366	0.0020	9662622	0.280	9662622	0.0202	0.0020	9662622
Demand Parameters									
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9663439					
Chemical Oxygen Demand	mg/L	17	10	9668785					
Misc. Inorganics									
Dissolved Organic Carbon (C)	mg/L	2.8	0.50	9666692					
Acidity (pH 4.5)	mg/L	<1.0	1.0	9667705					
Alkalinity (Total as CaCO ₃)	mg/L	46.7	0.50	9664161	57.5	9664161	69.0	0.50	9664161
Total Organic Carbon (C)	mg/L	2.6	0.50	9666755					
Acidity (pH 8.3)	mg/L	1.8	1.0	9667705					
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9664161	<0.50	9664161	<0.50	0.50	9664161
Bicarbonate (HCO ₃)	mg/L	56.9	0.50	9664161	70.2	9664161	84.1	0.50	9664161
Carbonate (CO ₃)	mg/L	<0.50	0.50	9664161	<0.50	9664161	<0.50	0.50	9664161
Hydroxide (OH)	mg/L	<0.50	0.50	9664161	<0.50	9664161	<0.50	0.50	9664161
Total Suspended Solids	mg/L	<1.0	1.0	9666895					
Anions									
Dissolved Chloride (Cl)	mg/L	78	0.50	9664773	67	9664773	65	0.50	9664773
Dissolved Sulphate (SO ₄)	mg/L	230	5.0	9664773	230	9664773	240	5.0	9664773
Nutrients									
Total Ammonia (N)	mg/L	0.77 (1)	0.010	9668403	0.012	9668403	0.020	0.0050	9668251
Nitrate plus Nitrite (N)	mg/L	0.378	0.0020	9664405	0.285	9664405	0.0202	0.0020	9664405
Nitrite (N)	mg/L	0.0125	0.0020	9664408	0.0047	9664408	<0.0020	0.0020	9664408
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



BUREAU
VERITAS

BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WW8476			WW8477		WW8478		
Sampling Date		2019/11/06 08:30			2019/11/06 15:00		2019/11/06 14:30		
COC Number		08474499			08474499		08474499		
	UNITS	1C	RDL	QC Batch	3A	QC Batch	3B	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.3	N/A	9662620	7.7	9662620	8.1	N/A	9662620
Cation Sum	meq/L	8.4	N/A	9662620	8.2	9662620	8.4	N/A	9662620
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9662616	1.1	9662616	1.0	0.010	9662616
Ion Balance (% Difference)	%	0.67	N/A	9662618	3.0	9662618	1.9	N/A	9662618
Nitrate (N)	mg/L	0.0059	0.0020	9662622	0.0025	9662622	<0.0020	0.0020	9662622
Demand Parameters									
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9663439					
Chemical Oxygen Demand	mg/L	19	10	9668785					
Misc. Inorganics									
Dissolved Organic Carbon (C)	mg/L	3.4	0.50	9666692					
Acidity (pH 4.5)	mg/L	<1.0	1.0	9667705					
Alkalinity (Total as CaCO ₃)	mg/L	75.8	0.50	9664161	65.3	9664153	70.7	0.50	9664153
Total Organic Carbon (C)	mg/L	3.0	0.50	9666755					
Acidity (pH 8.3)	mg/L	4.1	1.0	9667705					
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9664161	<0.50	9664153	<0.50	0.50	9664153
Bicarbonate (HCO ₃)	mg/L	92.4	0.50	9664161	79.7	9664153	86.2	0.50	9664153
Carbonate (CO ₃)	mg/L	<0.50	0.50	9664161	<0.50	9664153	<0.50	0.50	9664153
Hydroxide (OH)	mg/L	<0.50	0.50	9664161	<0.50	9664153	<0.50	0.50	9664153
Total Suspended Solids	mg/L	1.2	1.0	9666895					
Anions									
Dissolved Chloride (Cl)	mg/L	67	0.50	9664773	67	9664773	70	0.50	9664773
Dissolved Sulphate (SO ₄)	mg/L	240	5.0	9664773	220	9664773	230	5.0	9664773
Nutrients									
Total Ammonia (N)	mg/L	0.021	0.0050	9668403	0.033	9668403	0.014	0.0050	9668251
Nitrate plus Nitrite (N)	mg/L	0.0059	0.0020	9664405	0.0025	9664405	<0.0020	0.0020	9664405
Nitrite (N)	mg/L	<0.0020	0.0020	9664408	<0.0020	9664408	<0.0020	0.0020	9664408
RDL = Reportable Detection Limit									
N/A = Not Applicable									



BUREAU
VERITAS

BV Labs Job #: B996415

Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WW8479			WW8480		WW8481		
Sampling Date		2019/11/06 14:15			2019/11/06 13:45		2019/11/06 10:45		
COC Number		08474499			08474499		08474499		
	UNITS	3C	RDL	QC Batch	4A	QC Batch	4B	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	8.6	N/A	9662620	9.0	9662620	9.4	N/A	9662620
Cation Sum	meq/L	8.8	N/A	9662620	8.9	9662620	9.4	N/A	9662620
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9662616	0.99	9662616	1.0	0.010	9662616
Ion Balance (% Difference)	%	1.0	N/A	9662618	0.37	9662618	0.21	N/A	9662618
Nitrate (N)	mg/L	<0.0020	0.0020	9662622	0.0044	9662622	0.0022	0.0020	9662622
Demand Parameters									
Biochemical Oxygen Demand	mg/L	2.8	2.0	9663439					
Chemical Oxygen Demand	mg/L	54	10	9668785					
Misc. Inorganics									
Dissolved Organic Carbon (C)	mg/L	3.6	0.50	9663653					
Acidity (pH 4.5)	mg/L	<1.0	1.0	9667705					
Alkalinity (Total as CaCO ₃)	mg/L	81.1	0.50	9664153	71.8	9664161	84.6	0.50	9664153
Total Organic Carbon (C)	mg/L	4.1	0.50	9666755					
Acidity (pH 8.3)	mg/L	3.5	1.0	9667705					
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9664153	<0.50	9664161	<0.50	0.50	9664153
Bicarbonate (HCO ₃)	mg/L	98.9	0.50	9664153	87.6	9664161	103	0.50	9664153
Carbonate (CO ₃)	mg/L	<0.50	0.50	9664153	<0.50	9664161	<0.50	0.50	9664153
Hydroxide (OH)	mg/L	<0.50	0.50	9664153	<0.50	9664161	<0.50	0.50	9664153
Total Suspended Solids	mg/L	<1.0	1.0	9666895					
Anions									
Dissolved Chloride (Cl)	mg/L	67	0.50	9664773	72	9664773	73	0.50	9664773
Dissolved Sulphate (SO ₄)	mg/L	250	5.0	9664773	270	9664773	270	5.0	9664773
Nutrients									
Total Ammonia (N)	mg/L	0.019	0.0050	9668403	0.026	9668403	0.013	0.0050	9668251
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9664405	0.0044	9664405	0.0022	0.0020	9664405
Nitrite (N)	mg/L	<0.0020	0.0020	9664408	<0.0020	9664408	<0.0020	0.0020	9664408
RDL = Reportable Detection Limit									
N/A = Not Applicable									



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BV Labs Job #: B996415

Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WW8482			WW8483		WW8484		
Sampling Date		2019/11/06 08:45			2019/11/06 14:00		2019/11/06 11:00		
COC Number		08474499			08474503		08474503		
	UNITS	4C	RDL	QC Batch	6A	QC Batch	6B	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	11	N/A	9662620	8.3	9662620	8.8	N/A	9662620
Cation Sum	meq/L	10	N/A	9662620	8.4	9662620	9.2	N/A	9662620
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.91	0.010	9662616	1.0	9662616	1.0	0.010	9662616
Ion Balance (% Difference)	%	4.5	N/A	9662618	0.59	9662618	2.2	N/A	9662618
Nitrate (N)	mg/L	<0.0020	0.0020	9662622	0.0027	9662622	<0.0020	0.0020	9662622
Demand Parameters									
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9663439					
Chemical Oxygen Demand	mg/L	14	10	9668785					
Misc. Inorganics									
Dissolved Organic Carbon (C)	mg/L	4.1	0.50	9666692					
Acidity (pH 4.5)	mg/L	<1.0	1.0	9667705					
Alkalinity (Total as CaCO ₃)	mg/L	98.8	0.50	9664153	68.3	9664153	78.6	0.50	9664161
Total Organic Carbon (C)	mg/L	3.6	0.50	9666755					
Acidity (pH 8.3)	mg/L	8.7	1.0	9667705					
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9664153	<0.50	9664153	<0.50	0.50	9664161
Bicarbonate (HCO ₃)	mg/L	121	0.50	9664153	83.4	9664153	95.9	0.50	9664161
Carbonate (CO ₃)	mg/L	<0.50	0.50	9664153	<0.50	9664153	<0.50	0.50	9664161
Hydroxide (OH)	mg/L	<0.50	0.50	9664153	<0.50	9664153	<0.50	0.50	9664161
Total Suspended Solids	mg/L	1.1	1.0	9666895					
Anions									
Dissolved Chloride (Cl)	mg/L	120	0.50	9664773	76	9664773	76 (1)	0.50	9664773
Dissolved Sulphate (SO ₄)	mg/L	280	5.0	9664773	230	9664773	240	5.0	9664773
Nutrients									
Total Ammonia (N)	mg/L	0.018	0.0050	9668403	0.0080	9668403	0.0058	0.0050	9668403
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9664405	0.0027	9664405	<0.0020	0.0020	9664405
Nitrite (N)	mg/L	<0.0020	0.0020	9664408	<0.0020	9664408	<0.0020	0.0020	9664408
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) dec12									



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WW8485		
Sampling Date		2019/11/06 09:00		
COC Number		08474503		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	9.4	N/A	9662620
Cation Sum	meq/L	9.6	N/A	9662620
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9662616
Ion Balance (% Difference)	%	1.0	N/A	9662618
Nitrate (N)	mg/L	<0.0020	0.0020	9662622
Demand Parameters				
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9663439
Chemical Oxygen Demand	mg/L	24	10	9668785
Misc. Inorganics				
Dissolved Organic Carbon (C)	mg/L	3.7	0.50	9666692
Acidity (pH 4.5)	mg/L	<1.0	1.0	9667705
Alkalinity (Total as CaCO ₃)	mg/L	90.6	0.50	9664161
Total Organic Carbon (C)	mg/L	3.5	0.50	9666755
Acidity (pH 8.3)	mg/L	4.7	1.0	9667705
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9664161
Bicarbonate (HCO ₃)	mg/L	110	0.50	9664161
Carbonate (CO ₃)	mg/L	<0.50	0.50	9664161
Hydroxide (OH)	mg/L	<0.50	0.50	9664161
Total Suspended Solids	mg/L	<1.0	1.0	9666895
Anions				
Dissolved Chloride (Cl)	mg/L	73 (1)	0.50	9664773
Dissolved Sulphate (SO ₄)	mg/L	270 (2)	5.0	9664773
Nutrients				
Total Ammonia (N)	mg/L	0.017	0.0050	9668403
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9664405
Nitrite (N)	mg/L	<0.0020	0.0020	9664408
RDL = Reportable Detection Limit N/A = Not Applicable (1) aug8 (2) sep9				



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BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW8473	WW8474	WW8475	WW8476	WW8477		
Sampling Date		2019/11/06 15:30	2019/11/06 13:30	2019/11/06 10:30	2019/11/06 08:30	2019/11/06 15:00		
COC Number		08474499	08474499	08474499	08474499	08474499		
	UNITS	INFL-61	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	329	333	341	354	342	0.50	9661594
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0128	0.00122	0.00073	0.00055	0.00306	0.00050	9664321
Dissolved Antimony (Sb)	mg/L	0.0192	0.0128	0.0123	0.0101	0.0118	0.000020	9664321
Dissolved Arsenic (As)	mg/L	0.0571	0.0474	0.0401	0.0270	0.0402	0.000020	9664321
Dissolved Barium (Ba)	mg/L	0.0552	0.0533	0.0552	0.0542	0.0567	0.000020	9664321
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9664321
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664321
Dissolved Boron (B)	mg/L	0.032	0.030	0.030	0.026	0.025	0.010	9664321
Dissolved Cadmium (Cd)	mg/L	0.00205	0.000181	0.000295	0.000218	0.000165	0.0000050	9664321
Dissolved Chromium (Cr)	mg/L	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9664321
Dissolved Cobalt (Co)	mg/L	0.00275	0.0000814	0.0000417	0.0000300	0.000249	0.0000050	9664321
Dissolved Copper (Cu)	mg/L	0.0186	0.00386	0.00412	0.00312	0.00274	0.000050	9664321
Dissolved Iron (Fe)	mg/L	<0.0010	0.0022	0.0031	0.0056	0.0047	0.0010	9664321
Dissolved Lead (Pb)	mg/L	0.0130	0.000164	0.0000313	0.0000084	0.000262	0.0000050	9664321
Dissolved Lithium (Li)	mg/L	0.00961	0.00970	0.00985	0.0102	0.00989	0.00050	9664321
Dissolved Manganese (Mn)	mg/L	0.0484	0.00376	0.00104	0.00242	0.0124	0.000050	9664321
Dissolved Molybdenum (Mo)	mg/L	0.00153	0.00135	0.00126	0.00125	0.00131	0.000050	9664321
Dissolved Nickel (Ni)	mg/L	0.00833	0.00296	0.00328	0.00310	0.00470	0.000020	9664321
Dissolved Selenium (Se)	mg/L	0.00762	0.00486	0.00400	0.00299	0.00316	0.000040	9664321
Dissolved Silicon (Si)	mg/L	0.540	0.695	0.546	0.864	1.16	0.050	9664321
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664321
Dissolved Strontium (Sr)	mg/L	0.566	0.596	0.611	0.624	0.589	0.000050	9664321
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000021	<0.0000020	<0.0000020	0.0000020	9664321
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9664321
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9664321
Dissolved Uranium (U)	mg/L	0.0288	0.0191	0.0151	0.0174	0.0164	0.0000020	9664321
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9664321
Dissolved Zinc (Zn)	mg/L	0.174	0.0338	0.0409	0.0325	0.0367	0.00010	9664321
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9664321
Dissolved Calcium (Ca)	mg/L	103	104	107	111	108	0.050	9661597
Dissolved Magnesium (Mg)	mg/L	17.4	17.6	18.1	18.8	17.8	0.050	9661597

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW8473	WW8474	WW8475	WW8476	WW8477		
Sampling Date		2019/11/06 15:30	2019/11/06 13:30	2019/11/06 10:30	2019/11/06 08:30	2019/11/06 15:00		
COC Number		08474499	08474499	08474499	08474499	08474499		
	UNITS	INFL-61	1A	1B	1C	3A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.80	4.02	4.36	5.26	3.97	0.050	9661597
Dissolved Sodium (Na)	mg/L	27.4	27.3	28.1	28.4	28.2	0.050	9661597
Dissolved Sulphur (S)	mg/L	81.3	82.6	84.4	86.4	82.5	3.0	9661597
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW8478	WW8479	WW8480	WW8481	WW8482		
Sampling Date		2019/11/06 14:30	2019/11/06 14:15	2019/11/06 13:45	2019/11/06 10:45	2019/11/06 08:45		
COC Number		08474499	08474499	08474499	08474499	08474499		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	353	370	376	399	435	0.50	9661594
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00143	<0.00050	0.00451	0.00223	0.00092	0.00050	9664321
Dissolved Antimony (Sb)	mg/L	0.0107	0.00918	0.00662	0.00424	0.00452	0.000020	9664321
Dissolved Arsenic (As)	mg/L	0.0348	0.0286	0.0257	0.0143	0.00862	0.000020	9664321
Dissolved Barium (Ba)	mg/L	0.0574	0.0593	0.0575	0.0584	0.0621	0.000020	9664321
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9664321
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664321
Dissolved Boron (B)	mg/L	0.020	0.014	0.025	0.012	<0.010	0.010	9664321
Dissolved Cadmium (Cd)	mg/L	0.000212	0.000167	0.0000835	0.0000223	<0.0000050	0.0000050	9664321
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9664321
Dissolved Cobalt (Co)	mg/L	0.0000356	0.0000287	0.000183	0.0000292	0.0000289	0.0000050	9664321
Dissolved Copper (Cu)	mg/L	0.00358	0.00311	0.00154	0.00103	0.000427	0.000050	9664321
Dissolved Iron (Fe)	mg/L	0.0021	0.0034	0.0123	0.0050	0.0080	0.0010	9664321
Dissolved Lead (Pb)	mg/L	0.0000241	0.0000062	0.000405	0.0000481	0.0000139	0.0000050	9664321
Dissolved Lithium (Li)	mg/L	0.0101	0.0106	0.0108	0.0121	0.0129	0.00050	9664321
Dissolved Manganese (Mn)	mg/L	0.000464	0.00294	0.0123	0.00132	0.00527	0.000050	9664321
Dissolved Molybdenum (Mo)	mg/L	0.00109	0.00112	0.000657	0.000213	0.000090	0.000050	9664321
Dissolved Nickel (Ni)	mg/L	0.00365	0.00346	0.00486	0.00354	0.00334	0.000020	9664321
Dissolved Selenium (Se)	mg/L	0.00269	0.00196	0.00142	0.000836	0.000537	0.000040	9664321
Dissolved Silicon (Si)	mg/L	1.43	1.96	1.22	1.30	1.33	0.050	9664321
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664321
Dissolved Strontium (Sr)	mg/L	0.613	0.642	0.640	0.678	0.730	0.000050	9664321
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9664321
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9664321
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9664321
Dissolved Uranium (U)	mg/L	0.0158	0.0191	0.00886	0.00693	0.00613	0.0000020	9664321
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9664321
Dissolved Zinc (Zn)	mg/L	0.0275	0.0290	0.0196	0.00828	0.00427	0.00010	9664321
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9664321
Dissolved Calcium (Ca)	mg/L	111	116	119	126	137	0.050	9661597
Dissolved Magnesium (Mg)	mg/L	18.5	19.2	19.5	20.6	22.6	0.050	9661597

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW8478	WW8479	WW8480	WW8481	WW8482		
Sampling Date		2019/11/06 14:30	2019/11/06 14:15	2019/11/06 13:45	2019/11/06 10:45	2019/11/06 08:45		
COC Number		08474499	08474499	08474499	08474499	08474499		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.37	4.84	3.59	3.57	2.98	0.050	9661597
Dissolved Sodium (Na)	mg/L	28.9	29.8	30.2	31.8	35.1	0.050	9661597
Dissolved Sulphur (S)	mg/L	86.0	88.6	90.3	95.1	102	3.0	9661597

RDL = Reportable Detection Limit



BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW8483	WW8484	WW8485		
Sampling Date		2019/11/06 14:00	2019/11/06 11:00	2019/11/06 09:00		
COC Number		08474503	08474503	08474503		
	UNITS	6A	6B	6C	RDL	QC Batch

Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	355	384	404	0.50	9661594
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00257	0.00319	0.00065	0.00050	9664321
Dissolved Antimony (Sb)	mg/L	0.00790	0.00579	0.00514	0.000020	9664321
Dissolved Arsenic (As)	mg/L	0.0236	0.0154	0.0111	0.000020	9664321
Dissolved Barium (Ba)	mg/L	0.0565	0.0581	0.0623	0.000020	9664321
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9664321
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664321
Dissolved Boron (B)	mg/L	0.025	0.015	<0.010	0.010	9664321
Dissolved Cadmium (Cd)	mg/L	0.0000626	0.0000247	0.0000086	0.0000050	9664321
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9664321
Dissolved Cobalt (Co)	mg/L	0.000626	0.0000469	0.0000377	0.0000050	9664321
Dissolved Copper (Cu)	mg/L	0.00180	0.00106	0.000681	0.000050	9664321
Dissolved Iron (Fe)	mg/L	0.0209	0.0044	0.0075	0.0010	9664321
Dissolved Lead (Pb)	mg/L	0.000447	0.0000419	0.0000127	0.0000050	9664321
Dissolved Lithium (Li)	mg/L	0.0106	0.0113	0.0120	0.00050	9664321
Dissolved Manganese (Mn)	mg/L	0.0326	0.00242	0.00360	0.000050	9664321
Dissolved Molybdenum (Mo)	mg/L	0.000755	0.00305 (1)	0.000291	0.000050	9664321
Dissolved Nickel (Ni)	mg/L	0.00476	0.00352	0.00273	0.000020	9664321
Dissolved Selenium (Se)	mg/L	0.00173	0.000872	0.000534	0.000040	9664321
Dissolved Silicon (Si)	mg/L	1.32	1.35	1.47	0.050	9664321
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664321
Dissolved Strontium (Sr)	mg/L	0.618	0.665	0.684	0.000050	9664321
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9664321
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9664321
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9664321
Dissolved Uranium (U)	mg/L	0.0130	0.00829	0.00674	0.0000020	9664321
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9664321
Dissolved Zinc (Zn)	mg/L	0.0133	0.00941	0.00858	0.00010	9664321
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9664321
Dissolved Calcium (Ca)	mg/L	111	121	127	0.050	9661597

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW8483	WW8484	WW8485		
Sampling Date		2019/11/06 14:00	2019/11/06 11:00	2019/11/06 09:00		
COC Number		08474503	08474503	08474503		
	UNITS	6A	6B	6C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	18.7	19.9	20.9	0.050	9661597
Dissolved Potassium (K)	mg/L	3.95	4.52	5.11	0.050	9661597
Dissolved Sodium (Na)	mg/L	28.8	31.3	32.2	0.050	9661597
Dissolved Sulphur (S)	mg/L	86.2	91.7	94.7	3.0	9661597
RDL = Reportable Detection Limit						

BUREAU
VERITASBV Labs Job #: B996415
Report Date: 2019/11/14ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WW8473	WW8474	WW8475	WW8476	WW8477		
Sampling Date		2019/11/06 15:30	2019/11/06 13:30	2019/11/06 10:30	2019/11/06 08:30	2019/11/06 15:00		
COC Number		08474499	08474499	08474499	08474499	08474499		
	UNITS	INFL-61	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	332	341	349	369	350	0.50	9661451
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0168	0.00184	0.00126	0.00130	0.00392	0.00050	9664836
Total Antimony (Sb)	mg/L	0.0203	0.0134	0.0128	0.0106	0.0126	0.000020	9664836
Total Arsenic (As)	mg/L	0.0581	0.0474	0.0398	0.0270	0.0408	0.000020	9664836
Total Barium (Ba)	mg/L	0.0561	0.0551	0.0559	0.0575	0.0580	0.000020	9664836
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9664836
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664836
Total Boron (B)	mg/L	0.033	0.031	0.030	0.025	0.025	0.010	9664836
Total Cadmium (Cd)	mg/L	0.00212	0.000178	0.000316	0.000234	0.000166	0.0000050	9664836
Total Chromium (Cr)	mg/L	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9664836
Total Cobalt (Co)	mg/L	0.00284	0.0000881	0.0000426	0.0000331	0.000281	0.0000050	9664836
Total Copper (Cu)	mg/L	0.0196	0.00427	0.00442	0.00337	0.00307	0.000050	9664836
Total Iron (Fe)	mg/L	0.0051	0.0039	0.0051	0.0105	0.0090	0.0010	9664836
Total Lead (Pb)	mg/L	0.0191	0.000238	0.0000366	0.0000171	0.000367	0.0000050	9664836
Total Lithium (Li)	mg/L	0.00960	0.00977	0.00979	0.0103	0.0100	0.00050	9664836
Total Manganese (Mn)	mg/L	0.0536	0.00492	0.00119	0.00325	0.0142	0.000050	9664836
Total Molybdenum (Mo)	mg/L	0.00159	0.00139	0.00130	0.00125	0.00132	0.000050	9664836
Total Nickel (Ni)	mg/L	0.00848	0.00305	0.00331	0.00322	0.00484	0.000020	9664836
Total Selenium (Se)	mg/L	0.00747	0.00479	0.00396	0.00301	0.00313	0.000040	9664836
Total Silicon (Si)	mg/L	0.571	0.722	0.568	0.891	1.21	0.050	9664836
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664836
Total Strontium (Sr)	mg/L	0.635	0.639	0.647	0.668	0.653	0.000050	9664836
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9664836
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9664836
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9664836
Total Uranium (U)	mg/L	0.0299	0.0195	0.0163	0.0180	0.0174	0.0000020	9664836
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9664836
Total Zinc (Zn)	mg/L	0.179	0.0353	0.0450	0.0395	0.0413	0.00010	9664836
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9664836
Total Calcium (Ca)	mg/L	105	108	110	118	112	0.050	9661598
Total Magnesium (Mg)	mg/L	16.8	17.2	17.9	18.3	17.1	0.050	9661598

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW8473	WW8474	WW8475	WW8476	WW8477		
Sampling Date		2019/11/06 15:30	2019/11/06 13:30	2019/11/06 10:30	2019/11/06 08:30	2019/11/06 15:00		
COC Number		08474499	08474499	08474499	08474499	08474499		
	UNITS	INFL-61	1A	1B	1C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.94	4.16	4.53	5.43	4.10	0.050	9661598
Total Sodium (Na)	mg/L	25.7	26.6	27.3	27.7	27.2	0.050	9661598
Total Sulphur (S)	mg/L	83.7	85.0	87.0	89.0	85.9	3.0	9661598
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B996415
Report Date: 2019/11/14ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WW8478	WW8479	WW8480	WW8481	WW8482		
Sampling Date		2019/11/06 14:30	2019/11/06 14:15	2019/11/06 13:45	2019/11/06 10:45	2019/11/06 08:45		
COC Number		08474499	08474499	08474499	08474499	08474499		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	372	377	382	408	446	0.50	9661451
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00215	0.00097	0.00374	0.00150	0.00192	0.00050	9664836
Total Antimony (Sb)	mg/L	0.0114	0.00976	0.00695	0.00458	0.00472	0.000020	9664836
Total Arsenic (As)	mg/L	0.0360	0.0292	0.0257	0.0146	0.00847	0.000020	9664836
Total Barium (Ba)	mg/L	0.0598	0.0614	0.0586	0.0600	0.0631	0.000020	9664836
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9664836
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664836
Total Boron (B)	mg/L	0.020	0.013	0.025	<0.010	<0.010	0.010	9664836
Total Cadmium (Cd)	mg/L	0.000412	0.000170	0.0000944	0.0000270	<0.0000050	0.0000050	9664836
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9664836
Total Cobalt (Co)	mg/L	0.0000558	0.0000307	0.000197	0.0000289	0.0000266	0.0000050	9664836
Total Copper (Cu)	mg/L	0.0113	0.00330	0.00200	0.00118	0.000498	0.000050	9664836
Total Iron (Fe)	mg/L	0.0148	0.0059	0.0114	0.0063	0.0122	0.0010	9664836
Total Lead (Pb)	mg/L	0.0000895	0.0000090	0.000491	0.0000604	0.0000193	0.0000050	9664836
Total Lithium (Li)	mg/L	0.0101	0.0105	0.0108	0.0118	0.0126	0.00050	9664836
Total Manganese (Mn)	mg/L	0.00149	0.00317	0.0137	0.00218	0.00555	0.000050	9664836
Total Molybdenum (Mo)	mg/L	0.00111	0.00102	0.000706	0.000217	0.000090	0.000050	9664836
Total Nickel (Ni)	mg/L	0.00380	0.00348	0.00496	0.00384	0.00347	0.000020	9664836
Total Selenium (Se)	mg/L	0.00274	0.00190	0.00145	0.000798	0.000505	0.000040	9664836
Total Silicon (Si)	mg/L	1.46	2.02	1.29	1.39	1.37	0.050	9664836
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664836
Total Strontium (Sr)	mg/L	0.675	0.693	0.706	0.736	0.786	0.000050	9664836
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9664836
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9664836
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9664836
Total Uranium (U)	mg/L	0.0169	0.0195	0.00921	0.00723	0.00626	0.0000020	9664836
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9664836
Total Zinc (Zn)	mg/L	0.0298	0.0304	0.0196	0.00890	0.00505	0.00010	9664836
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9664836
Total Calcium (Ca)	mg/L	119	120	121	130	143	0.050	9661598
Total Magnesium (Mg)	mg/L	18.0	18.8	19.5	20.4	21.7	0.050	9661598

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW8478	WW8479	WW8480	WW8481	WW8482		
Sampling Date		2019/11/06 14:30	2019/11/06 14:15	2019/11/06 13:45	2019/11/06 10:45	2019/11/06 08:45		
COC Number		08474499	08474499	08474499	08474499	08474499		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	4.55	4.93	3.77	3.77	3.10	0.050	9661598
Total Sodium (Na)	mg/L	28.3	28.8	30.0	31.3	34.0	0.050	9661598
Total Sulphur (S)	mg/L	88.4	90.3	95.0	99.2	105	3.0	9661598

RDL = Reportable Detection Limit



BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW8483	WW8484	WW8485		
Sampling Date		2019/11/06 14:00	2019/11/06 11:00	2019/11/06 09:00		
COC Number		08474503	08474503	08474503		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	365	385	409	0.50	9661451
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00351	0.00431	0.00094	0.00050	9664836
Total Antimony (Sb)	mg/L	0.00837	0.00614	0.00531	0.000020	9664836
Total Arsenic (As)	mg/L	0.0247	0.0155	0.0111	0.000020	9664836
Total Barium (Ba)	mg/L	0.0579	0.0588	0.0638	0.000020	9664836
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9664836
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664836
Total Boron (B)	mg/L	0.025	0.013	<0.010	0.010	9664836
Total Cadmium (Cd)	mg/L	0.0000806	0.0000287	0.0000104	0.0000050	9664836
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9664836
Total Cobalt (Co)	mg/L	0.000679	0.0000683	0.0000363	0.0000050	9664836
Total Copper (Cu)	mg/L	0.00288	0.00135	0.000777	0.000050	9664836
Total Iron (Fe)	mg/L	0.0475	0.0085	0.0101	0.0010	9664836
Total Lead (Pb)	mg/L	0.000764	0.0000606	0.0000113	0.0000050	9664836
Total Lithium (Li)	mg/L	0.0102	0.0108	0.0114	0.00050	9664836
Total Manganese (Mn)	mg/L	0.0348	0.00468	0.00386	0.000050	9664836
Total Molybdenum (Mo)	mg/L	0.000707	0.000344	0.000304	0.000050	9664836
Total Nickel (Ni)	mg/L	0.00492	0.00362	0.00286	0.000020	9664836
Total Selenium (Se)	mg/L	0.00180	0.000860	0.000532	0.000040	9664836
Total Silicon (Si)	mg/L	1.37	1.36	1.50	0.050	9664836
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9664836
Total Strontium (Sr)	mg/L	0.667	0.706	0.743	0.000050	9664836
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9664836
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9664836
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9664836
Total Uranium (U)	mg/L	0.0142	0.00848	0.00694	0.0000020	9664836
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9664836
Total Zinc (Zn)	mg/L	0.0171	0.00979	0.00924	0.00010	9664836
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9664836
Total Calcium (Ca)	mg/L	116	122	130	0.050	9661598
Total Magnesium (Mg)	mg/L	18.5	19.6	20.5	0.050	9661598
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW8483	WW8484	WW8485		
Sampling Date		2019/11/06 14:00	2019/11/06 11:00	2019/11/06 09:00		
COC Number		08474503	08474503	08474503		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Potassium (K)	mg/L	4.08	4.70	5.28	0.050	9661598
Total Sodium (Na)	mg/L	28.4	30.7	31.7	0.050	9661598
Total Sulphur (S)	mg/L	88.8	94.8	97.2	3.0	9661598
RDL = Reportable Detection Limit						



BUREAU
VERITAS

BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.7°C
Package 2	3.0°C

Results relate only to the items tested.



BV Labs Job #: B996415
Report Date: 2019/11/14

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9663439	Biochemical Oxygen Demand	2019/11/13			98	85 - 115	<2.0	mg/L	10	20
9663653	Dissolved Organic Carbon (C)	2019/11/12	94	80 - 120	108	80 - 120	<0.50	mg/L	7.7	20
9664153	Alkalinity (PP as CaCO3)	2019/11/08					<0.50	mg/L		
9664153	Alkalinity (Total as CaCO3)	2019/11/08			95	80 - 120	<0.50	mg/L		
9664153	Bicarbonate (HCO3)	2019/11/08					<0.50	mg/L		
9664153	Carbonate (CO3)	2019/11/08					<0.50	mg/L		
9664153	Hydroxide (OH)	2019/11/08					<0.50	mg/L		
9664161	Alkalinity (PP as CaCO3)	2019/11/08					<0.50	mg/L	NC	20
9664161	Alkalinity (Total as CaCO3)	2019/11/08	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.28	20
9664161	Bicarbonate (HCO3)	2019/11/08					<0.50	mg/L	0.28	20
9664161	Carbonate (CO3)	2019/11/08					<0.50	mg/L	NC	20
9664161	Hydroxide (OH)	2019/11/08					<0.50	mg/L	NC	20
9664321	Dissolved Aluminum (Al)	2019/11/08	94	80 - 120	96	80 - 120	<0.00050	mg/L	4.7	20
9664321	Dissolved Antimony (Sb)	2019/11/08	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.55	20
9664321	Dissolved Arsenic (As)	2019/11/08	102	80 - 120	96	80 - 120	<0.000020	mg/L	0.19	20
9664321	Dissolved Barium (Ba)	2019/11/08	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.52	20
9664321	Dissolved Beryllium (Be)	2019/11/08	91	80 - 120	86	80 - 120	<0.000010	mg/L	NC	20
9664321	Dissolved Bismuth (Bi)	2019/11/08	102	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9664321	Dissolved Boron (B)	2019/11/08	95	80 - 120	84	80 - 120	<0.010	mg/L	NC	20
9664321	Dissolved Cadmium (Cd)	2019/11/08	100	80 - 120	99	80 - 120	<0.0000050	mg/L	19	20
9664321	Dissolved Chromium (Cr)	2019/11/08	101	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9664321	Dissolved Cobalt (Co)	2019/11/08	98	80 - 120	101	80 - 120	<0.0000050	mg/L	1.8	20
9664321	Dissolved Copper (Cu)	2019/11/08	94	80 - 120	101	80 - 120	<0.000050	mg/L	0.88	20
9664321	Dissolved Iron (Fe)	2019/11/08	102	80 - 120	104	80 - 120	<0.0010	mg/L	3.3	20
9664321	Dissolved Lead (Pb)	2019/11/08	107	80 - 120	103	80 - 120	<0.0000050	mg/L	8.2	20
9664321	Dissolved Lithium (Li)	2019/11/08	87	80 - 120	81	80 - 120	<0.00050	mg/L	2.4	20
9664321	Dissolved Manganese (Mn)	2019/11/08	102	80 - 120	101	80 - 120	<0.000050	mg/L	1.8	20
9664321	Dissolved Molybdenum (Mo)	2019/11/08	108	80 - 120	97	80 - 120	<0.000050	mg/L	1.7	20
9664321	Dissolved Nickel (Ni)	2019/11/08	97	80 - 120	102	80 - 120	<0.000020	mg/L	1.2	20
9664321	Dissolved Selenium (Se)	2019/11/08	103	80 - 120	98	80 - 120	<0.000040	mg/L	6.3	20
9664321	Dissolved Silicon (Si)	2019/11/08	101	80 - 120	92	80 - 120	<0.050	mg/L	0.32	20
9664321	Dissolved Silver (Ag)	2019/11/08	99	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20



BV Labs Job #: B996415
Report Date: 2019/11/14

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9664321	Dissolved Strontium (Sr)	2019/11/08	NC	80 - 120	95	80 - 120	<0.000050	mg/L	1.1	20
9664321	Dissolved Thallium (Tl)	2019/11/08	107	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9664321	Dissolved Tin (Sn)	2019/11/08	103	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9664321	Dissolved Titanium (Ti)	2019/11/08	105	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9664321	Dissolved Uranium (U)	2019/11/08	113	80 - 120	106	80 - 120	<0.0000020	mg/L	0.92	20
9664321	Dissolved Vanadium (V)	2019/11/08	104	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9664321	Dissolved Zinc (Zn)	2019/11/08	96	80 - 120	103	80 - 120	<0.00010	mg/L	0.62	20
9664321	Dissolved Zirconium (Zr)	2019/11/08	107	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9664405	Nitrate plus Nitrite (N)	2019/11/08	98	80 - 120	102	80 - 120	<0.0020	mg/L	22	25
9664408	Nitrite (N)	2019/11/08	96	80 - 120	103	80 - 120	<0.0020	mg/L	NC	25
9664773	Dissolved Chloride (Cl)	2019/11/08	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.54 (1)	20
9664773	Dissolved Sulphate (SO4)	2019/11/08	NC	80 - 120	102	80 - 120	<0.50	mg/L	9.0 (2)	20
9664836	Total Aluminum (Al)	2019/11/09	90	80 - 120	97	80 - 120	<0.00050	mg/L	3.6	20
9664836	Total Antimony (Sb)	2019/11/09	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.29	20
9664836	Total Arsenic (As)	2019/11/09	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.63	20
9664836	Total Barium (Ba)	2019/11/09	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.36	20
9664836	Total Beryllium (Be)	2019/11/09	91	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9664836	Total Bismuth (Bi)	2019/11/09	103	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
9664836	Total Boron (B)	2019/11/09	92	80 - 120	97	80 - 120	<0.010	mg/L	1.7	20
9664836	Total Cadmium (Cd)	2019/11/09	100	80 - 120	102	80 - 120	<0.0000050	mg/L	1.6	20
9664836	Total Chromium (Cr)	2019/11/09	102	80 - 120	104	80 - 120	<0.00010	mg/L	3.9	20
9664836	Total Cobalt (Co)	2019/11/09	100	80 - 120	102	80 - 120	<0.0000050	mg/L	0.84	20
9664836	Total Copper (Cu)	2019/11/09	94	80 - 120	101	80 - 120	<0.000050	mg/L	0.37	20
9664836	Total Iron (Fe)	2019/11/09	104	80 - 120	108	80 - 120	<0.0010	mg/L	18	20
9664836	Total Lead (Pb)	2019/11/09	108	80 - 120	107	80 - 120	<0.0000050	mg/L	1.1	20
9664836	Total Lithium (Li)	2019/11/09	87	80 - 120	94	80 - 120	<0.00050	mg/L	1.6	20
9664836	Total Manganese (Mn)	2019/11/09	NC	80 - 120	104	80 - 120	<0.000050	mg/L	1.6	20
9664836	Total Molybdenum (Mo)	2019/11/09	108	80 - 120	102	80 - 120	<0.000050	mg/L	1.1	20
9664836	Total Nickel (Ni)	2019/11/09	99	80 - 120	104	80 - 120	<0.000020	mg/L	0.060	20
9664836	Total Selenium (Se)	2019/11/09	100	80 - 120	100	80 - 120	<0.000040	mg/L	0.30	20
9664836	Total Silicon (Si)	2019/11/09	96	80 - 120	102	80 - 120	<0.050	mg/L	3.8	20
9664836	Total Silver (Ag)	2019/11/09	102	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20



BV Labs Job #: B996415
Report Date: 2019/11/14

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9664836	Total Strontium (Sr)	2019/11/09	NC	80 - 120	102	80 - 120	<0.000050	mg/L	0.93	20
9664836	Total Thallium (Tl)	2019/11/09	108	80 - 120	106	80 - 120	<0.0000020	mg/L	NC	20
9664836	Total Tin (Sn)	2019/11/09	102	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9664836	Total Titanium (Ti)	2019/11/09	104	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9664836	Total Uranium (U)	2019/11/09	109	80 - 120	107	80 - 120	<0.0000020	mg/L	0.22	20
9664836	Total Vanadium (V)	2019/11/09	104	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9664836	Total Zinc (Zn)	2019/11/09	NC	80 - 120	106	80 - 120	<0.00010	mg/L	0.70	20
9664836	Total Zirconium (Zr)	2019/11/09	108	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9666692	Dissolved Organic Carbon (C)	2019/11/13	113	80 - 120	107	80 - 120	<0.50	mg/L	1.5	20
9666755	Total Organic Carbon (C)	2019/11/13	107	80 - 120	108	80 - 120	<0.50	mg/L	1.6	20
9666895	Total Suspended Solids	2019/11/12	112	80 - 120	100	80 - 120	<1.0	mg/L	NC	20
9667705	Acidity (pH 4.5)	2019/11/08					<1.0	mg/L	NC	20
9667705	Acidity (pH 8.3)	2019/11/08			101	80 - 120	<1.0	mg/L	NC	20
9668251	Total Ammonia (N)	2019/11/14	121 (3)	80 - 120	119	80 - 120	<0.0050	mg/L	3.2	20
9668403	Total Ammonia (N)	2019/11/13	NC	80 - 120	103	80 - 120	<0.0050	mg/L	0.83	20
9668785	Chemical Oxygen Demand	2019/11/14	100	80 - 120	99	80 - 120	<10	mg/L	8.9	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) oct10

(2) nov11

(3) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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BV Labs Job #: B996415
Report Date: 2019/11/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

Burnaby, 4606 Canada Way, Burnaby, BC V5G 1K5, Toll Free (800) 665-8566

COC #:

ICOM#MI
08474503

EC-00077/05
2 of 2

Invoice Information				Report Information (if differs from Invoice)				Project Information (where applicable)				Rush Confirmation											
Company Name: BMC MINERALS LTD. Contact Name: Mary Mloska; Renate Vanderhorst Address: 530-1130 WEST PENDER ST Vancouver, BC V6E 4A4 Phone: (607) 665-6463 Email: mmloska@alexcoenv.com				Company Name: ALECO ENVIRONMENTAL Contact Name: Mary Mloska; Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK Y1A 2V3 Phone: (867) 665-6463 Email: randerhorst@alexcoenv.com				Quotation #: B60751 P.O. # / A/E#: Project #: BMC-18-02 Site Location: Kudat Ze Kayah Site #: Sampled By:				☒ Regular TAT 5 days (Most analyses) ☐ Rush TAT (Surcharges will be applied) Same Day ☐ 2 Days 1 Day ☐ 3 Days											
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO 1 12485				Analysis Requested Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity Ammonia Acidity BOD TSS COD/TOC BOC				Rush Confirmation #: ☐ CLUSTOY SEAL ☐ COOLER TEMPERATURES ☐ Present ☐ Indirect ☐ 4.5.2 ☐ 3.3.3											
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												Hold - DO NOT ANALYZE ☐ COOLING MEDIA PRESENT ☐ N ☐ COMMENTS											
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Ammonia	Acidity	BOD	TSS	COD/TOC	BOC	# OF CONTAINERS SUBMITTED	Comments							
1	6A	2014/11/06	14:00	Water	X	X	X	X	X						7	Metals preserved with HNO3, dissolved metals, field filtered, ammonia preserved							
2	6B	2014/11/06	11:00	Water	X	X	X	X	X						7	Metals preserved with HNO3, dissolved metals, field filtered, ammonia preserved							
3	6C	2014/11/06	9:00	Water	X	X	X	X	X						11	Metals preserved with HNO3, dissolved metals, field filtered, ammonia preserved							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
REINQUISHED BY: (Signature/Print) <i>Bruce Hendy-Redwards</i>				DATE: (YYYY/MM/DD) 2014/11/06				TIME: (HH:MM) 15:30				RECEIVED BY: (Signature/Print) <i>MARLO TRUJAN</i>				DATE: (YYYY/MM/DD) 2014/11/04				TIME: (HH:MM) 08:55			

0321

B996415_COC



CHAIN OF CUSTODY RECORD

08474499

05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665-8566

COC #:

Page 1 of 1

Invoice Information				Report Information (if differs from Invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required				
Company Name: BMC MINERALS LTD. Contact Name: Mary Mitchea, Renate Vanderhorst Address: 530-1130 WEST PENDER ST Vancouver, BC V6E 4A4 Phone: (607) 668-6463 Email: info@alexcoenv.com				Company Name: ALEXCO ENVIRONMENTAL Contact Name: Mary Mitchea, Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK V1A 2V3 Phone: (867) 668-6463 Email: rvanderhorst@alexcoenv.com				Quotation #: 860751 P.O. # / A/E/R: Project #: BMC-18-02 Site Location: Kudze Kayah Site #: Sampled By:				Regular TAT 5 days (Most analysis) ☒ Rush TAT (Surcharges will be applied) Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days ☐ Date Required:				
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specif) ☐ Other (Specif) ☐ Drinking Water ☐ BC Water Quality				Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485				Analysis Requested Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity Ammonia Acidity BOD TSS COD/TOC DOC				Rush Confirmation #: LABORATORY USE ONLY CUSTODY SEAL: Y COOLER TEMPERATURES Present: 4/5/2 Index: 3/3/3 COMMENTS: COOLING MEDIA PRESENT: YES				
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												# OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE				
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Ammonia	Acidity	BOD	TSS	COD/TOC	DOC	# OF CONTAINERS SUBMITTED	Comments
1 Influent INSL-61		2017/11/06	15:30	Water	X	X	X	X	X	X	X	X	X	X	11	Metals preserved with HNO3, dissolved
2 1A		2017/11/06	13:30	Water	X	X	X	X	X	X	X	X	X	X	7	Metals preserved with HNO3, dissolved
3 1B		2017/11/06	10:30	Water	X	X	X	X	X	X	X	X	X	X	7	Metals preserved with HNO3, dissolved
4 1C		2017/11/06	08:30	Water	X	X	X	X	X	X	X	X	X	X	11	Metals preserved with HNO3, dissolved
5 3A		2017/11/06	15:00	Water	X	X	X	X	X	X	X	X	X	X	7	Metals preserved with HNO3, dissolved
6 3B		2017/11/06	14:30	Water	X	X	X	X	X	X	X	X	X	X	7	Metals preserved with HNO3, dissolved
7 3C		2017/11/06	14:15	Water	X	X	X	X	X	X	X	X	X	X	11	Metals preserved with HNO3, dissolved
8 4A		2017/11/06	13:45	Water	X	X	X	X	X	X	X	X	X	X	7	Metals preserved with HNO3, dissolved
9 4B		2017/11/06	10:45	Water	X	X	X	X	X	X	X	X	X	X	7	Metals preserved with HNO3, dissolved
10 4C		2017/11/06	09:45	Water	X	X	X	X	X	X	X	X	X	X	11	Metals preserved with HNO3, dissolved

0321



B996415_COC



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08475126, 08475127

Attention: KAI WOLOSHYN
 ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/11/22
 Report #: R2814292
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B998124
Received: 2019/11/13, 08:40

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	13	N/A	2019/11/15	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	9	N/A	2019/11/15	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	3	N/A	2019/11/18	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	1	N/A	2019/11/20	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1, 2)	13	N/A	2019/11/18	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	13	N/A	2019/11/18	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	10	N/A	2019/11/18	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	3	N/A	2019/11/19	BBY WI-00033	Auto Calc
Ion Balance (1)	10	N/A	2019/11/18	BBY WI-00033	Auto Calc
Ion Balance (1)	3	N/A	2019/11/19	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	13	N/A	2019/11/18	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	13	N/A	2019/11/18	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	13	N/A	2019/11/15	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	13	N/A	2019/11/18	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	13	N/A	2019/11/16	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	13	N/A	2019/11/19	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	13	N/A	2019/11/15	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	13	N/A	2019/11/15	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	13	N/A	2019/11/15	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	13	N/A	2019/11/14	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08475126, 08475127

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/11/22
Report #: R2814292
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B998124

Received: 2019/11/13, 08:40

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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VERITAS

BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WX9225			WX9226			WX9227		
Sampling Date		2019/11/13 11:00			2019/11/13 10:00			2019/11/13 09:30		
COC Number		08475126			08475126			08475126		
	UNITS	INFL-63	RDL	QC Batch	1A	RDL	QC Batch	1B	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	7.0	N/A	9671537	6.6	N/A	9671537	8.4	N/A	9671537
Cation Sum	meq/L	8.6	N/A	9671537	8.8	N/A	9671537	8.9	N/A	9671537
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.2	0.010	9671535	1.3	0.010	9671535	1.1	0.010	9671535
Ion Balance (% Difference)	%	10	N/A	9671536	14	N/A	9671536	3.1	N/A	9671536
Nitrate (N)	mg/L	0.353	0.0020	9671746	0.654	0.0020	9671746	0.510	0.0020	9671746
Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	69.7	0.50	9672666	65.6	0.50	9672666	64.1	0.50	9672666
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9672666	<0.50	0.50	9672666	<0.50	0.50	9672666
Bicarbonate (HCO3)	mg/L	85.0	0.50	9672666	80.0	0.50	9672666	78.2	0.50	9672666
Carbonate (CO3)	mg/L	<0.50	0.50	9672666	<0.50	0.50	9672666	<0.50	0.50	9672666
Hydroxide (OH)	mg/L	<0.50	0.50	9672666	<0.50	0.50	9672666	<0.50	0.50	9672666
Anions										
Dissolved Sulphate (SO4)	mg/L	180	0.50	9675613	170	0.50	9675613	250 (1)	5.0	9679714
Nutrients										
Total Ammonia (N)	mg/L	0.79 (1)	0.010	9676160	0.31	0.0050	9676117	0.012	0.0050	9676160
Nitrate plus Nitrite (N)	mg/L	0.359	0.0020	9672618	0.665	0.0020	9672618	0.518	0.0020	9672618
Nitrite (N)	mg/L	0.0058	0.0020	9672619	0.0114	0.0020	9672619	0.0082	0.0020	9672619
RDL = Reportable Detection Limit										
N/A = Not Applicable										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										



BUREAU
VERITAS

BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WX9228		WX9229		WX9230		WX9231		
Sampling Date		2019/11/13 09:00		2019/11/13 10:05		2019/11/13 09:35		2019/11/13 09:05		
COC Number		08475126		08475126		08475126		08475126		
	UNITS	1C	RDL	3A	RDL	3B	RDL	3C	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	6.9	N/A	8.8	N/A	7.0	N/A	7.7	N/A	9671537
Cation Sum	meq/L	9.0	N/A	8.7	N/A	9.0	N/A	9.1	N/A	9671537
Filter and HNO3 Preservation	N/A	FIELD		FIELD		FIELD		FIELD		ONSITE
Ion Balance	N/A	1.3	0.010	0.99	0.010	1.3	0.010	1.2	0.010	9671535
Ion Balance (% Difference)	%	13	N/A	0.51	N/A	12	N/A	8.5	N/A	9671536
Nitrate (N)	mg/L	0.210	0.0020	0.103	0.0020	0.0484	0.0020	0.0046	0.0020	9671746
Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	65.6	0.50	70.3	0.50	67.2	0.50	68.5	0.50	9672666
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9672666
Bicarbonate (HCO3)	mg/L	80.0	0.50	85.8	0.50	82.0	0.50	83.5	0.50	9672666
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9672666
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9672666
Anions										
Dissolved Sulphate (SO4)	mg/L	160	0.50	270	5.0	180	0.50	210	5.0	9675613
Nutrients										
Total Ammonia (N)	mg/L	0.013	0.0050	0.060	0.0050	0.016	0.0050	0.010	0.0050	9676160
Nitrate plus Nitrite (N)	mg/L	0.214	0.0020	0.106	0.0020	0.0484	0.0020	0.0046	0.0020	9672615
Nitrite (N)	mg/L	0.0035	0.0020	0.0030	0.0020	<0.0020	0.0020	<0.0020	0.0020	9672617
RDL = Reportable Detection Limit N/A = Not Applicable										



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VERITAS

BV Labs Job #: B998124

Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WX9232			WX9233		WX9234		WX9238		
Sampling Date		2019/11/13 10:10			2019/11/13 09:40		2019/11/13 09:10		2019/11/13 10:15		
COC Number		08475126			08475126		08475126		08475127		
	UNITS	4A	RDL	QC Batch	4B	QC Batch	4C	RDL	6A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	6.6	N/A	9671537	8.5	9671537	9.9	N/A	7.0	N/A	9671537
Cation Sum	meq/L	9.1	N/A	9671537	9.4	9671537	9.9	N/A	9.0	N/A	9671537
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		FIELD		ONSITE
Ion Balance	N/A	1.4	0.010	9671535	1.1	9671535	1.0	0.010	1.3	0.010	9671535
Ion Balance (% Difference)	%	16	N/A	9671536	4.6	9671536	0.026	N/A	12	N/A	9671536
Nitrate (N)	mg/L	0.0472	0.0020	9671746	<0.0020	9671746	<0.0020	0.0020	0.0173	0.0020	9671746

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	72.9	0.50	9672666	72.0	9672666	74.2	0.50	71.0	0.50	9672666
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9672666	<0.50	9672666	<0.50	0.50	<0.50	0.50	9672666
Bicarbonate (HCO3)	mg/L	89.0	0.50	9672666	87.8	9672666	90.5	0.50	86.7	0.50	9672666
Carbonate (CO3)	mg/L	<0.50	0.50	9672666	<0.50	9672666	<0.50	0.50	<0.50	0.50	9672666
Hydroxide (OH)	mg/L	<0.50	0.50	9672666	<0.50	9672666	<0.50	0.50	<0.50	0.50	9672666

Anions

Dissolved Sulphate (SO4)	mg/L	160	0.50	9675613	250	9675613	300	5.0	180	0.50	9675613
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Nutrients

Total Ammonia (N)	mg/L	0.024	0.0050	9676160	0.013	9676117	0.017	0.0050	0.020	0.0050	9676160
Nitrate plus Nitrite (N)	mg/L	0.0472	0.0020	9672615	<0.0020	9672615	<0.0020	0.0020	0.0173	0.0020	9672615
Nitrite (N)	mg/L	<0.0020	0.0020	9672617	<0.0020	9672617	<0.0020	0.0020	<0.0020	0.0020	9672617

RDL = Reportable Detection Limit

N/A = Not Applicable



BUREAU
VERITAS

BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WX9239			WX9240		
Sampling Date		2019/11/13 09:45			2019/11/13 09:15		
COC Number		08475127			08475127		
	UNITS	6B	RDL	QC Batch	6C	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	6.7	N/A	9671537	8.1	N/A	9671537
Cation Sum	meq/L	9.4	N/A	9671537	9.7	N/A	9671537
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.4	0.010	9671535	1.2	0.010	9671535
Ion Balance (% Difference)	%	17	N/A	9671536	9.4	N/A	9671536
Nitrate (N)	mg/L	<0.0020	0.0020	9671746	<0.0020	0.0020	9671746
Misc. Inorganics							
Alkalinity (Total as CaCO ₃)	mg/L	71.6	0.50	9672666	71.8	0.50	9672666
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9672666	<0.50	0.50	9672666
Bicarbonate (HCO ₃)	mg/L	87.4	0.50	9672666	87.6	0.50	9672666
Carbonate (CO ₃)	mg/L	<0.50	0.50	9672666	<0.50	0.50	9672666
Hydroxide (OH)	mg/L	<0.50	0.50	9672666	<0.50	0.50	9672666
Anions							
Dissolved Sulphate (SO ₄)	mg/L	150	0.50	9675613	210	5.0	9675613
Nutrients							
Total Ammonia (N)	mg/L	0.056	0.0050	9676117	0.015	0.0050	9676160
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9672615	<0.0020	0.0020	9672615
Nitrite (N)	mg/L	<0.0020	0.0020	9672617	<0.0020	0.0020	9672617
RDL = Reportable Detection Limit N/A = Not Applicable							



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BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WX9225	WX9226	WX9227	WX9228	WX9229		
Sampling Date		2019/11/13 11:00	2019/11/13 10:00	2019/11/13 09:30	2019/11/13 09:00	2019/11/13 10:05		
COC Number		08475126	08475126	08475126	08475126	08475126		
	UNITS	INFL-63	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	362	372	376	383	368	0.50	9671074
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0134	0.00434	0.00142	0.00086	0.00302	0.00050	9672458
Dissolved Antimony (Sb)	mg/L	0.0197	0.0220	0.0204	0.0175	0.0206	0.000020	9672458
Dissolved Arsenic (As)	mg/L	0.0618	0.0601	0.0541	0.0431	0.0556	0.000020	9672458
Dissolved Barium (Ba)	mg/L	0.0574	0.0575	0.0566	0.0557	0.0575	0.000020	9672458
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9672458
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9672458
Dissolved Boron (B)	mg/L	0.039	0.039	0.039	0.038	0.031	0.010	9672458
Dissolved Cadmium (Cd)	mg/L	0.00200	0.000786	0.000385	0.000229	0.000628	0.0000050	9672458
Dissolved Chromium (Cr)	mg/L	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9672458
Dissolved Cobalt (Co)	mg/L	0.00254	0.000560	0.0000494	0.0000433	0.000203	0.0000050	9672458
Dissolved Copper (Cu)	mg/L	0.0224	0.00760	0.00336	0.00259	0.00432	0.000050	9672458
Dissolved Iron (Fe)	mg/L	<0.0010	0.0010	0.0017	0.0033	0.0017	0.0010	9672458
Dissolved Lead (Pb)	mg/L	0.0128	0.00259	0.000121	0.0000603	0.000352	0.0000050	9672458
Dissolved Lithium (Li)	mg/L	0.0122	0.0124	0.0125	0.0127	0.0121	0.00050	9672458
Dissolved Manganese (Mn)	mg/L	0.0480	0.0114	0.00100	0.00108	0.00602	0.000050	9672458
Dissolved Molybdenum (Mo)	mg/L	0.00164	0.00193	0.00152	0.00146	0.00163	0.000050	9672458
Dissolved Nickel (Ni)	mg/L	0.0322	0.0120	0.00403	0.00311	0.0104	0.000020	9672458
Dissolved Selenium (Se)	mg/L	0.00769	0.00769	0.00706	0.00618	0.00731	0.000040	9672458
Dissolved Silicon (Si)	mg/L	0.679	0.614	0.509	0.575	0.755	0.050	9672458
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9672458
Dissolved Strontium (Sr)	mg/L	0.621	0.629	0.638	0.634	0.631	0.000050	9672458
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000020	0.0000028	0.0000025	<0.0000020	0.0000020	9672458
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9672458
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9672458
Dissolved Uranium (U)	mg/L	0.0295	0.0310	0.0232	0.0160	0.0354	0.0000020	9672458
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9672458
Dissolved Zinc (Zn)	mg/L	0.159	0.111	0.0650	0.0379	0.114	0.00010	9672458
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9672458
Dissolved Calcium (Ca)	mg/L	115	118	119	121	117	0.050	9671075

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WX9225	WX9226	WX9227	WX9228	WX9229		
Sampling Date		2019/11/13 11:00	2019/11/13 10:00	2019/11/13 09:30	2019/11/13 09:00	2019/11/13 10:05		
COC Number		08475126	08475126	08475126	08475126	08475126		
	UNITS	INFL-63	1A	1B	1C	3A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	18.2	18.6	19.4	19.5	18.7	0.050	9671075
Dissolved Potassium (K)	mg/L	3.89	3.97	4.16	4.43	4.04	0.050	9671075
Dissolved Sodium (Na)	mg/L	27.4	27.9	28.8	29.1	28.3	0.050	9671075
Dissolved Sulphur (S)	mg/L	88.7	91.5	91.6	92.6	92.0	3.0	9671075
RDL = Reportable Detection Limit								



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BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WX9230	WX9231	WX9232	WX9233	WX9234		
Sampling Date		2019/11/13 09:35	2019/11/13 09:05	2019/11/13 10:10	2019/11/13 09:40	2019/11/13 09:10		
COC Number		08475126	08475126	08475126	08475126	08475126		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	381	385	385	398	421	0.50	9671074
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00181	0.00105	0.00400	0.00112	0.00101	0.00050	9672458
Dissolved Antimony (Sb)	mg/L	0.0198	0.0177	0.0148	0.0124	0.0110	0.000020	9672458
Dissolved Arsenic (As)	mg/L	0.0519	0.0443	0.0385	0.0238	0.0138	0.000020	9672458
Dissolved Barium (Ba)	mg/L	0.0571	0.0589	0.0568	0.0563	0.0578	0.000020	9672458
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9672458
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9672458
Dissolved Boron (B)	mg/L	0.027	0.024	0.029	0.015	<0.010	0.010	9672458
Dissolved Cadmium (Cd)	mg/L	0.000330	0.000216	0.000204	0.0000348	0.0000093	0.0000050	9672458
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9672458
Dissolved Cobalt (Co)	mg/L	0.0000486	0.0000389	0.000198	0.0000317	0.0000335	0.0000050	9672458
Dissolved Copper (Cu)	mg/L	0.00320	0.00258	0.00222	0.00120	0.000653	0.000050	9672458
Dissolved Iron (Fe)	mg/L	0.0020	0.0021	0.0105	0.0023	0.0056	0.0010	9672458
Dissolved Lead (Pb)	mg/L	0.000102	0.0000515	0.000363	0.0000683	0.0000354	0.0000050	9672458
Dissolved Lithium (Li)	mg/L	0.0125	0.0127	0.0124	0.0131	0.0139	0.00050	9672458
Dissolved Manganese (Mn)	mg/L	0.000940	0.000690	0.0103	0.00135	0.00412	0.000050	9672458
Dissolved Molybdenum (Mo)	mg/L	0.00152	0.00138	0.00131	0.000781	0.000447	0.000050	9672458
Dissolved Nickel (Ni)	mg/L	0.00536	0.00389	0.00621	0.00386	0.00337	0.000020	9672458
Dissolved Selenium (Se)	mg/L	0.00698	0.00583	0.00361	0.00280	0.00198	0.000040	9672458
Dissolved Silicon (Si)	mg/L	0.803	1.01	0.837	0.859	0.954	0.050	9672458
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9672458
Dissolved Strontium (Sr)	mg/L	0.634	0.644	0.649	0.655	0.694	0.000050	9672458
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9672458
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9672458
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9672458
Dissolved Uranium (U)	mg/L	0.0246	0.0128	0.0219	0.00921	0.00460	0.0000020	9672458
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9672458
Dissolved Zinc (Zn)	mg/L	0.0683	0.0417	0.0555	0.0167	0.00733	0.00010	9672458
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9672458
Dissolved Calcium (Ca)	mg/L	121	122	123	126	133	0.050	9671075

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WX9230	WX9231	WX9232	WX9233	WX9234		
Sampling Date		2019/11/13 09:35	2019/11/13 09:05	2019/11/13 10:10	2019/11/13 09:40	2019/11/13 09:10		
COC Number		08475126	08475126	08475126	08475126	08475126		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	19.0	19.4	19.1	20.0	21.3	0.050	9671075
Dissolved Potassium (K)	mg/L	4.18	4.33	3.82	3.94	3.79	0.050	9671075
Dissolved Sodium (Na)	mg/L	28.8	29.3	29.0	30.5	32.4	0.050	9671075
Dissolved Sulphur (S)	mg/L	93.2	93.9	92.9	96.3	102	3.0	9671075
RDL = Reportable Detection Limit								



BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WX9238	WX9239	WX9240		
Sampling Date		2019/11/13 10:15	2019/11/13 09:45	2019/11/13 09:15		
COC Number		08475127	08475127	08475127		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	381	399	411	0.50	9671074
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00275	0.00158	0.00096	0.00050	9672458
Dissolved Antimony (Sb)	mg/L	0.0143	0.0117	0.00997	0.000020	9672458
Dissolved Arsenic (As)	mg/L	0.0357	0.0207	0.0137	0.000020	9672458
Dissolved Barium (Ba)	mg/L	0.0572	0.0569	0.0593	0.000020	9672458
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9672458
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9672458
Dissolved Boron (B)	mg/L	0.028	0.020	<0.010	0.010	9672458
Dissolved Cadmium (Cd)	mg/L	0.000180	0.0000366	0.0000159	0.0000050	9672458
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9672458
Dissolved Cobalt (Co)	mg/L	0.000618	0.0000565	0.0000407	0.0000050	9672458
Dissolved Copper (Cu)	mg/L	0.00373	0.00133	0.000803	0.000050	9672458
Dissolved Iron (Fe)	mg/L	0.0131	0.0033	0.0051	0.0010	9672458
Dissolved Lead (Pb)	mg/L	0.000754	0.0000826	0.0000221	0.0000050	9672458
Dissolved Lithium (Li)	mg/L	0.0125	0.0132	0.0136	0.00050	9672458
Dissolved Manganese (Mn)	mg/L	0.0258	0.00265	0.00293	0.000050	9672458
Dissolved Molybdenum (Mo)	mg/L	0.00123	0.000721	0.000507	0.000050	9672458
Dissolved Nickel (Ni)	mg/L	0.00683	0.00370	0.00282	0.000020	9672458
Dissolved Selenium (Se)	mg/L	0.00394	0.00240	0.00189	0.000040	9672458
Dissolved Silicon (Si)	mg/L	0.886	0.921	1.05	0.050	9672458
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9672458
Dissolved Strontium (Sr)	mg/L	0.642	0.673	0.687	0.000050	9672458
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9672458
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9672458
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9672458
Dissolved Uranium (U)	mg/L	0.0258	0.00811	0.00398	0.0000020	9672458
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9672458
Dissolved Zinc (Zn)	mg/L	0.0347	0.0115	0.00858	0.00010	9672458
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9672458
Dissolved Calcium (Ca)	mg/L	121	126	130	0.050	9671075
RDL = Reportable Detection Limit						



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WX9238	WX9239	WX9240		
Sampling Date		2019/11/13 10:15	2019/11/13 09:45	2019/11/13 09:15		
COC Number		08475127	08475127	08475127		
	UNITS	6A	6B	6C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	19.2	20.3	20.9	0.050	9671075
Dissolved Potassium (K)	mg/L	4.01	4.43	4.79	0.050	9671075
Dissolved Sodium (Na)	mg/L	29.1	31.1	32.4	0.050	9671075
Dissolved Sulphur (S)	mg/L	92.4	98.5	99.7	3.0	9671075
RDL = Reportable Detection Limit						

BUREAU
VERITASBV Labs Job #: B998124
Report Date: 2019/11/22ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WX9225	WX9226	WX9227	WX9228	WX9229		
Sampling Date		2019/11/13 11:00	2019/11/13 10:00	2019/11/13 09:30	2019/11/13 09:00	2019/11/13 10:05		
COC Number		08475126	08475126	08475126	08475126	08475126		
	UNITS	INFL-63	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	332	339	350	354	341	0.50	9671070
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0333	0.00648	0.00130	0.00096	0.00394	0.00050	9673718
Total Antimony (Sb)	mg/L	0.0192	0.0213	0.0201	0.0172	0.0200	0.000020	9673718
Total Arsenic (As)	mg/L	0.0593	0.0582	0.0519	0.0418	0.0532	0.000020	9673718
Total Barium (Ba)	mg/L	0.0579	0.0563	0.0568	0.0564	0.0561	0.000020	9673718
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9673718
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9673718
Total Boron (B)	mg/L	0.031	0.031	0.031	0.031	0.024	0.010	9673718
Total Cadmium (Cd)	mg/L	0.00191	0.000773	0.000355	0.000221	0.000599	0.0000050	9673718
Total Chromium (Cr)	mg/L	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9673718
Total Cobalt (Co)	mg/L	0.00254	0.000550	0.0000470	0.0000407	0.000199	0.0000050	9673718
Total Copper (Cu)	mg/L	0.0227	0.00752	0.00335	0.00252	0.00449	0.000050	9673718
Total Iron (Fe)	mg/L	0.0087	0.0024	0.0024	0.0042	0.0029	0.0010	9673718
Total Lead (Pb)	mg/L	0.0189	0.00329	0.000137	0.0000631	0.000523	0.0000050	9673718
Total Lithium (Li)	mg/L	0.0110	0.0112	0.0114	0.0118	0.0113	0.00050	9673718
Total Manganese (Mn)	mg/L	0.0502	0.0117	0.000995	0.00107	0.00606	0.000050	9673718
Total Molybdenum (Mo)	mg/L	0.00153	0.00150	0.00143	0.00134	0.00153	0.000050	9673718
Total Nickel (Ni)	mg/L	0.0302	0.0118	0.00396	0.00291	0.00956	0.000020	9673718
Total Selenium (Se)	mg/L	0.00732	0.00731	0.00676	0.00575	0.00681	0.000040	9673718
Total Silicon (Si)	mg/L	0.672	0.594	0.500	0.563	0.740	0.050	9673718
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9673718
Total Strontium (Sr)	mg/L	0.611	0.643	0.642	0.650	0.646	0.000050	9673718
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000021	0.0000024	<0.0000020	0.0000020	9673718
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9673718
Total Titanium (Ti)	mg/L	0.00129	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9673718
Total Uranium (U)	mg/L	0.0288	0.0304	0.0231	0.0155	0.0343	0.0000020	9673718
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9673718
Total Zinc (Zn)	mg/L	0.153	0.108	0.0629	0.0372	0.108	0.00010	9673718
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9673718
Total Calcium (Ca)	mg/L	106	108	112	113	109	0.050	9671226

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WX9225	WX9226	WX9227	WX9228	WX9229		
Sampling Date		2019/11/13 11:00	2019/11/13 10:00	2019/11/13 09:30	2019/11/13 09:00	2019/11/13 10:05		
COC Number		08475126	08475126	08475126	08475126	08475126		
	UNITS	INFL-63	1A	1B	1C	3A	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.4	16.9	17.1	17.6	16.6	0.050	9671226
Total Potassium (K)	mg/L	3.88	3.99	4.10	4.39	3.89	0.050	9671226
Total Sodium (Na)	mg/L	25.0	25.4	26.0	26.6	25.2	0.050	9671226
Total Sulphur (S)	mg/L	82.2	85.6	85.7	87.1	83.5	3.0	9671226
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B998124
Report Date: 2019/11/22ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WX9230	WX9231	WX9232	WX9233	WX9234		
Sampling Date		2019/11/13 09:35	2019/11/13 09:05	2019/11/13 10:10	2019/11/13 09:40	2019/11/13 09:10		
COC Number		08475126	08475126	08475126	08475126	08475126		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	347	352	359	361	392	0.50	9671070
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00163	0.00087	0.00413	0.00146	0.00107	0.00050	9673718
Total Antimony (Sb)	mg/L	0.0191	0.0169	0.0143	0.0122	0.0108	0.000020	9673718
Total Arsenic (As)	mg/L	0.0494	0.0423	0.0367	0.0228	0.0133	0.000020	9673718
Total Barium (Ba)	mg/L	0.0570	0.0573	0.0565	0.0557	0.0580	0.000020	9673718
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9673718
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9673718
Total Boron (B)	mg/L	0.021	0.018	0.024	0.011	<0.010	0.010	9673718
Total Cadmium (Cd)	mg/L	0.000319	0.000206	0.000195	0.0000373	0.0000075	0.0000050	9673718
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9673718
Total Cobalt (Co)	mg/L	0.0000477	0.0000382	0.000191	0.0000308	0.0000312	0.0000050	9673718
Total Copper (Cu)	mg/L	0.00319	0.00253	0.00221	0.00122	0.000661	0.000050	9673718
Total Iron (Fe)	mg/L	0.0018	0.0020	0.0088	0.0032	0.0071	0.0010	9673718
Total Lead (Pb)	mg/L	0.000131	0.0000541	0.000376	0.0000892	0.0000340	0.0000050	9673718
Total Lithium (Li)	mg/L	0.0115	0.0115	0.0117	0.0120	0.0126	0.00050	9673718
Total Manganese (Mn)	mg/L	0.00107	0.000725	0.00992	0.00161	0.00413	0.000050	9673718
Total Molybdenum (Mo)	mg/L	0.00141	0.00130	0.00121	0.000743	0.000420	0.000050	9673718
Total Nickel (Ni)	mg/L	0.00489	0.00361	0.00600	0.00359	0.00311	0.000020	9673718
Total Selenium (Se)	mg/L	0.00644	0.00560	0.00335	0.00255	0.00189	0.000040	9673718
Total Silicon (Si)	mg/L	0.769	0.981	0.807	0.844	0.936	0.050	9673718
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9673718
Total Strontium (Sr)	mg/L	0.646	0.651	0.660	0.658	0.704	0.000050	9673718
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9673718
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9673718
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9673718
Total Uranium (U)	mg/L	0.0240	0.0129	0.0219	0.00935	0.00470	0.0000020	9673718
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9673718
Total Zinc (Zn)	mg/L	0.0660	0.0398	0.0543	0.0161	0.00731	0.00010	9673718
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9673718
Total Calcium (Ca)	mg/L	111	112	115	115	126	0.050	9671226

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WX9230	WX9231	WX9232	WX9233	WX9234		
Sampling Date		2019/11/13 09:35	2019/11/13 09:05	2019/11/13 10:10	2019/11/13 09:40	2019/11/13 09:10		
COC Number		08475126	08475126	08475126	08475126	08475126		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	17.2	17.5	17.4	18.1	19.0	0.050	9671226
Total Potassium (K)	mg/L	4.12	4.16	3.78	3.85	3.74	0.050	9671226
Total Sodium (Na)	mg/L	26.0	26.5	26.6	27.4	29.0	0.050	9671226
Total Sulphur (S)	mg/L	85.7	86.6	88.3	89.5	93.7	3.0	9671226
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WX9238	WX9239	WX9240		
Sampling Date		2019/11/13 10:15	2019/11/13 09:45	2019/11/13 09:15		
COC Number		08475127	08475127	08475127		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	354	370	388	0.50	9671070
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00351	0.00144	0.00090	0.00050	9673718
Total Antimony (Sb)	mg/L	0.0142	0.0115	0.00946	0.000020	9673718
Total Arsenic (As)	mg/L	0.0350	0.0200	0.0132	0.000020	9673718
Total Barium (Ba)	mg/L	0.0564	0.0567	0.0582	0.000020	9673718
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9673718
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9673718
Total Boron (B)	mg/L	0.023	0.015	<0.010	0.010	9673718
Total Cadmium (Cd)	mg/L	0.000226	0.0000444	0.0000159	0.0000050	9673718
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9673718
Total Cobalt (Co)	mg/L	0.000626	0.0000493	0.0000350	0.0000050	9673718
Total Copper (Cu)	mg/L	0.00530	0.00155	0.000798	0.000050	9673718
Total Iron (Fe)	mg/L	0.0190	0.0045	0.0058	0.0010	9673718
Total Lead (Pb)	mg/L	0.00115	0.000140	0.0000251	0.0000050	9673718
Total Lithium (Li)	mg/L	0.0115	0.0119	0.0124	0.00050	9673718
Total Manganese (Mn)	mg/L	0.0251	0.00274	0.00280	0.000050	9673718
Total Molybdenum (Mo)	mg/L	0.00119	0.000636	0.000464	0.000050	9673718
Total Nickel (Ni)	mg/L	0.00634	0.00349	0.00267	0.000020	9673718
Total Selenium (Se)	mg/L	0.00378	0.00226	0.00181	0.000040	9673718
Total Silicon (Si)	mg/L	0.847	0.904	1.02	0.050	9673718
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9673718
Total Strontium (Sr)	mg/L	0.657	0.681	0.681	0.000050	9673718
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9673718
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9673718
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9673718
Total Uranium (U)	mg/L	0.0259	0.00823	0.00403	0.0000020	9673718
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9673718
Total Zinc (Zn)	mg/L	0.0348	0.0114	0.00835	0.00010	9673718
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9673718
Total Calcium (Ca)	mg/L	113	118	123	0.050	9671226
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WX9238	WX9239	WX9240		
Sampling Date		2019/11/13 10:15	2019/11/13 09:45	2019/11/13 09:15		
COC Number		08475127	08475127	08475127		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	17.2	18.2	19.3	0.050	9671226
Total Potassium (K)	mg/L	3.95	4.30	4.71	0.050	9671226
Total Sodium (Na)	mg/L	26.0	27.8	28.9	0.050	9671226
Total Sulphur (S)	mg/L	86.4	89.7	93.0	3.0	9671226
RDL = Reportable Detection Limit						



BUREAU
VERITAS

BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	11.7°C
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Results relate only to the items tested.



BV Labs Job #: B998124
Report Date: 2019/11/22

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9672458	Dissolved Aluminum (Al)	2019/11/15	99	80 - 120	101	80 - 120	<0.00050	mg/L	2.8	20
9672458	Dissolved Antimony (Sb)	2019/11/15	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.79	20
9672458	Dissolved Arsenic (As)	2019/11/15	NC	80 - 120	96	80 - 120	<0.000020	mg/L	0.090	20
9672458	Dissolved Barium (Ba)	2019/11/15	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.81	20
9672458	Dissolved Beryllium (Be)	2019/11/15	95	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
9672458	Dissolved Bismuth (Bi)	2019/11/15	96	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9672458	Dissolved Boron (B)	2019/11/15	96	80 - 120	97	80 - 120	<0.010	mg/L	2.2	20
9672458	Dissolved Cadmium (Cd)	2019/11/15	98	80 - 120	100	80 - 120	<0.0000050	mg/L	1.2	20
9672458	Dissolved Chromium (Cr)	2019/11/15	98	80 - 120	101	80 - 120	<0.00010	mg/L	14	20
9672458	Dissolved Cobalt (Co)	2019/11/15	93	80 - 120	96	80 - 120	<0.0000050	mg/L	0.37	20
9672458	Dissolved Copper (Cu)	2019/11/15	93	80 - 120	100	80 - 120	<0.000050	mg/L	0.29	20
9672458	Dissolved Iron (Fe)	2019/11/15	101	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
9672458	Dissolved Lead (Pb)	2019/11/15	99	80 - 120	101	80 - 120	<0.0000050	mg/L	0.60	20
9672458	Dissolved Lithium (Li)	2019/11/15	96	80 - 120	98	80 - 120	<0.00050	mg/L	0.84	20
9672458	Dissolved Manganese (Mn)	2019/11/15	96	80 - 120	101	80 - 120	<0.000050	mg/L	0.077	20
9672458	Dissolved Molybdenum (Mo)	2019/11/15	103	80 - 120	99	80 - 120	<0.000050	mg/L	1.1	20
9672458	Dissolved Nickel (Ni)	2019/11/15	94	80 - 120	102	80 - 120	<0.000020	mg/L	0.32	20
9672458	Dissolved Selenium (Se)	2019/11/15	101	80 - 120	98	80 - 120	<0.000040	mg/L	0.52	20
9672458	Dissolved Silicon (Si)	2019/11/15	102	80 - 120	98	80 - 120	<0.050	mg/L	0.35	20
9672458	Dissolved Silver (Ag)	2019/11/15	97	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9672458	Dissolved Strontium (Sr)	2019/11/15	NC	80 - 120	94	80 - 120	<0.000050	mg/L	0.34	20
9672458	Dissolved Thallium (Tl)	2019/11/15	99	80 - 120	99	80 - 120	0.0000037, RDL=0.0000020 (1)	mg/L	NC	20
9672458	Dissolved Tin (Sn)	2019/11/15	96	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9672458	Dissolved Titanium (Ti)	2019/11/15	101	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9672458	Dissolved Uranium (U)	2019/11/15	102	80 - 120	102	80 - 120	<0.0000020	mg/L	1.2	20
9672458	Dissolved Vanadium (V)	2019/11/15	100	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9672458	Dissolved Zinc (Zn)	2019/11/15	NC	80 - 120	101	80 - 120	<0.00010	mg/L	0.23	20
9672458	Dissolved Zirconium (Zr)	2019/11/15	104	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9672615	Nitrate plus Nitrite (N)	2019/11/15	106	80 - 120	109	80 - 120	<0.0020	mg/L	0	25
9672617	Nitrite (N)	2019/11/15	105	80 - 120	105	80 - 120	<0.0020	mg/L	NC	25



BV Labs Job #: B998124
Report Date: 2019/11/22

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9672618	Nitrate plus Nitrite (N)	2019/11/15			109	80 - 120	<0.0020	mg/L		
9672619	Nitrite (N)	2019/11/15			109	80 - 120	<0.0020	mg/L		
9672666	Alkalinity (PP as CaCO3)	2019/11/15					<0.50	mg/L	NC	20
9672666	Alkalinity (Total as CaCO3)	2019/11/15	NC	80 - 120	95	80 - 120	<0.50	mg/L	1.2	20
9672666	Bicarbonate (HCO3)	2019/11/15					<0.50	mg/L	1.2	20
9672666	Carbonate (CO3)	2019/11/15					<0.50	mg/L	NC	20
9672666	Hydroxide (OH)	2019/11/15					<0.50	mg/L	NC	20
9673718	Total Aluminum (Al)	2019/11/16	98	80 - 120	99	80 - 120	<0.00050	mg/L	2.6	20
9673718	Total Antimony (Sb)	2019/11/16	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.022	20
9673718	Total Arsenic (As)	2019/11/16	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.39	20
9673718	Total Barium (Ba)	2019/11/16	NC	80 - 120	100	80 - 120	<0.000020	mg/L	1.4	20
9673718	Total Beryllium (Be)	2019/11/16	93	80 - 120	96	80 - 120	<0.000010	mg/L	NC	20
9673718	Total Bismuth (Bi)	2019/11/16	95	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9673718	Total Boron (B)	2019/11/16	96	80 - 120	95	80 - 120	<0.010	mg/L	0.14	20
9673718	Total Cadmium (Cd)	2019/11/16	97	80 - 120	99	80 - 120	<0.0000050	mg/L	0.24	20
9673718	Total Chromium (Cr)	2019/11/16	97	80 - 120	100	80 - 120	<0.00010	mg/L	5.2	20
9673718	Total Cobalt (Co)	2019/11/16	94	80 - 120	99	80 - 120	<0.0000050	mg/L	1.7	20
9673718	Total Copper (Cu)	2019/11/16	90	80 - 120	97	80 - 120	<0.000050	mg/L	0.66	20
9673718	Total Iron (Fe)	2019/11/16	95	80 - 120	99	80 - 120	<0.0010	mg/L	5.0	20
9673718	Total Lead (Pb)	2019/11/16	99	80 - 120	101	80 - 120	<0.0000050	mg/L	0.075	20
9673718	Total Lithium (Li)	2019/11/16	94	80 - 120	97	80 - 120	<0.00050	mg/L	1.4	20
9673718	Total Manganese (Mn)	2019/11/16	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.83	20
9673718	Total Molybdenum (Mo)	2019/11/16	103	80 - 120	98	80 - 120	<0.000050	mg/L	0.69	20
9673718	Total Nickel (Ni)	2019/11/16	90	80 - 120	99	80 - 120	<0.000020	mg/L	0.78	20
9673718	Total Selenium (Se)	2019/11/16	96	80 - 120	98	80 - 120	<0.000040	mg/L	0.54	20
9673718	Total Silicon (Si)	2019/11/16	100	80 - 120	104	80 - 120	<0.050	mg/L	1.6	20
9673718	Total Silver (Ag)	2019/11/16	96	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9673718	Total Strontium (Sr)	2019/11/16	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.12	20
9673718	Total Thallium (Tl)	2019/11/16	99	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9673718	Total Tin (Sn)	2019/11/16	99	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9673718	Total Titanium (Ti)	2019/11/16	96	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9673718	Total Uranium (U)	2019/11/16	103	80 - 120	102	80 - 120	<0.0000020	mg/L	0.77	20



BUREAU
VERITAS
BV Labs Job #: B998124
Report Date: 2019/11/22

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9673718	Total Vanadium (V)	2019/11/16	99	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9673718	Total Zinc (Zn)	2019/11/16	NC	80 - 120	100	80 - 120	<0.00010	mg/L	1.2	20
9673718	Total Zirconium (Zr)	2019/11/16	104	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9675613	Dissolved Sulphate (SO4)	2019/11/18	199	80 - 120	103	80 - 120	0.55, RDL=0.50	mg/L	3.5	20
9676117	Total Ammonia (N)	2019/11/19	93	80 - 120	99	80 - 120	<0.0050	mg/L	9.0	20
9676160	Total Ammonia (N)	2019/11/19	93	80 - 120	97	80 - 120	<0.0050	mg/L	1.9	20
9679714	Dissolved Sulphate (SO4)	2019/11/20			106	80 - 120	<0.50	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for Tl- 2X RDL acceptable for low level metals determination.



BUREAU
VERITAS

BV Labs Job #: B998124
Report Date: 2019/11/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.



Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

CHAIN OF CUSTODY RECORD

COC#:

BBY FCD-00077/05

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[illegible]



Your Project #: BMC-18-02
 Site Location: KUD ZE KAYAH
 Your C.O.C. #: 08475218, 08475219

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/11/25
 Report #: R2815545
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B999326

Received: 2019/11/18, 12:21

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	13	N/A	2019/11/20	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	8	N/A	2019/11/19	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	4	N/A	2019/11/20	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	1	N/A	2019/11/22	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1, 2)	13	N/A	2019/11/21	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	13	N/A	2019/11/21	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	13	N/A	2019/11/22	BBY WI-00033	Auto Calc
Ion Balance (1)	13	N/A	2019/11/22	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	13	N/A	2019/11/21	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	13	N/A	2019/11/21	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	13	N/A	2019/11/20	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	13	N/A	2019/11/21	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	13	N/A	2019/11/20	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	13	N/A	2019/11/20	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	13	N/A	2019/11/19	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	13	N/A	2019/11/19	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	13	N/A	2019/11/19	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	13	N/A	2019/11/19	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied.



Your Project #: BMC-18-02
Site Location: KUD ZE KAYAH
Your C.O.C. #: 08475218, 08475219

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/11/25
Report #: R2815545
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B999326

Received: 2019/11/18, 12:21

BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WY5552			WY5553	WY5554		WY5555		
Sampling Date		2019/11/18 10:55			2019/11/18 10:40	2019/11/18 10:20		2019/11/18 10:00		
COC Number		08475218			08475218	08475218		08475218		
	UNITS	INFL-64	RDL	QC Batch	1A	1B	QC Batch	1C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.3	N/A	9677082	7.7	7.6	9677082	8.6	N/A	9677082
Cation Sum	meq/L	8.2	N/A	9677082	8.1	8.4	9677082	8.5	N/A	9677082
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	9677073	1.0	1.0	9677073	0.99	0.010	9677073
Ion Balance (% Difference)	%	4.1	N/A	9677076	2.3	2.5	9677076	0.18	N/A	9677076
Nitrate (N)	mg/L	0.276	0.0020	9677092	0.603	0.637	9677092	0.447	0.0020	9677092

Misc. Inorganics

Alkalinity (Total as CaCO ₃)	mg/L	74.5	0.50	9677902	73.4	70.4	9677902	68.0	0.50	9677902
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9677902	<0.50	<0.50	9677902	<0.50	0.50	9677902
Bicarbonate (HCO ₃)	mg/L	90.8	0.50	9677902	89.5	85.9	9677902	83.0	0.50	9677902
Carbonate (CO ₃)	mg/L	<0.50	0.50	9677902	<0.50	<0.50	9677902	<0.50	0.50	9677902
Hydroxide (OH)	mg/L	<0.50	0.50	9677902	<0.50	<0.50	9677902	<0.50	0.50	9677902

Anions

Dissolved Chloride (Cl)	mg/L	61	0.50	9679014	64	66	9679014	69	0.50	9682642
Dissolved Sulphate (SO ₄)	mg/L	200	0.50	9679014	210	210 (1)	9679014	250 (1)	5.0	9682642

Nutrients

Total Ammonia (N)	mg/L	0.89	0.0050	9678939	0.38	0.051	9678922	0.0081	0.0050	9678939
Nitrate plus Nitrite (N)	mg/L	0.306	0.0020	9677937	0.627	0.646	9677937	0.447	0.0020	9677937
Nitrite (N)	mg/L	0.0302	0.0020	9677939	0.0239	0.0085	9677939	<0.0020	0.0020	9677939

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WY5556		WY5557			WY5558		
Sampling Date		2019/11/18 10:45		2019/11/18 10:25			2019/11/18 10:05		
COC Number		08475218		08475218			08475218		
	UNITS	3A	RDL	3B	RDL	QC Batch	3C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.8	N/A	7.1	N/A	9677082	7.6	N/A	9677082
Cation Sum	meq/L	8.5	N/A	8.4	N/A	9677082	8.4	N/A	9677082
Filter and HNO3 Preservation	N/A	FIELD		FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	1.1	0.010	9677073	1.1	0.010	9677073
Ion Balance (% Difference)	%	4.4	N/A	6.0	N/A	9677076	3.6	N/A	9677076
Nitrate (N)	mg/L	0.170	0.0020	0.0962	0.0020	9677092	0.0086	0.0020	9677092

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	74.3	0.50	75.2	0.50	9677902	73.4	0.50	9677902
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	0.50	9677902	<0.50	0.50	9677902
Bicarbonate (HCO3)	mg/L	90.6	0.50	91.7	0.50	9677902	89.6	0.50	9677902
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	0.50	9677902	<0.50	0.50	9677902
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	9677902	<0.50	0.50	9677902

Anions

Dissolved Chloride (Cl)	mg/L	70	0.50	68	0.50	9679014	66	0.50	9679014
Dissolved Sulphate (SO4)	mg/L	210 (1)	5.0	180	0.50	9679014	210	5.0	9679014

Nutrients

Total Ammonia (N)	mg/L	0.15	0.0050	0.011	0.0050	9678939	0.0057	0.0050	9678922
Nitrate plus Nitrite (N)	mg/L	0.183	0.0020	0.0962	0.0020	9677937	0.0086	0.0020	9677937
Nitrite (N)	mg/L	0.0127	0.0020	<0.0020	0.0020	9677939	<0.0020	0.0020	9677939

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WY5559		WY5560		WY5561		WY5562		
Sampling Date		2019/11/18 10:50		2019/11/18 10:30		2019/11/18 10:10		2019/11/18 11:00		
COC Number		08475218		08475218		08475218		08475219		
	UNITS	4A	RDL	4B	QC Batch	4C	QC Batch	6A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.0	N/A	8.5	9677082	8.4	9677082	7.7	N/A	9677082
Cation Sum	meq/L	8.4	N/A	8.8	9677082	9.1	9677082	8.4	N/A	9677082
Filter and HNO ₃ Preservation	N/A	FIELD		FIELD	ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.2	0.010	0.99	9677073	1.0	9677073	1.1	0.010	9677073
Ion Balance (% Difference)	%	9.5	N/A	0.69	9677076	2.3	9677076	2.6	N/A	9677076
Nitrate (N)	mg/L	0.0807	0.0020	<0.0020	9677092	<0.0020	9677092	0.113	0.0020	9677092

Misc. Inorganics

Alkalinity (Total as CaCO ₃)	mg/L	76.5	0.50	79.5	9677902	78.9	9677902	75.9	0.50	9677902
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	9677902	<0.50	9677902	<0.50	0.50	9677902
Bicarbonate (HCO ₃)	mg/L	93.4	0.50	96.9	9677902	96.3	9677902	92.5	0.50	9677902
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	9677902	<0.50	9677902	<0.50	0.50	9677902
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	9677902	<0.50	9677902	<0.50	0.50	9677902

Anions

Dissolved Chloride (Cl)	mg/L	63	0.50	68	9679014	71	9679014	62	0.50	9679014
Dissolved Sulphate (SO ₄)	mg/L	180	0.50	240 (1)	9679014	230	9679014	210	5.0	9679014

Nutrients

Total Ammonia (N)	mg/L	0.015	0.0050	0.0052	9678939	0.0066	9678922	0.16	0.0050	9679234
Nitrate plus Nitrite (N)	mg/L	0.0807	0.0020	<0.0020	9677937	<0.0020	9677937	0.122	0.0020	9677937
Nitrite (N)	mg/L	<0.0020	0.0020	<0.0020	9677939	<0.0020	9677939	0.0095	0.0020	9677939

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B999326

Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUD ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WY5563	WY5564		
Sampling Date		2019/11/18 10:35	2019/11/18 10:15		
COC Number		08475219	08475219		
	UNITS	6B	6C	RDL	QC Batch
Calculated Parameters					
Anion Sum	meq/L	7.6	8.8	N/A	9677082
Cation Sum	meq/L	8.5	8.7	N/A	9677082
Filter and HNO ₃ Preservation	N/A	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.1	0.94	0.010	9677073
Ion Balance (% Difference)	%	5.4	2.9	N/A	9677076
Nitrate (N)	mg/L	<0.0020	<0.0020	0.0020	9677092
Misc. Inorganics					
Alkalinity (Total as CaCO ₃)	mg/L	77.6	75.6	0.50	9677902
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	0.50	9677902
Bicarbonate (HCO ₃)	mg/L	94.7	92.2	0.50	9677902
Carbonate (CO ₃)	mg/L	<0.50	<0.50	0.50	9677902
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9677902
Anions					
Dissolved Chloride (Cl)	mg/L	64	69	0.50	9679014
Dissolved Sulphate (SO ₄)	mg/L	210	260	5.0	9679014
Nutrients					
Total Ammonia (N)	mg/L	0.0055	0.0053	0.0050	9678939
Nitrate plus Nitrite (N)	mg/L	<0.0020	<0.0020	0.0020	9677941
Nitrite (N)	mg/L	<0.0020	<0.0020	0.0020	9677943
RDL = Reportable Detection Limit					
N/A = Not Applicable					



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VERITAS

BV Labs Job #: B999326
Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WY5552	WY5553	WY5554	WY5555	WY5556		
Sampling Date		2019/11/18 10:55	2019/11/18 10:40	2019/11/18 10:20	2019/11/18 10:00	2019/11/18 10:45		
COC Number		08475218	08475218	08475218	08475218	08475218		
	UNITS	INFL-64	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	345	343	358	360	359	0.50	9677069
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0131	0.00697	0.00198	0.00082	0.00188	0.00050	9677538
Dissolved Antimony (Sb)	mg/L	0.0187	0.0199	0.0204	0.0195	0.0149	0.000020	9677538
Dissolved Arsenic (As)	mg/L	0.0599	0.0576	0.0554	0.0457	0.0402	0.000020	9677538
Dissolved Barium (Ba)	mg/L	0.0561	0.0555	0.0570	0.0569	0.0562	0.000020	9677538
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9677538
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9677538
Dissolved Boron (B)	mg/L	0.035	0.035	0.035	0.036	0.028	0.010	9677538
Dissolved Cadmium (Cd)	mg/L	0.00189	0.00106	0.000579	0.000266	0.000264	0.0000050	9677538
Dissolved Chromium (Cr)	mg/L	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9677538
Dissolved Cobalt (Co)	mg/L	0.00243	0.000906	0.0000934	0.0000434	0.000183	0.0000050	9677538
Dissolved Copper (Cu)	mg/L	0.0180	0.00831	0.00373	0.00221	0.00230	0.000050	9677538
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	0.0011	0.0029	0.0040	0.0010	9677538
Dissolved Lead (Pb)	mg/L	0.0115	0.00438	0.000306	0.0000570	0.000323	0.0000050	9677538
Dissolved Lithium (Li)	mg/L	0.0110	0.0111	0.0116	0.0117	0.0118	0.00050	9677538
Dissolved Manganese (Mn)	mg/L	0.0420	0.0169	0.00191	0.00110	0.0115 (1)	0.000050	9677538
Dissolved Molybdenum (Mo)	mg/L	0.00159	0.00156	0.00157	0.00152	0.00133	0.000050	9677538
Dissolved Nickel (Ni)	mg/L	0.00769	0.00842	0.00684	0.00433	0.00850	0.000020	9677538
Dissolved Selenium (Se)	mg/L	0.00764	0.00745	0.00755	0.00724	0.00395	0.000040	9677538
Dissolved Silicon (Si)	mg/L	0.607	0.484	0.407	0.443	0.703	0.050	9677538
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9677538
Dissolved Strontium (Sr)	mg/L	0.599	0.591	0.608	0.624	0.624	0.000050	9677538
Dissolved Thallium (Tl)	mg/L	0.0000022	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9677538
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9677538
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9677538
Dissolved Uranium (U)	mg/L	0.0278	0.0305	0.0309	0.0235	0.0262	0.0000020	9677538
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9677538
Dissolved Zinc (Zn)	mg/L	0.146	0.132	0.0990	0.0553	0.0727	0.00010	9677538
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9677538
Dissolved Calcium (Ca)	mg/L	110	109	113	115	114	0.050	9677084

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WY5552	WY5553	WY5554	WY5555	WY5556		
Sampling Date		2019/11/18 10:55	2019/11/18 10:40	2019/11/18 10:20	2019/11/18 10:00	2019/11/18 10:45		
COC Number		08475218	08475218	08475218	08475218	08475218		
	UNITS	INFL-64	1A	1B	1C	3A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.0	17.2	18.0	17.9	18.1	0.050	9677084
Dissolved Potassium (K)	mg/L	3.77	3.91	3.92	4.08	3.81	0.050	9677084
Dissolved Sodium (Na)	mg/L	25.7	26.6	27.3	27.5	27.6	0.050	9677084
Dissolved Sulphur (S)	mg/L	83.2	80.8	87.1	85.7	88.2	3.0	9677084
RDL = Reportable Detection Limit								



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BV Labs Job #: B999326
Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WY5557	WY5558	WY5559	WY5560	WY5561		
Sampling Date		2019/11/18 10:25	2019/11/18 10:05	2019/11/18 10:50	2019/11/18 10:30	2019/11/18 10:10		
COC Number		08475218	08475218	08475218	08475218	08475218		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	354	354	355	372	385	0.50	9677069
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00124	0.00103	0.00386	0.00109	0.00085	0.00050	9677538
Dissolved Antimony (Sb)	mg/L	0.0189	0.0176	0.0196	0.0117	0.0107	0.000020	9677538
Dissolved Arsenic (As)	mg/L	0.0505	0.0448	0.0556	0.0268	0.0162	0.000020	9677538
Dissolved Barium (Ba)	mg/L	0.0566	0.0555	0.0562	0.0572	0.0566	0.000020	9677538
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9677538
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9677538
Dissolved Boron (B)	mg/L	0.028	0.023	0.026	0.017	<0.010	0.010	9677538
Dissolved Cadmium (Cd)	mg/L	0.000436	0.000245	0.000696 (1)	0.0000503	0.0000116	0.0000050	9677538
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9677538
Dissolved Cobalt (Co)	mg/L	0.0000448	0.0000337	0.000161	0.0000306	0.0000272	0.0000050	9677538
Dissolved Copper (Cu)	mg/L	0.00314	0.00222	0.00467 (1)	0.00124	0.000635	0.000050	9677538
Dissolved Iron (Fe)	mg/L	0.0014	0.0015	0.0016	0.0023	0.0059	0.0010	9677538
Dissolved Lead (Pb)	mg/L	0.000107	0.0000471	0.000398	0.0000672	0.0000307	0.0000050	9677538
Dissolved Lithium (Li)	mg/L	0.0115	0.0113	0.0117	0.0121	0.0126	0.00050	9677538
Dissolved Manganese (Mn)	mg/L	0.000992	0.000689	0.00408	0.00140	0.00461	0.000050	9677538
Dissolved Molybdenum (Mo)	mg/L	0.00147	0.00140	0.00171	0.000929	0.000583	0.000050	9677538
Dissolved Nickel (Ni)	mg/L	0.00863	0.00574	0.00995	0.00526	0.00384	0.000020	9677538
Dissolved Selenium (Se)	mg/L	0.00709	0.00660	0.00757 (1)	0.00291	0.00206	0.000040	9677538
Dissolved Silicon (Si)	mg/L	0.609	0.664	0.619	0.747	0.769	0.050	9677538
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9677538
Dissolved Strontium (Sr)	mg/L	0.606	0.610	0.613	0.645	0.652	0.000050	9677538
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9677538
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9677538
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9677538
Dissolved Uranium (U)	mg/L	0.0316	0.0240	0.0348	0.0158	0.00800	0.0000020	9677538
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9677538
Dissolved Zinc (Zn)	mg/L	0.0954	0.0635	0.112	0.0276	0.0114	0.00010	9677538
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9677538
Dissolved Calcium (Ca)	mg/L	112	113	113	118	122	0.050	9677084

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WY5557	WY5558	WY5559	WY5560	WY5561		
Sampling Date		2019/11/18 10:25	2019/11/18 10:05	2019/11/18 10:50	2019/11/18 10:30	2019/11/18 10:10		
COC Number		08475218	08475218	08475218	08475218	08475218		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.7	17.7	17.9	18.9	19.2	0.050	9677084
Dissolved Potassium (K)	mg/L	3.99	4.06	4.08	3.93	3.74	0.050	9677084
Dissolved Sodium (Na)	mg/L	27.1	27.5	28.0	28.7	29.4	0.050	9677084
Dissolved Sulphur (S)	mg/L	85.1	80.4	86.2	88.6	91.4	3.0	9677084
RDL = Reportable Detection Limit								



BV Labs Job #: B999326
Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WY5562	WY5563	WY5564		
Sampling Date		2019/11/18 11:00	2019/11/18 10:35	2019/11/18 10:15		
COC Number		08475219	08475219	08475219		
	UNITS	6A	6B	6C	RDL	QC Batch

Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	353	360	369	0.50	9677069
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00394	0.00089	0.00073	0.00050	9677538
Dissolved Antimony (Sb)	mg/L	0.0177	0.0144	0.0134	0.000020	9677538
Dissolved Arsenic (As)	mg/L	0.0459	0.0280	0.0211	0.000020	9677538
Dissolved Barium (Ba)	mg/L	0.0552	0.0552	0.0549	0.000020	9677538
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9677538
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9677538
Dissolved Boron (B)	mg/L	0.026	0.020	<0.010	0.010	9677538
Dissolved Cadmium (Cd)	mg/L	0.000413	0.0000614	0.0000175	0.0000050	9677538
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9677538
Dissolved Cobalt (Co)	mg/L	0.000717	0.0000449	0.0000334	0.0000050	9677538
Dissolved Copper (Cu)	mg/L	0.00563	0.00187	0.00108	0.000050	9677538
Dissolved Iron (Fe)	mg/L	0.0092	0.0079 (1)	0.0041	0.0010	9677538
Dissolved Lead (Pb)	mg/L	0.00123	0.000122	0.0000533	0.0000050	9677538
Dissolved Lithium (Li)	mg/L	0.0117	0.0115	0.0116	0.00050	9677538
Dissolved Manganese (Mn)	mg/L	0.0191	0.00209	0.00196	0.000050	9677538
Dissolved Molybdenum (Mo)	mg/L	0.00143	0.00109	0.000914	0.000050	9677538
Dissolved Nickel (Ni)	mg/L	0.00780	0.00514	0.00345	0.000020	9677538
Dissolved Selenium (Se)	mg/L	0.00609	0.00385	0.00333	0.000040	9677538
Dissolved Silicon (Si)	mg/L	0.673	0.694	0.716	0.050	9677538
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9677538
Dissolved Strontium (Sr)	mg/L	0.600	0.613	0.637	0.000050	9677538
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9677538
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9677538
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9677538
Dissolved Uranium (U)	mg/L	0.0325	0.0177	0.0119	0.0000020	9677538
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9677538
Dissolved Zinc (Zn)	mg/L	0.0615	0.0178	0.00928	0.00010	9677538
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9677538
Dissolved Calcium (Ca)	mg/L	112	114	117	0.050	9677084

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WY5562	WY5563	WY5564		
Sampling Date		2019/11/18 11:00	2019/11/18 10:35	2019/11/18 10:15		
COC Number		08475219	08475219	08475219		
	UNITS	6A	6B	6C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	17.8	18.2	18.7	0.050	9677084
Dissolved Potassium (K)	mg/L	3.96	4.16	4.33	0.050	9677084
Dissolved Sodium (Na)	mg/L	27.3	27.8	28.5	0.050	9677084
Dissolved Sulphur (S)	mg/L	83.8	87.2	89.3	3.0	9677084
RDL = Reportable Detection Limit						

BUREAU
VERITASBV Labs Job #: B999326
Report Date: 2019/11/25ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WY5552	WY5553	WY5554	WY5555	WY5556		
Sampling Date		2019/11/18 10:55	2019/11/18 10:40	2019/11/18 10:20	2019/11/18 10:00	2019/11/18 10:45		
COC Number		08475218	08475218	08475218	08475218	08475218		
	UNITS	INFL-64	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	330	337	335	346	338	0.50	9677067
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0162	0.00798	0.00205	0.00089	0.00453	0.00050	9678003
Total Antimony (Sb)	mg/L	0.0189	0.0200	0.0198	0.0197	0.0195	0.000020	9678003
Total Arsenic (As)	mg/L	0.0574	0.0553	0.0508	0.0428	0.0513	0.000020	9678003
Total Barium (Ba)	mg/L	0.0566	0.0564	0.0563	0.0566	0.0556	0.000020	9678003
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9678003
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9678003
Total Boron (B)	mg/L	0.035	0.035	0.033	0.036	0.026	0.010	9678003
Total Cadmium (Cd)	mg/L	0.00193	0.00107	0.000570	0.000271	0.000703	0.0000050	9678003
Total Chromium (Cr)	mg/L	0.00014	0.00011	<0.00010	<0.00010	<0.00010	0.00010	9678003
Total Cobalt (Co)	mg/L	0.00263	0.000992	0.000103	0.0000442	0.000173	0.0000050	9678003
Total Copper (Cu)	mg/L	0.0201	0.00926	0.00415	0.00238	0.00563	0.000050	9678003
Total Iron (Fe)	mg/L	0.0040	0.0022	0.0018	0.0038	0.0025	0.0010	9678003
Total Lead (Pb)	mg/L	0.0177	0.00571	0.000427	0.0000606	0.000852	0.0000050	9678003
Total Lithium (Li)	mg/L	0.0106	0.0109	0.0107	0.0111	0.0109	0.00050	9678003
Total Manganese (Mn)	mg/L	0.0481	0.0185	0.00216	0.00120	0.00507	0.000050	9678003
Total Molybdenum (Mo)	mg/L	0.00159	0.00153	0.00147	0.00149	0.00164	0.000050	9678003
Total Nickel (Ni)	mg/L	0.00814	0.00864	0.00709	0.00443	0.0102	0.000020	9678003
Total Selenium (Se)	mg/L	0.00702	0.00706	0.00677	0.00658	0.00671	0.000040	9678003
Total Silicon (Si)	mg/L	0.578	0.479	0.384	0.417	0.587	0.050	9678003
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9678003
Total Strontium (Sr)	mg/L	0.591	0.582	0.597	0.605	0.595	0.000050	9678003
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000025	0.0000055	<0.0000020	0.0000020	9678003
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9678003
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9678003
Total Uranium (U)	mg/L	0.0281	0.0312	0.0315	0.0240	0.0363	0.0000020	9678003
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9678003
Total Zinc (Zn)	mg/L	0.152	0.139	0.101	0.0569	0.115	0.00010	9678003
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9678003
Total Calcium (Ca)	mg/L	104	107	106	109	106	0.050	9677088
Total Magnesium (Mg)	mg/L	17.0	17.1	17.0	17.6	17.6	0.050	9677088

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B999326
Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WY5552	WY5553	WY5554	WY5555	WY5556		
Sampling Date		2019/11/18 10:55	2019/11/18 10:40	2019/11/18 10:20	2019/11/18 10:00	2019/11/18 10:45		
COC Number		08475218	08475218	08475218	08475218	08475218		
	UNITS	INFL-64	1A	1B	1C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.79	3.80	3.82	4.05	3.95	0.050	9677088
Total Sodium (Na)	mg/L	25.8	25.8	25.7	26.5	26.8	0.050	9677088
Total Sulphur (S)	mg/L	79.9	81.1	81.3	83.9	82.3	3.0	9677088

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B999326
Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WY5557	WY5558	WY5559	WY5560	WY5561		
Sampling Date		2019/11/18 10:25	2019/11/18 10:05	2019/11/18 10:50	2019/11/18 10:30	2019/11/18 10:10		
COC Number		08475218	08475218	08475218	08475218	08475218		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	339	348	347	355	372	0.50	9677067
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00147	0.00129	0.00280	0.00123	0.00151	0.00050	9678003
Total Antimony (Sb)	mg/L	0.0188	0.0182	0.0149	0.0118	0.0107	0.000020	9678003
Total Arsenic (As)	mg/L	0.0481	0.0438	0.0378	0.0246	0.0149	0.000020	9678003
Total Barium (Ba)	mg/L	0.0576	0.0568	0.0565	0.0567	0.0569	0.000020	9678003
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9678003
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9678003
Total Boron (B)	mg/L	0.027	0.024	0.028	0.017	<0.010	0.010	9678003
Total Cadmium (Cd)	mg/L	0.000445	0.000266	0.000280	0.0000528	0.0000109	0.0000050	9678003
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9678003
Total Cobalt (Co)	mg/L	0.0000456	0.0000387	0.000191	0.0000313	0.0000266	0.0000050	9678003
Total Copper (Cu)	mg/L	0.00373	0.00243	0.00281	0.00140	0.000734	0.000050	9678003
Total Iron (Fe)	mg/L	0.0020	0.0018	0.0063	0.0034	0.0074	0.0010	9678003
Total Lead (Pb)	mg/L	0.000127	0.0000484	0.000424	0.0000802	0.0000311	0.0000050	9678003
Total Lithium (Li)	mg/L	0.0107	0.0111	0.0112	0.0116	0.0117	0.00050	9678003
Total Manganese (Mn)	mg/L	0.00111	0.000772	0.0123	0.00168	0.00481	0.000050	9678003
Total Molybdenum (Mo)	mg/L	0.00147	0.00143	0.00132	0.000926	0.000574	0.000050	9678003
Total Nickel (Ni)	mg/L	0.00912	0.00599	0.00875	0.00554	0.00401	0.000020	9678003
Total Selenium (Se)	mg/L	0.00639	0.00615	0.00360	0.00259	0.00181	0.000040	9678003
Total Silicon (Si)	mg/L	0.582	0.688	0.668	0.703	0.751	0.050	9678003
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9678003
Total Strontium (Sr)	mg/L	0.601	0.615	0.611	0.623	0.655	0.000050	9678003
Total Thallium (Tl)	mg/L	<0.0000020	0.0000025	<0.0000020	<0.0000020	<0.0000020	0.0000020	9678003
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9678003
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9678003
Total Uranium (U)	mg/L	0.0325	0.0253	0.0270	0.0153	0.00829	0.0000020	9678003
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9678003
Total Zinc (Zn)	mg/L	0.100	0.0662	0.0764	0.0294	0.0119	0.00010	9678003
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9678003
Total Calcium (Ca)	mg/L	107	110	110	113	118	0.050	9677088
Total Magnesium (Mg)	mg/L	17.4	17.5	17.8	17.9	18.9	0.050	9677088

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B999326
Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WY5557	WY5558	WY5559	WY5560	WY5561		
Sampling Date		2019/11/18 10:25	2019/11/18 10:05	2019/11/18 10:50	2019/11/18 10:30	2019/11/18 10:10		
COC Number		08475218	08475218	08475218	08475218	08475218		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	3.98	4.07	3.76	3.69	3.71	0.050	9677088
Total Sodium (Na)	mg/L	26.3	26.5	26.4	27.1	28.3	0.050	9677088
Total Sulphur (S)	mg/L	82.3	83.1	83.5	83.9	88.8	3.0	9677088

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B999326
Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WY5562	WY5563	WY5564		
Sampling Date		2019/11/18 11:00	2019/11/18 10:35	2019/11/18 10:15		
COC Number		08475219	08475219	08475219		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	342	346	352	0.50	9677067
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00506	0.00122	0.00088	0.00050	9678003
Total Antimony (Sb)	mg/L	0.0178	0.0143	0.0134	0.000020	9678003
Total Arsenic (As)	mg/L	0.0436	0.0260	0.0197	0.000020	9678003
Total Barium (Ba)	mg/L	0.0555	0.0546	0.0543	0.000020	9678003
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9678003
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9678003
Total Boron (B)	mg/L	0.025	0.020	<0.010	0.010	9678003
Total Cadmium (Cd)	mg/L	0.000431	0.0000598	0.0000204	0.0000050	9678003
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9678003
Total Cobalt (Co)	mg/L	0.000794	0.0000449	0.0000328	0.0000050	9678003
Total Copper (Cu)	mg/L	0.00705	0.00251	0.00138	0.000050	9678003
Total Iron (Fe)	mg/L	0.0143	0.0048	0.0051	0.0010	9678003
Total Lead (Pb)	mg/L	0.00176	0.000161	0.0000613	0.0000050	9678003
Total Lithium (Li)	mg/L	0.0109	0.0112	0.0112	0.00050	9678003
Total Manganese (Mn)	mg/L	0.0205	0.00228	0.00202	0.000050	9678003
Total Molybdenum (Mo)	mg/L	0.00146	0.00107	0.000935	0.000050	9678003
Total Nickel (Ni)	mg/L	0.00788	0.00524	0.00367	0.000020	9678003
Total Selenium (Se)	mg/L	0.00551	0.00344	0.00302	0.000040	9678003
Total Silicon (Si)	mg/L	0.645	0.660	0.694	0.050	9678003
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9678003
Total Strontium (Sr)	mg/L	0.600	0.611	0.626	0.000050	9678003
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9678003
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9678003
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9678003
Total Uranium (U)	mg/L	0.0338	0.0182	0.0118	0.0000020	9678003
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9678003
Total Zinc (Zn)	mg/L	0.0654	0.0198	0.0105	0.00010	9678003
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9678003
Total Calcium (Ca)	mg/L	108	109	111	0.050	9677088
Total Magnesium (Mg)	mg/L	17.4	17.9	18.2	0.050	9677088
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WY5562	WY5563	WY5564		
Sampling Date		2019/11/18 11:00	2019/11/18 10:35	2019/11/18 10:15		
COC Number		08475219	08475219	08475219		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Potassium (K)	mg/L	3.96	4.11	4.33	0.050	9677088
Total Sodium (Na)	mg/L	26.5	27.2	27.6	0.050	9677088
Total Sulphur (S)	mg/L	82.0	83.3	85.2	3.0	9677088
RDL = Reportable Detection Limit						



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	15.7°C
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Results relate only to the items tested.



BV Labs Job #: B999326
Report Date: 2019/11/25

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9677538	Dissolved Aluminum (Al)	2019/11/20	93	80 - 120	100	80 - 120	<0.00050	mg/L	7.5	20
9677538	Dissolved Antimony (Sb)	2019/11/20	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.58	20
9677538	Dissolved Arsenic (As)	2019/11/20	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.43	20
9677538	Dissolved Barium (Ba)	2019/11/20	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.13	20
9677538	Dissolved Beryllium (Be)	2019/11/20	88	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9677538	Dissolved Bismuth (Bi)	2019/11/20	90	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9677538	Dissolved Boron (B)	2019/11/20	91	80 - 120	100	80 - 120	<0.010	mg/L	1.6	20
9677538	Dissolved Cadmium (Cd)	2019/11/20	92	80 - 120	101	80 - 120	<0.0000050	mg/L	0.56	20
9677538	Dissolved Chromium (Cr)	2019/11/20	91	80 - 120	99	80 - 120	<0.00010	mg/L	13	20
9677538	Dissolved Cobalt (Co)	2019/11/20	89	80 - 120	98	80 - 120	<0.0000050	mg/L	2.0	20
9677538	Dissolved Copper (Cu)	2019/11/20	86	80 - 120	99	80 - 120	<0.000050	mg/L	0.74	20
9677538	Dissolved Iron (Fe)	2019/11/20	96	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
9677538	Dissolved Lead (Pb)	2019/11/20	96	80 - 120	105	80 - 120	<0.0000050	mg/L	0.013	20
9677538	Dissolved Lithium (Li)	2019/11/20	89	80 - 120	99	80 - 120	<0.00050	mg/L	1.2	20
9677538	Dissolved Manganese (Mn)	2019/11/20	91	80 - 120	101	80 - 120	<0.000050	mg/L	1.7	20
9677538	Dissolved Molybdenum (Mo)	2019/11/20	102	80 - 120	102	80 - 120	<0.000050	mg/L	2.2	20
9677538	Dissolved Nickel (Ni)	2019/11/20	89	80 - 120	101	80 - 120	<0.000020	mg/L	3.0	20
9677538	Dissolved Selenium (Se)	2019/11/20	100	80 - 120	103	80 - 120	<0.000040	mg/L	1.5	20
9677538	Dissolved Silicon (Si)	2019/11/20	97	80 - 120	97	80 - 120	<0.050	mg/L	0.11	20
9677538	Dissolved Silver (Ag)	2019/11/20	93	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9677538	Dissolved Strontium (Sr)	2019/11/20	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.14	20
9677538	Dissolved Thallium (Tl)	2019/11/20	95	80 - 120	100	80 - 120	0.0000026, RDL=0.00000020 (1)	mg/L	9.5	20
9677538	Dissolved Tin (Sn)	2019/11/20	94	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9677538	Dissolved Titanium (Ti)	2019/11/20	96	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9677538	Dissolved Uranium (U)	2019/11/20	97	80 - 120	104	80 - 120	<0.0000020	mg/L	0.15	20
9677538	Dissolved Vanadium (V)	2019/11/20	96	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9677538	Dissolved Zinc (Zn)	2019/11/20	NC	80 - 120	102	80 - 120	<0.00010	mg/L	0.91	20
9677538	Dissolved Zirconium (Zr)	2019/11/20	101	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9677902	Alkalinity (PP as CaCO3)	2019/11/20					<0.50	mg/L	NC	20
9677902	Alkalinity (Total as CaCO3)	2019/11/20	NC	80 - 120	98	80 - 120	<0.50	mg/L	0.067	20
9677902	Bicarbonate (HCO3)	2019/11/20					<0.50	mg/L	0.067	20



BV Labs Job #: B999326
Report Date: 2019/11/25

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9677902	Carbonate (CO3)	2019/11/20					<0.50	mg/L	NC	20
9677902	Hydroxide (OH)	2019/11/20					<0.50	mg/L	NC	20
9677937	Nitrate plus Nitrite (N)	2019/11/19	97	80 - 120	104	80 - 120	<0.0020	mg/L	0.24	25
9677939	Nitrite (N)	2019/11/19	104	80 - 120	105	80 - 120	<0.0020	mg/L	7.1	25
9677941	Nitrate plus Nitrite (N)	2019/11/19			101	80 - 120	<0.0020	mg/L		
9677943	Nitrite (N)	2019/11/19			103	80 - 120	<0.0020	mg/L		
9678003	Total Aluminum (Al)	2019/11/20	NC	80 - 120	103	80 - 120	<0.00050	mg/L	0.70	20
9678003	Total Antimony (Sb)	2019/11/20	100	80 - 120	104	80 - 120	<0.000020	mg/L	1.0	20
9678003	Total Arsenic (As)	2019/11/20	100	80 - 120	102	80 - 120	<0.000020	mg/L	3.9	20
9678003	Total Barium (Ba)	2019/11/20	NC	80 - 120	106	80 - 120	<0.000020	mg/L	2.2	20
9678003	Total Beryllium (Be)	2019/11/20	99	80 - 120	103	80 - 120	<0.000010	mg/L	14	20
9678003	Total Bismuth (Bi)	2019/11/20	95	80 - 120	102	80 - 120	<0.0000050	mg/L	2.5	20
9678003	Total Boron (B)	2019/11/20	98	80 - 120	107	80 - 120	<0.010	mg/L	0.13	20
9678003	Total Cadmium (Cd)	2019/11/20	99	80 - 120	105	80 - 120	<0.0000050	mg/L	4.0	20
9678003	Total Chromium (Cr)	2019/11/20	108	80 - 120	103	80 - 120	<0.00010	mg/L	11	20
9678003	Total Cobalt (Co)	2019/11/20	100	80 - 120	103	80 - 120	<0.0000050	mg/L	1.1	20
9678003	Total Copper (Cu)	2019/11/20	NC	80 - 120	104	80 - 120	<0.000050	mg/L	0.97	20
9678003	Total Iron (Fe)	2019/11/20	97	80 - 120	107	80 - 120	<0.0010	mg/L	19	20
9678003	Total Lead (Pb)	2019/11/20	100	80 - 120	104	80 - 120	<0.0000050	mg/L	2.1	20
9678003	Total Lithium (Li)	2019/11/20	96	80 - 120	103	80 - 120	<0.00050	mg/L	0.23	20
9678003	Total Manganese (Mn)	2019/11/20	NC	80 - 120	104	80 - 120	<0.000050	mg/L	1.4	20
9678003	Total Molybdenum (Mo)	2019/11/20	103	80 - 120	103	80 - 120	<0.000050	mg/L	4.5	20
9678003	Total Nickel (Ni)	2019/11/20	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.69	20
9678003	Total Selenium (Se)	2019/11/20	92	80 - 120	102	80 - 120	<0.000040	mg/L	16	20
9678003	Total Silicon (Si)	2019/11/20	NC	80 - 120	102	80 - 120	<0.050	mg/L	1.6	20
9678003	Total Silver (Ag)	2019/11/20	99	80 - 120	99	80 - 120	<0.0000050	mg/L	3.9	20
9678003	Total Strontium (Sr)	2019/11/20	NC	80 - 120	103	80 - 120	<0.000050	mg/L	2.0	20
9678003	Total Thallium (Tl)	2019/11/20	99	80 - 120	103	80 - 120	<0.0000020	mg/L	3.6	20
9678003	Total Tin (Sn)	2019/11/20	100	80 - 120	103	80 - 120	<0.00020	mg/L	1.6	20
9678003	Total Titanium (Ti)	2019/11/20	102	80 - 120	104	80 - 120	<0.00050	mg/L	6.3	20
9678003	Total Uranium (U)	2019/11/20	105	80 - 120	105	80 - 120	<0.0000020	mg/L	11	20
9678003	Total Vanadium (V)	2019/11/20	103	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20



BV Labs Job #: B999326
Report Date: 2019/11/25

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9678003	Total Zinc (Zn)	2019/11/20	NC	80 - 120	106	80 - 120	<0.00010	mg/L	0.87	20
9678003	Total Zirconium (Zr)	2019/11/20	106	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9678922	Total Ammonia (N)	2019/11/20	113	80 - 120	103	80 - 120	<0.0050	mg/L	2.2	20
9678939	Total Ammonia (N)	2019/11/20	109	80 - 120	110	80 - 120	<0.0050	mg/L	NC	20
9679014	Dissolved Chloride (Cl)	2019/11/19	NC	80 - 120	103	80 - 120	<0.50	mg/L	3.6	20
9679014	Dissolved Sulphate (SO4)	2019/11/19	NC	80 - 120	105	80 - 120	0.59, RDL=0.50	mg/L	12	20
9679234	Total Ammonia (N)	2019/11/20	90	80 - 120	111	80 - 120	<0.0050	mg/L	0.34	20
9682642	Dissolved Chloride (Cl)	2019/11/22			103	80 - 120	<0.50	mg/L		
9682642	Dissolved Sulphate (SO4)	2019/11/22			102	80 - 120	<0.50	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for TI- 2X RDL acceptable for low level metals determination.



BUREAU
VERITAS

BV Labs Job #: B999326
Report Date: 2019/11/25

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUD ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY R

COC #:

08475218

BBY FCD-00077/05

Page of of

Turnaround Time (TAT) Required

Invoice Information Company Name: BMC MINERALS LTD. Contact Name: 530-1130 WEST PENDER ST Address: Vancouver, BC V6E 4A4 Phone: 604-681-4444 Email: maxxam@bmcminerals.com		Report Information (if differs from Invoice) Company Name: ALEXCO ENVIRONMENTAL Contact Name: Mary Mioska, Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK X1A 2V3 Phone: (867) 668-6463 Email: mmioska@alexcoenv.com		Project Information (where applicable) Duration #: B60751 P.O. # / Aff #: BMC-18-02 Project #: Kudt Ze Kayah Site Location: Kudt Ze Kayah Site #: 1 Sampled By: 1		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS ☒ Regular TAT 5 days (Most analyses) ☐ Rush TAT (Surcharges will be applied) Same Day ☐ 2 Days ☐ 3 Days Date Required: 1 Day ☐ 3 Days						
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		Analysis Requested		Rush Confirmation #: LABORATORY USE ONLY LOCKED SEAL: ☒ YES ☐ NO COOLER TEMPERATURES: 4.5 4.5 2.3 2.2 COOLING MEDIA PRESENT: ☒ YES ☐ NO						
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Ammonia	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1 INFL-64		18-Nov-19	10:55	Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved
2 1A		18-Nov-19	10:40	Water	X	X	X	X	X	6		Metals field filtered, ammonia preserved
3 1B		18-Nov-19	10:20	Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved
4 1C		18-Nov-19	10:00	Water	X	X	X	X	X	6		Metals field filtered, ammonia preserved
5 3A		18-Nov-19	10:45	Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved
6 3B		18-Nov-19	10:25	Water	X	X	X	X	X	6		Metals field filtered, ammonia preserved
7 3C		18-Nov-19	10:05	Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved
8 4A		18-Nov-19	10:50	Water	X	X	X	X	X	6		Metals field filtered, ammonia preserved
9 4B		18-Nov-19	10:30	Water	X	X	X	X	X	6		Metals preserved with HNO3, dissolved
10 4C		18-Nov-19	10:10	Water	X	X	X	X	X	6		Metals field filtered, ammonia preserved

RECEIVED BY: (Signature/Print) **James Webb** DATE: (YYYY/MM/DD) **2019/11/18** TIME: (HH:MM) **18:00**

RECEIVED BY: (Signature/Print) **James Webb** DATE: (YYYY/MM/DD) **2019/11/19** TIME: (HH:MM) **08:15**



B999326_COC



Page ____ of ____

Turnaround Time (TAT) Required

B999326_COC



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08475441, 08475445

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/12/04
 Report #: R2819864
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A1432

Received: 2019/11/25, 12:34

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	5	N/A	2019/11/27	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level	13	N/A	2019/12/04	BBY6SOP-00026	SM 22 2320 B m
Biochemical Oxygen Demand	5	2019/11/28	2019/12/03	BBY6SOP-00045	SM 23 5210 B m
Low level chloride/sulphate by AC	13	N/A	2019/11/27	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
COD by Colorimeter	5	N/A	2019/11/27	BBY6SOP-00024	SM 23 5220 D m
Carbon (DOC) (1, 2)	5	N/A	2019/11/27	AB SOP-00087	MMCW 119 1996 m
Hardness Total (calculated as CaCO ₃) (3)	13	N/A	2019/11/28	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	1	N/A	2019/11/27	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	12	N/A	2019/11/28	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2019/11/27	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	12	N/A	2019/11/28	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	13	N/A	2019/11/27	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	13	N/A	2019/11/28	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	12	N/A	2019/11/27	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Low Level (total)	1	N/A	2019/11/28	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved) (1)	13	N/A	2019/11/28	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level)	13	N/A	2019/11/27	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level)	13	N/A	2019/11/27	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc	13	N/A	2019/11/28	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals	13	N/A	2019/11/26	BBY7 WI-00004	SM 23 3030B m
Carbon (Total Organic) (1, 4)	1	N/A	2019/11/27	AB SOP-00087	MMCW 119 1996 m
Carbon (Total Organic) (1, 4)	4	N/A	2019/11/29	AB SOP-00087	MMCW 119 1996 m
Total Suspended Solids (NFR)	5	2019/11/27	2019/11/28	BBY6SOP-00034	SM 23 2540 D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08475441, 08475445

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/12/04
Report #: R2819864
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A1432

Received: 2019/11/25, 12:34

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Calgary Environmental

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WZ7980			WZ7981	WZ7982			WZ7983		
Sampling Date		2019/11/25 09:30			2019/11/25 09:10	2019/11/25 08:50			2019/11/25 08:30		
COC Number		08475441			08475441	08475441			08475441		
	UNITS	INFLUENT-67	RDL	QC Batch	1A	1B	RDL	QC Batch	1C	RDL	QC Batch

Calculated Parameters

Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE	FIELD		ONSITE
Nitrate (N)	mg/L	0.333	0.0020	9686550	0.585	0.644	0.0020	9686550	0.565	0.0020	9686550

Demand Parameters

Biochemical Oxygen Demand	mg/L	<2.0	2.0	9689169					<2.0	2.0	9689169
Chemical Oxygen Demand	mg/L	18	10	9688319					18	10	9688319

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L	2.6	0.50	9688015					2.8	0.50	9688015
Acidity (pH 4.5)	mg/L	<1.0	1.0	9687924					<1.0	1.0	9687924
Alkalinity (Total as CaCO ₃)	mg/L	71.6	0.50	9695734	70.2	71.4	0.50	9695734	73.4	0.50	9695734
Total Organic Carbon (C)	mg/L	2.5	0.50	9689109					2.5	0.50	9689109
Acidity (pH 8.3)	mg/L	3.4	1.0	9687924					4.3	1.0	9687924
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9695734	<0.50	<0.50	0.50	9695734	<0.50	0.50	9695734
Bicarbonate (HCO ₃)	mg/L	87.3	0.50	9695734	85.6	87.1	0.50	9695734	89.5	0.50	9695734
Carbonate (CO ₃)	mg/L	<0.50	0.50	9695734	<0.50	<0.50	0.50	9695734	<0.50	0.50	9695734
Hydroxide (OH)	mg/L	<0.50	0.50	9695734	<0.50	<0.50	0.50	9695734	<0.50	0.50	9695734
Total Suspended Solids	mg/L	<1.0	1.0	9687348					1.0	1.0	9687348

Anions

Dissolved Chloride (Cl)	mg/L	62	0.50	9689189	63	63	0.50	9689189	62	0.50	9689189
Dissolved Sulphate (SO ₄)	mg/L	230 (1)	5.0	9689189	250 (1)	260 (1)	5.0	9689189	260 (1)	5.0	9689189

Nutrients

Total Ammonia (N)	mg/L	0.46 (2)	0.050	9688019	0.20	0.032	0.0050	9688019	0.016	0.0050	9688019
Nitrate plus Nitrite (N)	mg/L	0.338	0.0020	9688556	0.612	0.652	0.0020	9688556	0.569	0.0020	9688556
Nitrite (N)	mg/L	0.0047	0.0020	9688558	0.0264	0.0076	0.0020	9688558	0.0039	0.0020	9688558

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

(2) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.



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BV Labs Job #: B9A1432
Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WZ7984	WZ7985			WZ7986			WZ7987		
Sampling Date		2019/11/25 09:15	2019/11/25 08:55			2019/11/25 08:35			2019/11/25 09:20		
COC Number		08475441	08475441			08475441			08475441		
	UNITS	3A	3B	RDL	QC Batch	3C	RDL	QC Batch	4A	RDL	QC Batch

Calculated Parameters

Filter and HNO3 Preservation	N/A	FIELD	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Nitrate (N)	mg/L	0.211	0.124	0.0020	9686550	0.0218	0.0020	9686550	0.0728	0.0020	9686550

Demand Parameters

Biochemical Oxygen Demand	mg/L					<2.0	2.0	9689169			
Chemical Oxygen Demand	mg/L					22	10	9688319			

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L					2.9	0.50	9688015			
Acidity (pH 4.5)	mg/L					<1.0	1.0	9687924			
Alkalinity (Total as CaCO3)	mg/L	71.7	73.1	0.50	9695734	75.2	0.50	9695734	74.9	0.50	9695734
Total Organic Carbon (C)	mg/L					2.3	0.50	9689109			
Acidity (pH 8.3)	mg/L					3.5	1.0	9687924			
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	9695734	<0.50	0.50	9695734	<0.50	0.50	9695734
Bicarbonate (HCO3)	mg/L	87.5	89.2	0.50	9695734	91.8	0.50	9695734	91.4	0.50	9695734
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	9695734	<0.50	0.50	9695734	<0.50	0.50	9695734
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9695734	<0.50	0.50	9695734	<0.50	0.50	9695734
Total Suspended Solids	mg/L					<1.0	1.0	9687348			

Anions

Dissolved Chloride (Cl)	mg/L	63	66	0.50	9689189	63	0.50	9689189	78	0.50	9689189
Dissolved Sulphate (SO4)	mg/L	250 (1)	260 (1)	5.0	9689189	270 (1)	5.0	9689189	230 (1)	5.0	9689189

Nutrients

Total Ammonia (N)	mg/L	0.070	0.013	0.0050	9688019	0.013	0.0050	9688019	0.010	0.0050	9688019
Nitrate plus Nitrite (N)	mg/L	0.241	0.127	0.0020	9688556	0.0218	0.0020	9688556	0.0728	0.0020	9688556
Nitrite (N)	mg/L	0.0295	0.0028	0.0020	9688558	<0.0020	0.0020	9688558	<0.0020	0.0020	9688558

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WZ7988			WZ7989			WZ7990	WZ7991		
Sampling Date		2019/11/25 09:00			2019/11/25 08:40			2019/11/25 09:25	2019/11/25 09:05		
COC Number		08475441			08475441			08475445	08475445		
	UNITS	4B	RDL	QC Batch	4C	RDL	QC Batch	6A	6B	RDL	QC Batch

Calculated Parameters

Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD	FIELD		ONSITE
Nitrate (N)	mg/L	<0.0020	0.0020	9686550	<0.0020	0.0020	9686550	0.0885	<0.0020	0.0020	9686550

Demand Parameters

Biochemical Oxygen Demand	mg/L				<2.0	2.0	9689169				
Chemical Oxygen Demand	mg/L				20	10	9688319				

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L				3.0	0.50	9688015				
Acidity (pH 4.5)	mg/L				<1.0	1.0	9687924				
Alkalinity (Total as CaCO3)	mg/L	79.8	0.50	9695734	84.0	0.50	9695734	77.1	79.8	0.50	9695734
Total Organic Carbon (C)	mg/L				2.7	0.50	9687706				
Acidity (pH 8.3)	mg/L				8.9	1.0	9687924				
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9695734	<0.50	0.50	9695734	<0.50	<0.50	0.50	9695734
Bicarbonate (HCO3)	mg/L	97.4	0.50	9695734	103	0.50	9695734	94.0	97.3	0.50	9695734
Carbonate (CO3)	mg/L	<0.50	0.50	9695734	<0.50	0.50	9695734	<0.50	<0.50	0.50	9695734
Hydroxide (OH)	mg/L	<0.50	0.50	9695734	<0.50	0.50	9695734	<0.50	<0.50	0.50	9695734
Total Suspended Solids	mg/L				<1.0	1.0	9687348				

Anions

Dissolved Chloride (Cl)	mg/L	65	0.50	9689189	68	0.50	9689189	64	74	0.50	9689189
Dissolved Sulphate (SO4)	mg/L	260 (1)	5.0	9689189	260 (1)	5.0	9689189	250 (1)	270 (1)	5.0	9689189

Nutrients

Total Ammonia (N)	mg/L	0.0065	0.0050	9688019	0.017	0.0050	9688019	0.054	0.0077	0.0050	9688019
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9688556	<0.0020	0.0020	9688556	0.0956	<0.0020	0.0020	9688556
Nitrite (N)	mg/L	<0.0020	0.0020	9688558	<0.0020	0.0020	9688558	0.0071	<0.0020	0.0020	9688558

RDL = Reportable Detection Limit

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WZ7992		
Sampling Date		2019/11/25 08:45		
COC Number		08475445		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Filter and HNO3 Preservation	N/A	FIELD		ONSITE
Nitrate (N)	mg/L	<0.0020	0.0020	9686550
Demand Parameters				
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9689169
Chemical Oxygen Demand	mg/L	21	10	9688319
Misc. Inorganics				
Dissolved Organic Carbon (C)	mg/L	3.2	0.50	9688015
Acidity (pH 4.5)	mg/L	<1.0	1.0	9687924
Alkalinity (Total as CaCO3)	mg/L	81.8	0.50	9695734
Total Organic Carbon (C)	mg/L	2.4	0.50	9689109
Acidity (pH 8.3)	mg/L	9.5	1.0	9687924
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9695734
Bicarbonate (HCO3)	mg/L	99.8	0.50	9695734
Carbonate (CO3)	mg/L	<0.50	0.50	9695734
Hydroxide (OH)	mg/L	<0.50	0.50	9695734
Total Suspended Solids	mg/L	1.3	1.0	9687348
Anions				
Dissolved Chloride (Cl)	mg/L	68	0.50	9689189
Dissolved Sulphate (SO4)	mg/L	220 (1)	5.0	9689189
Nutrients				
Total Ammonia (N)	mg/L	0.015	0.0050	9688019
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9688556
Nitrite (N)	mg/L	<0.0020	0.0020	9688558
RDL = Reportable Detection Limit				
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.				



BUREAU
VERITAS

BV Labs Job #: B9A1432
Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WZ7980	WZ7981	WZ7982	WZ7983	WZ7984		
Sampling Date		2019/11/25 09:30	2019/11/25 09:10	2019/11/25 08:50	2019/11/25 08:30	2019/11/25 09:15		
COC Number		08475441	08475441	08475441	08475441	08475441		
	UNITS	INFLUENT-67	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	362	360	361	369	363	0.50	9685664
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00931	0.00480	0.00193	0.00086	0.00317	0.00050	9687648
Dissolved Antimony (Sb)	mg/L	0.0201	0.0203	0.0201	0.0193	0.0201	0.000020	9687648
Dissolved Arsenic (As)	mg/L	0.0610	0.0590	0.0556	0.0476	0.0562	0.000020	9687648
Dissolved Barium (Ba)	mg/L	0.0594	0.0584	0.0577	0.0564	0.0569	0.000020	9687648
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9687648
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687648
Dissolved Boron (B)	mg/L	0.037	0.036	0.036	0.036	0.029	0.010	9687648
Dissolved Cadmium (Cd)	mg/L	0.00208	0.00133	0.000822	0.000406	0.000928	0.0000050	9687648
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	<0.00010	<0.00010	0.00013	0.00010	9687648
Dissolved Cobalt (Co)	mg/L	0.00275	0.000964	0.000140	0.0000495	0.000147	0.0000050	9687648
Dissolved Copper (Cu)	mg/L	0.0163	0.00918	0.00403	0.00226	0.00497	0.000050	9687648
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	0.0013	0.0026	0.0017	0.0010	9687648
Dissolved Lead (Pb)	mg/L	0.0120	0.00406	0.000441	0.0000691	0.000424	0.0000050	9687648
Dissolved Lithium (Li)	mg/L	0.0126	0.0117	0.0120	0.0121	0.0118	0.00050	9687648
Dissolved Manganese (Mn)	mg/L	0.0499	0.0183	0.00253	0.00118	0.00348	0.000050	9687648
Dissolved Molybdenum (Mo)	mg/L	0.00164	0.00162	0.00158	0.00151	0.00159	0.000050	9687648
Dissolved Nickel (Ni)	mg/L	0.00861	0.00799	0.00678	0.00532	0.00800	0.000020	9687648
Dissolved Selenium (Se)	mg/L	0.00817	0.00772	0.00759	0.00733	0.00770	0.000040	9687648
Dissolved Silicon (Si)	mg/L	0.608	0.453	0.408	0.379	0.539	0.050	9687648
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687648
Dissolved Strontium (Sr)	mg/L	0.659	0.622	0.618	0.626	0.621	0.000050	9687648
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9687648
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9687648
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9687648
Dissolved Uranium (U)	mg/L	0.0301	0.0308	0.0314	0.0292	0.0352	0.0000020	9687648
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9687648
Dissolved Zinc (Zn)	mg/L	0.171	0.155	0.129	0.0923	0.133	0.00010	9687648
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9687648
Dissolved Calcium (Ca)	mg/L	117	116	116	118	117	0.050	9685665
Dissolved Magnesium (Mg)	mg/L	17.2	17.4	17.4	18.1	17.4	0.050	9685665

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WZ7980	WZ7981	WZ7982	WZ7983	WZ7984		
Sampling Date		2019/11/25 09:30	2019/11/25 09:10	2019/11/25 08:50	2019/11/25 08:30	2019/11/25 09:15		
COC Number		08475441	08475441	08475441	08475441	08475441		
	UNITS	INFLUENT-67	1A	1B	1C	3A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.83	3.84	3.98	4.10	3.85	0.050	9685665
Dissolved Sodium (Na)	mg/L	25.6	26.4	26.5	27.1	26.7	0.050	9685665
Dissolved Sulphur (S)	mg/L	88.3	86.9	84.4	85.5	87.8	3.0	9685665

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B9A1432
Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WZ7985	WZ7986	WZ7987	WZ7988	WZ7989		
Sampling Date		2019/11/25 08:55	2019/11/25 08:35	2019/11/25 09:20	2019/11/25 09:00	2019/11/25 08:40		
COC Number		08475441	08475441	08475441	08475441	08475441		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	355	368	371	380	392	0.50	9685664
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00111	0.00144	0.00214	0.00077	0.00082	0.00050	9687648
Dissolved Antimony (Sb)	mg/L	0.0192	0.0190	0.0138	0.0118	0.0109	0.000020	9687648
Dissolved Arsenic (As)	mg/L	0.0506	0.0471	0.0416	0.0292	0.0200	0.000020	9687648
Dissolved Barium (Ba)	mg/L	0.0567	0.0580	0.0577	0.0584	0.0580	0.000020	9687648
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9687648
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687648
Dissolved Boron (B)	mg/L	0.028	0.026	0.030	0.019	<0.010	0.010	9687648
Dissolved Cadmium (Cd)	mg/L	0.000581	0.000351	0.000322	0.0000747	0.0000177	0.0000050	9687648
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9687648
Dissolved Cobalt (Co)	mg/L	0.0000469	0.0000377	0.000173	0.0000293	0.0000263	0.0000050	9687648
Dissolved Copper (Cu)	mg/L	0.00322	0.00217	0.00217	0.00121	0.000627	0.000050	9687648
Dissolved Iron (Fe)	mg/L	0.0011	0.0013	0.0038	0.0021	0.0051	0.0010	9687648
Dissolved Lead (Pb)	mg/L	0.000108	0.0000509	0.000297	0.0000660	0.0000322	0.0000050	9687648
Dissolved Lithium (Li)	mg/L	0.0117	0.0122	0.0122	0.0126	0.0128	0.00050	9687648
Dissolved Manganese (Mn)	mg/L	0.000844	0.000435	0.00842	0.00125	0.00343	0.000050	9687648
Dissolved Molybdenum (Mo)	mg/L	0.00154	0.00153	0.00136	0.00101	0.000752	0.000050	9687648
Dissolved Nickel (Ni)	mg/L	0.00751	0.00663	0.00769	0.00557	0.00445	0.000020	9687648
Dissolved Selenium (Se)	mg/L	0.00719	0.00702	0.00381	0.00288	0.00217	0.000040	9687648
Dissolved Silicon (Si)	mg/L	0.494	0.578	0.620	0.649	0.691	0.050	9687648
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687648
Dissolved Strontium (Sr)	mg/L	0.614	0.628	0.637	0.650	0.663	0.000050	9687648
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9687648
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9687648
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9687648
Dissolved Uranium (U)	mg/L	0.0334	0.0324	0.0267	0.0188	0.0129	0.0000020	9687648
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9687648
Dissolved Zinc (Zn)	mg/L	0.112	0.0949	0.0853	0.0416	0.0206	0.00010	9687648
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9687648
Dissolved Calcium (Ca)	mg/L	114	118	119	122	125	0.050	9685665
Dissolved Magnesium (Mg)	mg/L	17.4	18.1	17.9	18.2	19.0	0.050	9685665

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WZ7985	WZ7986	WZ7987	WZ7988	WZ7989		
Sampling Date		2019/11/25 08:55	2019/11/25 08:35	2019/11/25 09:20	2019/11/25 09:00	2019/11/25 08:40		
COC Number		08475441	08475441	08475441	08475441	08475441		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.84	4.03	3.76	3.83	3.80	0.050	9685665
Dissolved Sodium (Na)	mg/L	26.5	27.7	27.3	27.8	29.1	0.050	9685665
Dissolved Sulphur (S)	mg/L	83.5	86.6	87.7	90.1	92.0	3.0	9685665
RDL = Reportable Detection Limit								



BV Labs Job #: B9A1432
Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WZ7990	WZ7991	WZ7992		
Sampling Date		2019/11/25 09:25	2019/11/25 09:05	2019/11/25 08:45		
COC Number		08475445	08475445	08475445		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	387	383	377	0.50	9685664
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00317	0.00094	0.00096	0.00050	9687648
Dissolved Antimony (Sb)	mg/L	0.0194	0.0153	0.0144	0.000020	9687648
Dissolved Arsenic (As)	mg/L	0.0490	0.0310	0.0241	0.000020	9687648
Dissolved Barium (Ba)	mg/L	0.0610	0.0592	0.0580	0.000020	9687648
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9687648
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687648
Dissolved Boron (B)	mg/L	0.027	0.024	0.010	0.010	9687648
Dissolved Cadmium (Cd)	mg/L	0.000414	0.0000643	0.0000252	0.0000050	9687648
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9687648
Dissolved Cobalt (Co)	mg/L	0.000527	0.0000530	0.0000393	0.0000050	9687648
Dissolved Copper (Cu)	mg/L	0.00634	0.00175	0.00109	0.000050	9687648
Dissolved Iron (Fe)	mg/L	0.0103	0.0042	0.0046	0.0010	9687648
Dissolved Lead (Pb)	mg/L	0.00100	0.0000908	0.0000377	0.0000050	9687648
Dissolved Lithium (Li)	mg/L	0.0123	0.0124	0.0123	0.00050	9687648
Dissolved Manganese (Mn)	mg/L	0.0176	0.00337	0.00276	0.000050	9687648
Dissolved Molybdenum (Mo)	mg/L	0.00148	0.00113	0.000983	0.000050	9687648
Dissolved Nickel (Ni)	mg/L	0.00743	0.00513	0.00372	0.000020	9687648
Dissolved Selenium (Se)	mg/L	0.00610	0.00365	0.00325	0.000040	9687648
Dissolved Silicon (Si)	mg/L	0.725	0.699	0.697	0.050	9687648
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687648
Dissolved Strontium (Sr)	mg/L	0.675	0.665	0.647	0.000050	9687648
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9687648
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9687648
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9687648
Dissolved Uranium (U)	mg/L	0.0351	0.0213	0.0159	0.0000020	9687648
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9687648
Dissolved Zinc (Zn)	mg/L	0.0734	0.0263	0.0142	0.00010	9687648
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9687648
Dissolved Calcium (Ca)	mg/L	124	123	121	0.050	9685665
Dissolved Magnesium (Mg)	mg/L	18.7	18.4	18.4	0.050	9685665
RDL = Reportable Detection Limit						



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WZ7990	WZ7991	WZ7992		
Sampling Date		2019/11/25 09:25	2019/11/25 09:05	2019/11/25 08:45		
COC Number		08475445	08475445	08475445		
	UNITS	6A	6B	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.34	4.37	4.45	0.050	9685665
Dissolved Sodium (Na)	mg/L	27.9	28.3	28.0	0.050	9685665
Dissolved Sulphur (S)	mg/L	95.3	90.5	87.0	3.0	9685665
RDL = Reportable Detection Limit						



BUREAU
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BV Labs Job #: B9A1432

Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WZ7980	WZ7981	WZ7982	WZ7983	WZ7984		
Sampling Date		2019/11/25 09:30	2019/11/25 09:10	2019/11/25 08:50	2019/11/25 08:30	2019/11/25 09:15		
COC Number		08475441	08475441	08475441	08475441	08475441		
	UNITS	INFLUENT-67	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO3)	mg/L	344	340	346	348	342	0.50	9685802
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0160	0.00674	0.00239	0.00111	0.00447	0.00050	9687938
Total Antimony (Sb)	mg/L	0.0202	0.0207	0.0203	0.0201	0.0205	0.000020	9687938
Total Arsenic (As)	mg/L	0.0616	0.0585	0.0552	0.0470	0.0555	0.000020	9687938
Total Barium (Ba)	mg/L	0.0592	0.0586	0.0590	0.0584	0.0587	0.000020	9687938
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9687938
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687938
Total Boron (B)	mg/L	0.033	0.033	0.031	0.032	0.025	0.010	9687938
Total Cadmium (Cd)	mg/L	0.00203	0.00131	0.000781	0.000387	0.000909	0.0000050	9687938
Total Chromium (Cr)	mg/L	0.00014	0.00011	<0.00010	<0.00010	<0.00010	0.00010	9687938
Total Cobalt (Co)	mg/L	0.00283	0.000941	0.000141	0.0000443	0.000165	0.0000050	9687938
Total Copper (Cu)	mg/L	0.0181	0.00955	0.00459	0.00241	0.00535	0.000050	9687938
Total Iron (Fe)	mg/L	0.0073	0.0020	0.0019	0.0042	0.0021	0.0010	9687938
Total Lead (Pb)	mg/L	0.0208	0.00589	0.000692	0.0000779	0.00101	0.0000050	9687938
Total Lithium (Li)	mg/L	0.0109	0.0110	0.0112	0.0115	0.0111	0.00050	9687938
Total Manganese (Mn)	mg/L	0.0552	0.0189	0.00282	0.00128	0.00447	0.000050	9687938
Total Molybdenum (Mo)	mg/L	0.00161	0.00155	0.00155	0.00153	0.00162	0.000050	9687938
Total Nickel (Ni)	mg/L	0.00859	0.00775	0.00679	0.00522	0.00773	0.000020	9687938
Total Selenium (Se)	mg/L	0.00783	0.00787	0.00750	0.00710	0.00755	0.000040	9687938
Total Silicon (Si)	mg/L	0.574	0.447	0.396	0.368	0.546	0.050	9687938
Total Silver (Ag)	mg/L	0.0000099	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687938
Total Strontium (Sr)	mg/L	0.633	0.614	0.616	0.612	0.612	0.000050	9687938
Total Thallium (Tl)	mg/L	0.0000029	0.0000042	0.0000024	0.0000022	<0.0000020	0.0000020	9687938
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9687938
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9687938
Total Uranium (U)	mg/L	0.0304	0.0324	0.0328	0.0303	0.0364	0.0000020	9687938
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9687938
Total Zinc (Zn)	mg/L	0.173	0.155	0.129	0.0913	0.128	0.00010	9687938
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9687938
Total Calcium (Ca)	mg/L	110	109	111	111	110	0.050	9686548
Total Magnesium (Mg)	mg/L	16.8	16.4	17.0	17.1	16.3	0.050	9686548

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B9A1432
Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WZ7980	WZ7981	WZ7982	WZ7983	WZ7984		
Sampling Date		2019/11/25 09:30	2019/11/25 09:10	2019/11/25 08:50	2019/11/25 08:30	2019/11/25 09:15		
COC Number		08475441	08475441	08475441	08475441	08475441		
	UNITS	INFLUENT-67	1A	1B	1C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.87	3.81	3.95	4.16	3.85	0.050	9686548
Total Sodium (Na)	mg/L	25.7	25.1	26.1	26.1	24.9	0.050	9686548
Total Sulphur (S)	mg/L	84.5	82.0	83.8	82.5	82.0	3.0	9686548
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B9A1432
Report Date: 2019/12/04ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WZ7985	WZ7986	WZ7987	WZ7988	WZ7989		
Sampling Date		2019/11/25 08:55	2019/11/25 08:35	2019/11/25 09:20	2019/11/25 09:00	2019/11/25 08:40		
COC Number		08475441	08475441	08475441	08475441	08475441		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	344	347	352	360	369	0.50	9685802
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00205	0.00083	0.00231	0.00116	0.00099	0.00050	9687938
Total Antimony (Sb)	mg/L	0.0200	0.0189	0.0139	0.0117	0.0112	0.000020	9687938
Total Arsenic (As)	mg/L	0.0501	0.0451	0.0407	0.0286	0.0197	0.000020	9687938
Total Barium (Ba)	mg/L	0.0597	0.0580	0.0587	0.0586	0.0587	0.000020	9687938
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9687938
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687938
Total Boron (B)	mg/L	0.025	0.023	0.027	0.017	<0.010	0.010	9687938
Total Cadmium (Cd)	mg/L	0.000575	0.000325	0.000307	0.0000690	0.0000196	0.0000050	9687938
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9687938
Total Cobalt (Co)	mg/L	0.0000435	0.0000391	0.000168	0.0000289	0.0000238	0.0000050	9687938
Total Copper (Cu)	mg/L	0.00360	0.00228	0.00252	0.00141	0.000687	0.000050	9687938
Total Iron (Fe)	mg/L	0.0024	0.0018	0.0052	0.0029	0.0062	0.0010	9687938
Total Lead (Pb)	mg/L	0.000144	0.0000530	0.000396	0.0000800	0.0000372	0.0000050	9687938
Total Lithium (Li)	mg/L	0.0113	0.0113	0.0113	0.0116	0.0121	0.00050	9687938
Total Manganese (Mn)	mg/L	0.000992	0.000527	0.00867	0.00165	0.00358	0.000050	9687938
Total Molybdenum (Mo)	mg/L	0.00155	0.00154	0.00132	0.000964	0.000727	0.000050	9687938
Total Nickel (Ni)	mg/L	0.00717	0.00650	0.00761	0.00541	0.00437	0.000020	9687938
Total Selenium (Se)	mg/L	0.00702	0.00666	0.00370	0.00287	0.00220	0.000040	9687938
Total Silicon (Si)	mg/L	0.510	0.556	0.596	0.634	0.672	0.050	9687938
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687938
Total Strontium (Sr)	mg/L	0.613	0.620	0.616	0.635	0.651	0.000050	9687938
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9687938
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9687938
Total Titanium (Ti)	mg/L	<0.00050	0.00090	<0.00050	<0.00050	<0.00050	0.00050	9687938
Total Uranium (U)	mg/L	0.0357	0.0330	0.0271	0.0192	0.0132	0.0000020	9687938
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9687938
Total Zinc (Zn)	mg/L	0.113	0.0923	0.0833	0.0410	0.0200	0.00010	9687938
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9687938
Total Calcium (Ca)	mg/L	110	111	113	115	118	0.050	9686548
Total Magnesium (Mg)	mg/L	17.0	17.1	17.1	17.5	18.0	0.050	9686548

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WZ7985	WZ7986	WZ7987	WZ7988	WZ7989		
Sampling Date		2019/11/25 08:55	2019/11/25 08:35	2019/11/25 09:20	2019/11/25 09:00	2019/11/25 08:40		
COC Number		08475441	08475441	08475441	08475441	08475441		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	3.96	4.01	3.76	3.79	3.93	0.050	9686548
Total Sodium (Na)	mg/L	25.7	26.1	26.1	26.7	27.4	0.050	9686548
Total Sulphur (S)	mg/L	81.8	81.8	83.8	84.4	86.3	3.0	9686548

RDL = Reportable Detection Limit

**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WZ7990	WZ7991	WZ7992		
Sampling Date		2019/11/25 09:25	2019/11/25 09:05	2019/11/25 08:45		
COC Number		08475445	08475445	08475445		
	UNITS	6A	6B	6C	RDL	QC Batch

Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	372	369	368	0.50	9685802
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00454	0.00124	0.00096	0.00050	9687938
Total Antimony (Sb)	mg/L	0.0193	0.0156	0.0149	0.000020	9687938
Total Arsenic (As)	mg/L	0.0483	0.0312	0.0243	0.000020	9687938
Total Barium (Ba)	mg/L	0.0616	0.0604	0.0597	0.000020	9687938
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9687938
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687938
Total Boron (B)	mg/L	0.024	0.021	<0.010	0.010	9687938
Total Cadmium (Cd)	mg/L	0.000413	0.0000782	0.0000253	0.0000050	9687938
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9687938
Total Cobalt (Co)	mg/L	0.000514	0.0000511	0.0000395	0.0000050	9687938
Total Copper (Cu)	mg/L	0.00738	0.00242	0.00130	0.000050	9687938
Total Iron (Fe)	mg/L	0.0161	0.0050	0.0057	0.0010	9687938
Total Lead (Pb)	mg/L	0.00151	0.000123	0.0000474	0.0000050	9687938
Total Lithium (Li)	mg/L	0.0117	0.0118	0.0119	0.00050	9687938
Total Manganese (Mn)	mg/L	0.0176	0.00362	0.00299	0.000050	9687938
Total Molybdenum (Mo)	mg/L	0.00151	0.00110	0.000978	0.000050	9687938
Total Nickel (Ni)	mg/L	0.00740	0.00512	0.00365	0.000020	9687938
Total Selenium (Se)	mg/L	0.00605	0.00368	0.00321	0.000040	9687938
Total Silicon (Si)	mg/L	0.727	0.790	0.700	0.050	9687938
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9687938
Total Strontium (Sr)	mg/L	0.663	0.646	0.642	0.000050	9687938
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9687938
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9687938
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9687938
Total Uranium (U)	mg/L	0.0361	0.0221	0.0162	0.0000020	9687938
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9687938
Total Zinc (Zn)	mg/L	0.0719	0.0259	0.0140	0.00010	9687938
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9687938
Total Calcium (Ca)	mg/L	120	118	118	0.050	9686548
Total Magnesium (Mg)	mg/L	17.5	18.1	18.0	0.050	9686548
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WZ7990	WZ7991	WZ7992		
Sampling Date		2019/11/25 09:25	2019/11/25 09:05	2019/11/25 08:45		
COC Number		08475445	08475445	08475445		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Potassium (K)	mg/L	4.22	4.38	4.52	0.050	9686548
Total Sodium (Na)	mg/L	26.2	27.6	27.7	0.050	9686548
Total Sulphur (S)	mg/L	88.4	88.2	86.3	3.0	9686548
RDL = Reportable Detection Limit						



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VERITAS

BV Labs Job #: B9A1432

Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WZ7980
Sample ID: INFLUENT-67
Matrix: Water

Collected: 2019/11/25
Shipped:
Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9687924	N/A	2019/11/27	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9689169	2019/11/28	2019/12/03	Isabel Choi
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
COD by Colorimeter	M/PROB	9688319	N/A	2019/11/27	Isabel Choi
Carbon (DOC)	TECH	9688015	N/A	2019/11/27	Taylor Mullings
Hardness Total (calculated as CaCO ₃)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9685664	N/A	2019/11/27	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/27	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/28	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy
Carbon (Total Organic)	TECH	9689109	N/A	2019/11/29	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9687348	2019/11/27	2019/11/28	William Zou

BV Labs ID: WZ7980 Dup
Sample ID: INFLUENT-67
Matrix: Water

Collected: 2019/11/25
Shipped:
Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
COD by Colorimeter	M/PROB	9688319	N/A	2019/11/27	Isabel Choi
Carbon (DOC)	TECH	9688015	N/A	2019/11/27	Taylor Mullings
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Carbon (Total Organic)	TECH	9689109	N/A	2019/11/29	Taylor Mullings

BV Labs ID: WZ7981
Sample ID: 1A
Matrix: Water

Collected: 2019/11/25
Shipped:
Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9685664	N/A	2019/11/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada



BUREAU
VERITAS

BV Labs Job #: B9A1432

Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WZ7981

Sample ID: 1A

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy

BV Labs ID: WZ7982

Sample ID: 1B

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9685664	N/A	2019/11/28	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy

BV Labs ID: WZ7982 Dup

Sample ID: 1B

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling

BV Labs ID: WZ7983

Sample ID: 1C

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9687924	N/A	2019/11/27	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9689169	2019/11/28	2019/12/03	Isabel Choi
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
COD by Colorimeter	M/PROB	9688319	N/A	2019/11/27	Isabel Choi
Carbon (DOC)	TECH	9688015	N/A	2019/11/27	Taylor Mullings
Hardness Total (calculated as CaCO3)	CALC	9685802	N/A	2019/11/28	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9685664	N/A	2019/11/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Automated Statchk



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VERITAS

BV Labs Job #: B9A1432

Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WZ7983

Sample ID: 1C

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy
Carbon (Total Organic)	TECH	9689109	N/A	2019/11/29	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9687348	2019/11/27	2019/11/28	William Zou

BV Labs ID: WZ7983 Dup

Sample ID: 1C

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9687924	N/A	2019/11/27	Wilson Au Yueng

BV Labs ID: WZ7984

Sample ID: 3A

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9685664	N/A	2019/11/28	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy

BV Labs ID: WZ7985

Sample ID: 3B

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9685802	N/A	2019/11/28	Report Automation Engine
Hardness (calculated as CaCO ₃)	CALC	9685664	N/A	2019/11/28	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B9A1432

Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WZ7985

Sample ID: 3B

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy

BV Labs ID: WZ7986

Sample ID: 3C

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9687924	N/A	2019/11/27	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9689169	2019/11/28	2019/12/03	Isabel Choi
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
COD by Colorimeter	M/PROB	9688319	N/A	2019/11/27	Isabel Choi
Carbon (DOC)	TECH	9688015	N/A	2019/11/27	Taylor Mullings
Hardness Total (calculated as CaCO ₃)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9685664	N/A	2019/11/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy
Carbon (Total Organic)	TECH	9689109	N/A	2019/11/29	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9687348	2019/11/27	2019/11/28	William Zou

BV Labs ID: WZ7987

Sample ID: 4A

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9685664	N/A	2019/11/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An



BUREAU
VERITAS

BV Labs Job #: B9A1432

Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WZ7987

Sample ID: 4A

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy

BV Labs ID: WZ7988

Sample ID: 4B

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9685802	N/A	2019/11/28	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9685664	N/A	2019/11/28	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy

BV Labs ID: WZ7989

Sample ID: 4C

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9687924	N/A	2019/11/27	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9689169	2019/11/28	2019/12/03	Isabel Choi
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
COD by Colorimeter	M/PROB	9688319	N/A	2019/11/27	Isabel Choi
Carbon (DOC)	TECH	9688015	N/A	2019/11/27	Taylor Mullings
Hardness Total (calculated as CaCO3)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9685664	N/A	2019/11/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin



BUREAU
VERITAS

BV Labs Job #: B9A1432

Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WZ7989

Sample ID: 4C

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy
Carbon (Total Organic)	TECH	9687706	N/A	2019/11/27	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9687348	2019/11/27	2019/11/28	William Zou

BV Labs ID: WZ7990

Sample ID: 6A

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9685802	N/A	2019/11/28	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9685664	N/A	2019/11/28	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Report Automation Engine
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy

BV Labs ID: WZ7991

Sample ID: 6B

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9685664	N/A	2019/11/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy



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VERITAS

BV Labs Job #: B9A1432

Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: WZ7992

Sample ID: 6C

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9687924	N/A	2019/11/27	Wilson Au Yueng
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9689169	2019/11/28	2019/12/03	Isabel Choi
Low level chloride/sulphate by AC	KONE	9689189	N/A	2019/11/27	Balwinder Bassi
COD by Colorimeter	M/PROB	9688319	N/A	2019/11/27	Isabel Choi
Carbon (DOC)	TECH	9688015	N/A	2019/11/27	Taylor Mullings
Hardness Total (calculated as CaCO ₃)	CALC	9685802	N/A	2019/11/28	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9685664	N/A	2019/11/28	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9685665	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9687648	N/A	2019/11/27	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9686548	N/A	2019/11/28	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9687938	N/A	2019/11/27	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9688019	N/A	2019/11/28	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9688556	N/A	2019/11/27	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9688558	N/A	2019/11/27	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9686550	N/A	2019/11/28	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/11/26	Juvahne Cris Roy
Carbon (Total Organic)	TECH	9689109	N/A	2019/11/29	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9687348	2019/11/27	2019/11/28	William Zou

BV Labs ID: WZ7992 Dup

Sample ID: 6C

Matrix: Water

Collected: 2019/11/25

Shipped:

Received: 2019/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9695734	N/A	2019/12/04	Coco Guo



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.0°C
Package 2	15.7°C

Sample WZ7980 [INFLUENT-67] : Sample was analyzed past method specified hold time for Biochemical Oxygen Demand. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample WZ7983 [1C] : Sample was analyzed past method specified hold time for Biochemical Oxygen Demand. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample WZ7986 [3C] : Sample was analyzed past method specified hold time for Biochemical Oxygen Demand. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample WZ7989 [4C] : Sample was analyzed past method specified hold time for Biochemical Oxygen Demand. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample WZ7992 [6C] : Sample was analyzed past method specified hold time for Biochemical Oxygen Demand. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Results relate only to the items tested.



BV Labs Job #: B9A1432
Report Date: 2019/12/04

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9687348	Total Suspended Solids	2019/11/28	NC	80 - 120	101	80 - 120	<1.0	mg/L	11	20
9687648	Dissolved Aluminum (Al)	2019/11/27	98	80 - 120	100	80 - 120	<0.00050	mg/L	1.3	20
9687648	Dissolved Antimony (Sb)	2019/11/27	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.0040	20
9687648	Dissolved Arsenic (As)	2019/11/27	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.26	20
9687648	Dissolved Barium (Ba)	2019/11/27	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.56	20
9687648	Dissolved Beryllium (Be)	2019/11/27	93	80 - 120	93	80 - 120	<0.000010	mg/L	NC	20
9687648	Dissolved Bismuth (Bi)	2019/11/27	94	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9687648	Dissolved Boron (B)	2019/11/27	94	80 - 120	94	80 - 120	<0.010	mg/L	1.9	20
9687648	Dissolved Cadmium (Cd)	2019/11/27	96	80 - 120	97	80 - 120	<0.0000050	mg/L	0.59	20
9687648	Dissolved Chromium (Cr)	2019/11/27	96	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9687648	Dissolved Cobalt (Co)	2019/11/27	93	80 - 120	98	80 - 120	<0.0000050	mg/L	0.72	20
9687648	Dissolved Copper (Cu)	2019/11/27	88	80 - 120	97	80 - 120	<0.000050	mg/L	0.62	20
9687648	Dissolved Iron (Fe)	2019/11/27	102	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
9687648	Dissolved Lead (Pb)	2019/11/27	98	80 - 120	103	80 - 120	0.0000076, RDL=0.0000050 (1)	mg/L	0.12	20
9687648	Dissolved Lithium (Li)	2019/11/27	96	80 - 120	100	80 - 120	<0.00050	mg/L	1.2	20
9687648	Dissolved Manganese (Mn)	2019/11/27	95	80 - 120	101	80 - 120	<0.000050	mg/L	0.34	20
9687648	Dissolved Molybdenum (Mo)	2019/11/27	105	80 - 120	101	80 - 120	<0.000050	mg/L	0.26	20
9687648	Dissolved Nickel (Ni)	2019/11/27	92	80 - 120	100	80 - 120	<0.000020	mg/L	0.33	20
9687648	Dissolved Selenium (Se)	2019/11/27	101	80 - 120	94	80 - 120	<0.000040	mg/L	1.4	20
9687648	Dissolved Silicon (Si)	2019/11/27	107	80 - 120	98	80 - 120	<0.050	mg/L	0.92	20
9687648	Dissolved Silver (Ag)	2019/11/27	95	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9687648	Dissolved Strontium (Sr)	2019/11/27	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.45	20
9687648	Dissolved Thallium (Tl)	2019/11/27	100	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9687648	Dissolved Tin (Sn)	2019/11/27	97	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9687648	Dissolved Titanium (Ti)	2019/11/27	102	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9687648	Dissolved Uranium (U)	2019/11/27	100	80 - 120	102	80 - 120	<0.0000020	mg/L	0.17	20
9687648	Dissolved Vanadium (V)	2019/11/27	100	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9687648	Dissolved Zinc (Zn)	2019/11/27	NC	80 - 120	97	80 - 120	<0.00010	mg/L	0.60	20
9687648	Dissolved Zirconium (Zr)	2019/11/27	105	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9687706	Total Organic Carbon (C)	2019/11/27	NC	80 - 120	103	80 - 120	<0.50	mg/L	0.33	20
9687924	Acidity (pH 4.5)	2019/11/27					<1.0	mg/L	NC	20



BV Labs Job #: B9A1432
Report Date: 2019/12/04

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9687924	Acidity (pH 8.3)	2019/11/27			98	80 - 120	<1.0	mg/L	3.1	20
9687938	Total Aluminum (Al)	2019/11/27	97	80 - 120	98	80 - 120	<0.00050	mg/L	5.2	20
9687938	Total Antimony (Sb)	2019/11/27	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.57	20
9687938	Total Arsenic (As)	2019/11/27	NC	80 - 120	104	80 - 120	<0.000020	mg/L	2.7	20
9687938	Total Barium (Ba)	2019/11/27	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.15	20
9687938	Total Beryllium (Be)	2019/11/27	93	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
9687938	Total Bismuth (Bi)	2019/11/27	96	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9687938	Total Boron (B)	2019/11/27	91	80 - 120	93	80 - 120	<0.010	mg/L	0.97	20
9687938	Total Cadmium (Cd)	2019/11/27	97	80 - 120	100	80 - 120	<0.0000050	mg/L	1.9	20
9687938	Total Chromium (Cr)	2019/11/27	100	80 - 120	103	80 - 120	<0.00010	mg/L	17	20
9687938	Total Cobalt (Co)	2019/11/27	97	80 - 120	103	80 - 120	<0.0000050	mg/L	2.6	20
9687938	Total Copper (Cu)	2019/11/27	94	80 - 120	104	80 - 120	<0.000050	mg/L	1.9	20
9687938	Total Iron (Fe)	2019/11/27	99	80 - 120	105	80 - 120	<0.0010	mg/L	15	20
9687938	Total Lead (Pb)	2019/11/27	100	80 - 120	103	80 - 120	<0.0000050	mg/L	0.25	20
9687938	Total Lithium (Li)	2019/11/27	93	80 - 120	95	80 - 120	<0.00050	mg/L	0.75	20
9687938	Total Manganese (Mn)	2019/11/27	NC	80 - 120	102	80 - 120	<0.000050	mg/L	1.5	20
9687938	Total Molybdenum (Mo)	2019/11/27	108	80 - 120	101	80 - 120	<0.000050	mg/L	1.4	20
9687938	Total Nickel (Ni)	2019/11/27	95	80 - 120	104	80 - 120	<0.000020	mg/L	3.4	20
9687938	Total Selenium (Se)	2019/11/27	101	80 - 120	99	80 - 120	<0.000040	mg/L	2.3	20
9687938	Total Silicon (Si)	2019/11/27	97	80 - 120	101	80 - 120	<0.050	mg/L	0.38	20
9687938	Total Silver (Ag)	2019/11/27	98	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9687938	Total Strontium (Sr)	2019/11/27	NC	80 - 120	100	80 - 120	<0.000050	mg/L	2.9	20
9687938	Total Thallium (Tl)	2019/11/27	102	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9687938	Total Tin (Sn)	2019/11/27	98	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9687938	Total Titanium (Ti)	2019/11/27	103	80 - 120	106	80 - 120	<0.00050	mg/L	NC	20
9687938	Total Uranium (U)	2019/11/27	103	80 - 120	105	80 - 120	<0.0000020	mg/L	0.88	20
9687938	Total Vanadium (V)	2019/11/27	103	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9687938	Total Zinc (Zn)	2019/11/27	NC	80 - 120	106	80 - 120	<0.00010	mg/L	1.9	20
9687938	Total Zirconium (Zr)	2019/11/27	105	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9688015	Dissolved Organic Carbon (C)	2019/11/27	108	80 - 120	103	80 - 120	<0.50	mg/L	3.8	20
9688019	Total Ammonia (N)	2019/11/28	93	80 - 120	96	80 - 120	<0.0050	mg/L	1.5	20
9688319	Chemical Oxygen Demand	2019/11/27	101	80 - 120	107	80 - 120	<10	mg/L	11	20



BV Labs Job #: B9A1432
Report Date: 2019/12/04

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9688556	Nitrate plus Nitrite (N)	2019/11/27	109	80 - 120	108	80 - 120	<0.0020	mg/L	0.35	25
9688558	Nitrite (N)	2019/11/27	102	80 - 120	105	80 - 120	<0.0020	mg/L	2.1	25
9689109	Total Organic Carbon (C)	2019/11/29	90	80 - 120	103	80 - 120	<0.50	mg/L	0.28	20
9689169	Biochemical Oxygen Demand	2019/12/03			94	85 - 115	<2.0	mg/L	11	20
9689189	Dissolved Chloride (Cl)	2019/11/27	97	80 - 120	104	80 - 120	<0.50	mg/L	8.2	20
9689189	Dissolved Sulphate (SO4)	2019/11/27	98	80 - 120	105	80 - 120	<0.50	mg/L	4.0	20
9695734	Alkalinity (PP as CaCO3)	2019/12/04					<0.50	mg/L	NC	20
9695734	Alkalinity (Total as CaCO3)	2019/12/04	NC	80 - 120	96	80 - 120	<0.50	mg/L	1.8	20
9695734	Bicarbonate (HCO3)	2019/12/04					<0.50	mg/L	1.8	20
9695734	Carbonate (CO3)	2019/12/04					<0.50	mg/L	NC	20
9695734	Hydroxide (OH)	2019/12/04					<0.50	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for Pb- 2X RDL acceptable for low level metals determination.



BUREAU
VERITAS

BV Labs Job #: B9A1432
Report Date: 2019/12/04

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RE

COC #:



08475445

BBV FCD-00077/05
Page 1 of 1

Invoice Information Company Name: <u>BMC MINERALS LTD.</u> Contact Name: _____ Address: <u>530-1130 WEST PENDER ST</u> <u>Vancouver, BC</u> PC: <u>V6E 4A4</u> Phone: _____ Email: _____		Report Information (if differs from invoice) Company Name: <u>ALESCO ENVIRONMENTAL</u> Contact Name: <u>Mary Mitoska, Renate Vanderhorst</u> Address: <u>UNIT 3 151 INDUSTRIAL RD</u> <u>Whitehorse, YK</u> PC: <u>V1A 2V3</u> Phone: <u>(867) 668-6463</u> <u>vanderhorst@alexcoenv.com</u> Email: <u>mmitska@alexcoenv.com</u>		Project Information (where applicable) Quotation #: <u>860751</u> P.O. #/ A/E/R: _____ Project #: <u>BMC-18-02</u> Site Location: <u>Kudt Ze Kayah</u> Site #: _____ Sampled By: _____		Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days																																																																																																																																																																																																							
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) <u>USE SCENARIO # 12485</u>		Analysis Requested																																																																																																																																																																																																									
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM		<table border="1"> <thead> <tr> <th>Sample Identification</th> <th>Lab Identification</th> <th>Date Sampled (YYYY/MM/DD)</th> <th>Time Sampled (HH:MM)</th> <th>Matrix</th> <th>Low Level Dissolved Metals</th> <th>Low Level Total Metals</th> <th>Anions (SO4, NO2, NO3, Cl)</th> <th>Alkalinity</th> <th>Ammonia</th> <th>Acidity</th> <th>BOD</th> <th>TSS</th> <th>COB/TOC</th> <th>DOC</th> <th># OF CONTAINERS SUBMITTED</th> <th>HOLD - DO NOT ANALYZE</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>6A</td> <td>25-Nov-19</td> <td>9:25</td> <td>Water</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>6</td> <td></td> <td>Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved</td> </tr> <tr> <td>2</td> <td>6B</td> <td>25-Nov-19</td> <td>9:05</td> <td>Water</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>6</td> <td></td> <td>Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved</td> </tr> <tr> <td>3</td> <td>6C</td> <td>25-Nov-19</td> <td>8:45</td> <td>Water</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>9</td> <td></td> <td>Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved</td> </tr> <tr> <td>4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>9</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Ammonia	Acidity	BOD	TSS	COB/TOC	DOC	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS	1	6A	25-Nov-19	9:25	Water	X	X	X	X	X						6		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved	2	6B	25-Nov-19	9:05	Water	X	X	X	X	X						6		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved	3	6C	25-Nov-19	8:45	Water	X	X	X	X	X						9		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved	4																		5																		6																		7																		8																		9																		10																	
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RETURNED BY: (Signature/Print) _____ DATE: (YYYY/MM/DD) _____ TIME: (HH:MM) _____		RECEIVED BY: (Signature/Print) <u>APRIL AVANTI BATEL</u> DATE: (YYYY/MM/DD) <u>2011/11/26</u> TIME: (HH:MM) <u>08:15</u>																																																																																																																																																																																																											

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Page 1 of 1

B9A1432 COC



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08475608, 08475604

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/12/06
 Report #: R2820573
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A3685

Received: 2019/12/02, 13:11

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	12	N/A	2019/12/03	BBY6SOP-00026	SM 22 2320 B m
Alkalinity - Low Level	1	N/A	2019/12/04	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC	10	N/A	2019/12/03	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC	3	N/A	2019/12/04	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (2)	13	N/A	2019/12/05	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	13	N/A	2019/12/04	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	13	N/A	2019/12/05	BBY WI-00033	Auto Calc
Ion Balance	13	N/A	2019/12/05	BBY WI-00033	Auto Calc
Sum of cations, anions	13	N/A	2019/12/05	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	13	N/A	2019/12/04	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	10	N/A	2019/12/03	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Low Level (dissolved)	3	N/A	2019/12/04	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	13	N/A	2019/12/05	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	13	N/A	2019/12/05	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved) (1)	6	N/A	2019/12/04	AB SOP-00007	SM 23 4500 NH ₃ A G m
Ammonia-N Low Level (Preserved) (1)	7	N/A	2019/12/05	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level)	13	N/A	2019/12/03	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level)	13	N/A	2019/12/03	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc	13	N/A	2019/12/03	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals	13	N/A	2019/12/03	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08475608, 08475604

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/12/06
Report #: R2820573
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A3685

Received: 2019/12/02, 13:11

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Calgary Environmental

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

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BUREAU
VERITAS

BV Labs Job #: B9A3685
Report Date: 2019/12/06

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XA9485		XA9486		XA9487	XA9488		
Sampling Date		2019/12/02 11:00		2019/12/02 10:40		2019/12/02 10:20	2019/12/02 10:00		
COC Number		08475608		08475608		08475608	08475608		
	UNITS	INFL-70	QC Batch	1A	RDL	1B	1C	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	7.7	9697400	7.8	N/A	7.5	8.2	N/A	9697400
Cation Sum	meq/L	7.7	9697400	7.9	N/A	7.8	8.6	N/A	9697400
Filter and HNO ₃ Preservation	N/A	FIELD	ONSITE	FIELD		FIELD	FIELD		ONSITE
Ion Balance	N/A	0.99	9697197	1.0	0.010	1.0	1.0	0.010	9697197
Ion Balance (% Difference)	%	0.33	9697198	0.19	N/A	2.0	2.0	N/A	9697198
Nitrate (N)	mg/L	0.364	9695293	0.503	0.0020	0.581	0.705	0.0020	9695293
Misc. Inorganics									
Alkalinity (Total as CaCO ₃)	mg/L	77.4	9695733	75.2	0.50	77.0	71.3	0.50	9695733
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	9695733	<0.50	0.50	<0.50	<0.50	0.50	9695733
Bicarbonate (HCO ₃)	mg/L	94.4	9695733	91.7	0.50	93.9	87.0	0.50	9695733
Carbonate (CO ₃)	mg/L	<0.50	9695733	<0.50	0.50	<0.50	<0.50	0.50	9695733
Hydroxide (OH)	mg/L	<0.50	9695733	<0.50	0.50	<0.50	<0.50	0.50	9695733
Anions									
Dissolved Chloride (Cl)	mg/L	55	9696901	56	0.50	56	59	0.50	9696901
Dissolved Sulphate (SO ₄)	mg/L	220 (1)	9696901	230 (1)	5.0	210 (1)	240 (1)	5.0	9696901
Nutrients									
Total Ammonia (N)	mg/L	0.71 (1)	9696571	0.56 (1)	0.010	0.43	0.11	0.0050	9697894
Nitrate plus Nitrite (N)	mg/L	0.370	9695779	0.542	0.0020	0.610	0.718	0.0020	9695783
Nitrite (N)	mg/L	0.0055	9695780	0.0388	0.0020	0.0287	0.0131	0.0020	9695784
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XA9489		XA9490		XA9491		XA9492		
Sampling Date		2019/12/02 10:45		2019/12/02 10:25		2019/12/02 10:05		2019/12/02 10:50		
COC Number		08475608		08475608		08475608		08475608		
	UNITS	3A	RDL	3B	QC Batch	3C	QC Batch	4A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.2	N/A	7.9	9697400	7.5	9697400	8.1	N/A	9697400
Cation Sum	meq/L	7.7	N/A	8.4	9697400	8.0	9697400	7.9	N/A	9697400
Filter and HNO3 Preservation	N/A	FIELD		FIELD	ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.94	0.010	1.1	9697197	1.1	9697197	0.98	0.010	9697197
Ion Balance (% Difference)	%	3.0	N/A	3.6	9697198	3.5	9697198	1.3	N/A	9697198
Nitrate (N)	mg/L	0.393	0.0020	0.387	9695293	0.272	9695293	0.317	0.0020	9695293

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	77.9	0.50	76.3	9695733	73.5	9695733	76.4	0.50	9695733
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	9695733	<0.50	9695733	<0.50	0.50	9695733
Bicarbonate (HCO3)	mg/L	95.0	0.50	93.1	9695733	89.7	9695733	93.2	0.50	9695733
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	9695733	<0.50	9695733	<0.50	0.50	9695733
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	9695733	<0.50	9695733	<0.50	0.50	9695733

Anions

Dissolved Chloride (Cl)	mg/L	56	0.50	65	9696901	58	9696901	55	0.50	9696901
Dissolved Sulphate (SO4)	mg/L	240 (1)	5.0	220 (1)	9696901	210 (1)	9696901	240 (1)	5.0	9696901

Nutrients

Total Ammonia (N)	mg/L	0.53 (1)	0.010	0.22	9697894	0.036	9696571	0.38	0.0050	9697894
Nitrate plus Nitrite (N)	mg/L	0.446	0.0020	0.411	9695779	0.288	9695779	0.339	0.0020	9695783
Nitrite (N)	mg/L	0.0533	0.0020	0.0244	9695780	0.0161	9695780	0.0227	0.0020	9695784

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B9A3685

Report Date: 2019/12/06

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XA9493	XA9494		XA9498		XA9499		
Sampling Date		2019/12/02 10:30	2019/12/02 10:10		2019/12/02 10:55		2019/12/02 10:35		
COC Number		08475608	08475608		08475604		08475604		
	UNITS	4B	4C	QC Batch	6A	QC Batch	6B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.1	8.4	9697400	7.9	9697400	8.4	N/A	9697400
Cation Sum	meq/L	8.0	8.3	9697400	7.9	9697400	8.3	N/A	9697400
Filter and HNO3 Preservation	N/A	FIELD	FIELD	ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.99	0.99	9697197	0.99	9697197	1.0	0.010	9697197
Ion Balance (% Difference)	%	0.38	0.68	9697198	0.35	9697198	0.17	N/A	9697198
Nitrate (N)	mg/L	0.0345	<0.0020	9695293	0.275	9695293	0.0711	0.0020	9695293

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	76.2	78.3	9695733	76.2	9695733	75.5	0.50	9695734
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	9695733	<0.50	9695733	<0.50	0.50	9695734
Bicarbonate (HCO3)	mg/L	92.9	95.5	9695733	93.0	9695733	92.0	0.50	9695734
Carbonate (CO3)	mg/L	<0.50	<0.50	9695733	<0.50	9695733	<0.50	0.50	9695734
Hydroxide (OH)	mg/L	<0.50	<0.50	9695733	<0.50	9695733	<0.50	0.50	9695734

Anions

Dissolved Chloride (Cl)	mg/L	57	60	9696901	62	9696901	67	0.50	9696903
Dissolved Sulphate (SO4)	mg/L	240 (1)	250 (1)	9696901	220 (1)	9696901	240 (1)	5.0	9696903

Nutrients

Total Ammonia (N)	mg/L	0.012	0.012	9696571	0.33	9697894	0.018	0.0050	9696571
Nitrate plus Nitrite (N)	mg/L	0.0345	<0.0020	9695783	0.289	9695779	0.0711	0.0020	9695783
Nitrite (N)	mg/L	<0.0020	<0.0020	9695784	0.0148	9695780	<0.0020	0.0020	9695784

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XA9500		
Sampling Date		2019/12/02 10:15		
COC Number		08475604		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	8.3	N/A	9697400
Cation Sum	meq/L	8.2	N/A	9697400
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE
Ion Balance	N/A	0.99	0.010	9697197
Ion Balance (% Difference)	%	0.34	N/A	9697198
Nitrate (N)	mg/L	<0.0020	0.0020	9695293
Misc. Inorganics				
Alkalinity (Total as CaCO ₃)	mg/L	77.6	0.50	9695733
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9695733
Bicarbonate (HCO ₃)	mg/L	94.6	0.50	9695733
Carbonate (CO ₃)	mg/L	<0.50	0.50	9695733
Hydroxide (OH)	mg/L	<0.50	0.50	9695733
Anions				
Dissolved Chloride (Cl)	mg/L	68	0.50	9696901
Dissolved Sulphate (SO ₄)	mg/L	230 (1)	5.0	9696901
Nutrients				
Total Ammonia (N)	mg/L	0.017	0.0050	9696571
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9695783
Nitrite (N)	mg/L	<0.0020	0.0020	9695784
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.				

BUREAU
VERITASBV Labs Job #: B9A3685
Report Date: 2019/12/06ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9485	XA9486		XA9487	XA9488		
Sampling Date		2019/12/02 11:00	2019/12/02 10:40		2019/12/02 10:20	2019/12/02 10:00		
COC Number		08475608	08475608		08475608	08475608		
	UNITS	INFL-70	1A	QC Batch	1B	1C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	323	332	9694445	331	362	0.50	9694445
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00819	0.00523	9695593	0.00327	0.00123	0.00050	9695593
Dissolved Antimony (Sb)	mg/L	0.0189	0.0193	9695593	0.0194	0.0204	0.000020	9695593
Dissolved Arsenic (As)	mg/L	0.0605	0.0614	9695593	0.0585	0.0578	0.000020	9695593
Dissolved Barium (Ba)	mg/L	0.0556	0.0577	9695593	0.0572	0.0597	0.000020	9695593
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9695593	<0.000010	<0.000010	0.000010	9695593
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9695593	<0.0000050	<0.0000050	0.0000050	9695593
Dissolved Boron (B)	mg/L	0.033	0.033	9695593	0.034	0.036	0.010	9695593
Dissolved Cadmium (Cd)	mg/L	0.00200	0.00177	9695593	0.00150	0.000769	0.0000050	9695593
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9695593	<0.00010	<0.00010	0.00010	9695593
Dissolved Cobalt (Co)	mg/L	0.00267	0.00127	9695593	0.000573	0.0000696	0.0000050	9695593
Dissolved Copper (Cu)	mg/L	0.0251	0.0160	9695593	0.00997	0.00341	0.000050	9695593
Dissolved Iron (Fe)	mg/L	<0.0010	0.0013	9695593	<0.0010	0.0016	0.0010	9695593
Dissolved Lead (Pb)	mg/L	0.0146	0.00680	9695593	0.00247	0.000243	0.0000050	9695593
Dissolved Lithium (Li)	mg/L	0.0100	0.0103	9695593	0.0103	0.0113	0.00050	9695593
Dissolved Manganese (Mn)	mg/L	0.0523	0.0263	9695593	0.0128	0.00182	0.000050	9695593
Dissolved Molybdenum (Mo)	mg/L	0.00155	0.00153	9695593	0.00150	0.00162	0.000050	9695593
Dissolved Nickel (Ni)	mg/L	0.00814	0.00865	9695593	0.00810	0.00697	0.000020	9695593
Dissolved Selenium (Se)	mg/L	0.00775	0.00794	9695593	0.00759	0.00781	0.000040	9695593
Dissolved Silicon (Si)	mg/L	0.452	0.438	9695593	0.422	0.388	0.050	9695593
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9695593	<0.0000050	<0.0000050	0.0000050	9695593
Dissolved Strontium (Sr)	mg/L	0.582	0.615	9695593	0.603	0.647	0.000050	9695593
Dissolved Thallium (Tl)	mg/L	0.0000030	<0.0000020	9697798	0.0000042	0.0000029	0.0000020	9695593
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9695593	<0.00020	<0.00020	0.00020	9695593
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9695593	<0.00050	<0.00050	0.00050	9695593
Dissolved Uranium (U)	mg/L	0.0285	0.0287	9695593	0.0289	0.0292	0.0000020	9695593
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9695593	<0.00020	<0.00020	0.00020	9695593
Dissolved Zinc (Zn)	mg/L	0.169	0.181	9695593	0.174	0.142	0.00010	9695593
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9695593	<0.00010	<0.00010	0.00010	9695593
Dissolved Calcium (Ca)	mg/L	102	106	9694452	106	115	0.050	9694452
Dissolved Magnesium (Mg)	mg/L	16.4	16.6	9694452	16.3	18.2	0.050	9694452

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9485	XA9486		XA9487	XA9488		
Sampling Date		2019/12/02 11:00	2019/12/02 10:40		2019/12/02 10:20	2019/12/02 10:00		
COC Number		08475608	08475608		08475608	08475608		
	UNITS	INFL-70	1A	QC Batch	1B	1C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.69	3.79	9694452	3.81	4.19	0.050	9694452
Dissolved Sodium (Na)	mg/L	24.9	24.9	9694452	25.0	27.8	0.050	9694452
Dissolved Sulphur (S)	mg/L	78.6	80.9	9694452	79.2	88.9	3.0	9694452
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B9A3685
Report Date: 2019/12/06

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9489	XA9490	XA9491	XA9492	XA9493		
Sampling Date		2019/12/02 10:45	2019/12/02 10:25	2019/12/02 10:05	2019/12/02 10:50	2019/12/02 10:30		
COC Number		08475608	08475608	08475608	08475608	08475608		
	UNITS	3A	3B	3C	4A	4B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO3)	mg/L	325	356	339	333	341	0.50	9694445
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00446	0.00183	0.00184	0.00384	0.00113	0.00050	9695593
Dissolved Antimony (Sb)	mg/L	0.0197	0.0206	0.0202	0.0206	0.0206	0.000020	9695593
Dissolved Arsenic (As)	mg/L	0.0650	0.0609	0.0554	0.0600	0.0418	0.000020	9695593
Dissolved Barium (Ba)	mg/L	0.0574	0.0594	0.0586	0.0564	0.0572	0.000020	9695593
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9695593
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9695593
Dissolved Boron (B)	mg/L	0.032	0.032	0.028	0.027	0.021	0.010	9695593
Dissolved Cadmium (Cd)	mg/L	0.00181	0.00114	0.000650	0.00126	0.000269	0.0000050	9695593
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9695593
Dissolved Cobalt (Co)	mg/L	0.000456	0.0000848	0.0000508	0.000625	0.0000697	0.0000050	9695593
Dissolved Copper (Cu)	mg/L	0.0126	0.00493	0.00283	0.00942	0.00253	0.000050	9695593
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	0.0010	0.0016	0.0014	0.0010	9695593
Dissolved Lead (Pb)	mg/L	0.00225	0.000558	0.000151	0.00236	0.000298	0.0000050	9695593
Dissolved Lithium (Li)	mg/L	0.0104	0.0111	0.0106	0.0104	0.0109	0.00050	9695593
Dissolved Manganese (Mn)	mg/L	0.0114	0.00115	0.000539	0.0121	0.00175	0.000050	9695593
Dissolved Molybdenum (Mo)	mg/L	0.00159	0.00165	0.00150	0.00156	0.00138	0.000050	9695593
Dissolved Nickel (Ni)	mg/L	0.00834	0.00825	0.00745	0.00812	0.00675	0.000020	9695593
Dissolved Selenium (Se)	mg/L	0.00769	0.00787	0.00750	0.00761	0.00640	0.000040	9695593
Dissolved Silicon (Si)	mg/L	0.452	0.440	0.438	0.490	0.501	0.050	9695593
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9695593
Dissolved Strontium (Sr)	mg/L	0.601	0.639	0.614	0.605	0.611	0.000050	9695593
Dissolved Thallium (Tl)	mg/L	0.0000026	<0.0000020	0.0000024	<0.0000020	<0.0000020	0.0000020	9695593
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9695593
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9695593
Dissolved Uranium (U)	mg/L	0.0298	0.0337	0.0296	0.0315	0.0284	0.0000020	9695593
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9695593
Dissolved Zinc (Zn)	mg/L	0.169	0.156	0.135	0.143	0.0847	0.00010	9695593
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9695593
Dissolved Calcium (Ca)	mg/L	103	113	108	105	108	0.050	9694452
Dissolved Magnesium (Mg)	mg/L	16.3	17.9	16.9	16.9	17.2	0.050	9694452

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B9A3685
Report Date: 2019/12/06

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9489	XA9490	XA9491	XA9492	XA9493		
Sampling Date		2019/12/02 10:45	2019/12/02 10:25	2019/12/02 10:05	2019/12/02 10:50	2019/12/02 10:30		
COC Number		08475608	08475608	08475608	08475608	08475608		
	UNITS	3A	3B	3C	4A	4B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.85	4.10	3.92	3.81	3.82	0.050	9694452
Dissolved Sodium (Na)	mg/L	24.5	27.4	25.5	25.3	25.9	0.050	9694452
Dissolved Sulphur (S)	mg/L	78.4	87.1	81.1	80.6	81.9	3.0	9694452
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B9A3685
Report Date: 2019/12/06ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XA9494	XA9498	XA9499	XA9500		
Sampling Date		2019/12/02 10:10	2019/12/02 10:55	2019/12/02 10:35	2019/12/02 10:15		
COC Number		08475608	08475604	08475604	08475604		
	UNITS	4C	6A	6B	6C	RDL	QC Batch

Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	352	332	354	348	0.50	9694445
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00120	0.00420	0.00174	0.00113	0.00050	9695593
Dissolved Antimony (Sb)	mg/L	0.0178	0.0204	0.0203	0.0185	0.000020	9695593
Dissolved Arsenic (As)	mg/L	0.0312	0.0602	0.0476	0.0374	0.000020	9695593
Dissolved Barium (Ba)	mg/L	0.0579	0.0576	0.0572	0.0566	0.000020	9695593
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9695593
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9695593
Dissolved Boron (B)	mg/L	0.012	0.028	0.023	0.015	0.010	9695593
Dissolved Cadmium (Cd)	mg/L	0.0000870	0.00106	0.000259	0.0000623	0.0000050	9695593
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9695593
Dissolved Cobalt (Co)	mg/L	0.0000363	0.000947	0.000130	0.0000467	0.0000050	9695593
Dissolved Copper (Cu)	mg/L	0.00146	0.00907	0.00352	0.00216	0.000050	9695593
Dissolved Iron (Fe)	mg/L	0.0027	0.0050	0.0035	0.0034	0.0010	9695593
Dissolved Lead (Pb)	mg/L	0.000131	0.00235	0.000576	0.000140	0.0000050	9695593
Dissolved Lithium (Li)	mg/L	0.0111	0.0109	0.0111	0.0109	0.00050	9695593
Dissolved Manganese (Mn)	mg/L	0.00203	0.0295	0.00407	0.00192	0.000050	9695593
Dissolved Molybdenum (Mo)	mg/L	0.00118	0.00155	0.00156	0.00136	0.000050	9695593
Dissolved Nickel (Ni)	mg/L	0.00547	0.00777	0.00616	0.00468	0.000020	9695593
Dissolved Selenium (Se)	mg/L	0.00503	0.00777	0.00686	0.00590	0.000040	9695593
Dissolved Silicon (Si)	mg/L	0.551	0.526	0.548	0.597	0.050	9695593
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9695593
Dissolved Strontium (Sr)	mg/L	0.625	0.610	0.641	0.627	0.000050	9695593
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9695593
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9695593
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9695593
Dissolved Uranium (U)	mg/L	0.0214	0.0317	0.0310	0.0238	0.0000020	9695593
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9695593
Dissolved Zinc (Zn)	mg/L	0.0485	0.133	0.0670	0.0301	0.00010	9695593
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9695593
Dissolved Calcium (Ca)	mg/L	112	106	113	111	0.050	9694452
Dissolved Magnesium (Mg)	mg/L	17.5	16.6	17.6	17.3	0.050	9694452

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XA9494	XA9498	XA9499	XA9500		
Sampling Date		2019/12/02 10:10	2019/12/02 10:55	2019/12/02 10:35	2019/12/02 10:15		
COC Number		08475608	08475604	08475604	08475604		
	UNITS	4C	6A	6B	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.85	4.05	4.04	4.25	0.050	9694452
Dissolved Sodium (Na)	mg/L	26.2	25.2	26.8	26.0	0.050	9694452
Dissolved Sulphur (S)	mg/L	84.5	80.4	85.4	84.3	3.0	9694452
RDL = Reportable Detection Limit							



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BV Labs Job #: B9A3685
Report Date: 2019/12/06

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XA9485	XA9486	XA9487	XA9488	XA9489		
Sampling Date		2019/12/02 11:00	2019/12/02 10:40	2019/12/02 10:20	2019/12/02 10:00	2019/12/02 10:45		
COC Number		08475608	08475608	08475608	08475608	08475608		
	UNITS	INFL-70	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO3)	mg/L	351	357	354	365	355	0.50	9694602
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0271	0.0114	0.00745	0.00269	0.00950	0.00050	9697222
Total Antimony (Sb)	mg/L	0.0195	0.0193	0.0192	0.0195	0.0196	0.000020	9697222
Total Arsenic (As)	mg/L	0.0643	0.0623	0.0603	0.0562	0.0671	0.000020	9697222
Total Barium (Ba)	mg/L	0.0576	0.0576	0.0577	0.0581	0.0572	0.000020	9697222
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9697222
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697222
Total Boron (B)	mg/L	0.035	0.036	0.037	0.036	0.033	0.010	9697222
Total Cadmium (Cd)	mg/L	0.00209	0.00179	0.00150	0.000714	0.00184	0.0000050	9697222
Total Chromium (Cr)	mg/L	0.00011	<0.00010	0.00011	<0.00010	<0.00010	0.00010	9697222
Total Cobalt (Co)	mg/L	0.00269	0.00121	0.000562	0.0000628	0.000478	0.0000050	9697222
Total Copper (Cu)	mg/L	0.0268	0.0161	0.0101	0.00337	0.0130	0.000050	9697222
Total Iron (Fe)	mg/L	0.0160	0.0042	0.0044	0.0033	0.0036	0.0010	9697222
Total Lead (Pb)	mg/L	0.0227	0.00942	0.00448	0.000405	0.00432	0.0000050	9697222
Total Lithium (Li)	mg/L	0.0116	0.0116	0.0117	0.0116	0.0113	0.00050	9697222
Total Manganese (Mn)	mg/L	0.0562	0.0267	0.0134	0.00214	0.0122	0.000050	9697222
Total Molybdenum (Mo)	mg/L	0.00173	0.00169	0.00171	0.00164	0.00164	0.000050	9697222
Total Nickel (Ni)	mg/L	0.00810	0.00830	0.00796	0.00662	0.00829	0.000020	9697222
Total Selenium (Se)	mg/L	0.00792	0.00790	0.00802	0.00762	0.00809	0.000040	9697222
Total Silicon (Si)	mg/L	0.575	0.488	0.465	0.396	0.504	0.050	9697222
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697222
Total Strontium (Sr)	mg/L	0.654	0.647	0.651	0.647	0.639	0.000050	9697222
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9697222
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9697222
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9697222
Total Uranium (U)	mg/L	0.0288	0.0287	0.0280	0.0265	0.0290	0.0000020	9697222
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9697222
Total Zinc (Zn)	mg/L	0.163	0.167	0.163	0.129	0.159	0.00010	9697222
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9697222
Total Calcium (Ca)	mg/L	112	114	113	117	114	0.050	9695048
Total Magnesium (Mg)	mg/L	17.4	17.4	17.3	17.7	17.2	0.050	9695048

RDL = Reportable Detection Limit



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BV Labs Job #: B9A3685
Report Date: 2019/12/06

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XA9485	XA9486	XA9487	XA9488	XA9489		
Sampling Date		2019/12/02 11:00	2019/12/02 10:40	2019/12/02 10:20	2019/12/02 10:00	2019/12/02 10:45		
COC Number		08475608	08475608	08475608	08475608	08475608		
	UNITS	INFL-70	1A	1B	1C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.89	3.87	3.91	4.01	3.99	0.050	9695048
Total Sodium (Na)	mg/L	26.6	26.9	26.8	27.3	26.5	0.050	9695048
Total Sulphur (S)	mg/L	85.0	86.3	85.5	83.3	85.9	3.0	9695048

RDL = Reportable Detection Limit

BUREAU
VERITASBV Labs Job #: B9A3685
Report Date: 2019/12/06ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XA9490	XA9491	XA9492	XA9493	XA9494		
Sampling Date		2019/12/02 10:25	2019/12/02 10:05	2019/12/02 10:50	2019/12/02 10:30	2019/12/02 10:10		
COC Number		08475608	08475608	08475608	08475608	08475608		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	364	368	358	357	380	0.50	9694602
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00464	0.00151	0.00859	0.00357	0.00203	0.00050	9697222
Total Antimony (Sb)	mg/L	0.0200	0.0199	0.0204	0.0189	0.0175	0.000020	9697222
Total Arsenic (As)	mg/L	0.0609	0.0570	0.0616	0.0398	0.0317	0.000020	9697222
Total Barium (Ba)	mg/L	0.0584	0.0589	0.0563	0.0545	0.0573	0.000020	9697222
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9697222
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697222
Total Boron (B)	mg/L	0.034	0.030	0.029	0.021	0.013	0.010	9697222
Total Cadmium (Cd)	mg/L	0.00109	0.000647	0.00130	0.000254	0.0000820	0.0000050	9697222
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	0.00010	9697222
Total Cobalt (Co)	mg/L	0.0000796	0.0000494	0.000624	0.0000661	0.0000454	0.0000050	9697222
Total Copper (Cu)	mg/L	0.00512	0.00282	0.00974	0.00261	0.00152	0.000050	9697222
Total Iron (Fe)	mg/L	0.0022	0.0019	0.0054	0.0032	0.0041	0.0010	9697222
Total Lead (Pb)	mg/L	0.00101	0.000197	0.00476	0.000472	0.000179	0.0000050	9697222
Total Lithium (Li)	mg/L	0.0117	0.0115	0.0116	0.0113	0.0122	0.00050	9697222
Total Manganese (Mn)	mg/L	0.00148	0.000658	0.0131	0.00187	0.00222	0.000050	9697222
Total Molybdenum (Mo)	mg/L	0.00166	0.00168	0.00164	0.00144	0.00123	0.000050	9697222
Total Nickel (Ni)	mg/L	0.00803	0.00736	0.00790	0.00633	0.00534	0.000020	9697222
Total Selenium (Se)	mg/L	0.00804	0.00778	0.00758	0.00581	0.00517	0.000040	9697222
Total Silicon (Si)	mg/L	0.454	0.509	0.522	0.524	0.570	0.050	9697222
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697222
Total Strontium (Sr)	mg/L	0.651	0.665	0.636	0.633	0.674	0.000050	9697222
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9697222
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9697222
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00063	<0.00050	<0.00050	0.00050	9697222
Total Uranium (U)	mg/L	0.0315	0.0296	0.0305	0.0266	0.0211	0.0000020	9697222
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9697222
Total Zinc (Zn)	mg/L	0.145	0.128	0.133	0.0734	0.0452	0.00010	9697222
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9697222
Total Calcium (Ca)	mg/L	116	118	114	114	122	0.050	9695048
Total Magnesium (Mg)	mg/L	17.8	18.2	17.5	17.4	18.3	0.050	9695048
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XA9490	XA9491	XA9492	XA9493	XA9494		
Sampling Date		2019/12/02 10:25	2019/12/02 10:05	2019/12/02 10:50	2019/12/02 10:30	2019/12/02 10:10		
COC Number		08475608	08475608	08475608	08475608	08475608		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	4.09	4.13	3.97	3.82	3.98	0.050	9695048
Total Sodium (Na)	mg/L	27.5	27.8	27.1	26.9	28.5	0.050	9695048
Total Sulphur (S)	mg/L	85.8	87.8	83.7	85.0	87.6	3.0	9695048

RDL = Reportable Detection Limit

BUREAU
VERITASBV Labs Job #: B9A3685
Report Date: 2019/12/06ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XA9498	XA9499	XA9500		
Sampling Date		2019/12/02 10:55	2019/12/02 10:35	2019/12/02 10:15		
COC Number		08475604	08475604	08475604		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	354	372	370	0.50	9694602
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00958	0.00353	0.00127	0.00050	9697222
Total Antimony (Sb)	mg/L	0.0195	0.0199	0.0181	0.000020	9697222
Total Arsenic (As)	mg/L	0.0614	0.0483	0.0380	0.000020	9697222
Total Barium (Ba)	mg/L	0.0555	0.0572	0.0566	0.000020	9697222
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9697222
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697222
Total Boron (B)	mg/L	0.033	0.025	0.016	0.010	9697222
Total Cadmium (Cd)	mg/L	0.00110	0.000262	0.0000688	0.0000050	9697222
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9697222
Total Cobalt (Co)	mg/L	0.00100	0.000131	0.0000447	0.0000050	9697222
Total Copper (Cu)	mg/L	0.0100	0.00420	0.00260	0.000050	9697222
Total Iron (Fe)	mg/L	0.0157	0.0051	0.0039	0.0010	9697222
Total Lead (Pb)	mg/L	0.00464	0.000939	0.000173	0.0000050	9697222
Total Lithium (Li)	mg/L	0.0113	0.0118	0.0119	0.00050	9697222
Total Manganese (Mn)	mg/L	0.0330	0.00436	0.00202	0.000050	9697222
Total Molybdenum (Mo)	mg/L	0.00207	0.00154	0.00146	0.000050	9697222
Total Nickel (Ni)	mg/L	0.00779	0.00622	0.00454	0.000020	9697222
Total Selenium (Se)	mg/L	0.00773	0.00714	0.00582	0.000040	9697222
Total Silicon (Si)	mg/L	0.535	0.577	0.684	0.050	9697222
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9697222
Total Strontium (Sr)	mg/L	0.632	0.659	0.670	0.000050	9697222
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9697222
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9697222
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9697222
Total Uranium (U)	mg/L	0.0305	0.0297	0.0230	0.0000020	9697222
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9697222
Total Zinc (Zn)	mg/L	0.125	0.0642	0.0287	0.00010	9697222
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9697222
Total Calcium (Ca)	mg/L	113	119	118	0.050	9695048
Total Magnesium (Mg)	mg/L	17.3	18.5	18.4	0.050	9695048
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XA9498	XA9499	XA9500		
Sampling Date		2019/12/02 10:55	2019/12/02 10:35	2019/12/02 10:15		
COC Number		08475604	08475604	08475604		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Potassium (K)	mg/L	4.28	4.28	4.34	0.050	9695048
Total Sodium (Na)	mg/L	26.8	28.5	28.9	0.050	9695048
Total Sulphur (S)	mg/L	83.7	88.5	90.0	3.0	9695048
RDL = Reportable Detection Limit						



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.7°C
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Sample XA9485, Elements by ICPMS Low Level (dissolved): Test repeated.

Sample XA9486, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.



BV Labs Job #: B9A3685
Report Date: 2019/12/06

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9695593	Dissolved Aluminum (Al)	2019/12/03	99	80 - 120	100	80 - 120	<0.00050	mg/L	2.7	20
9695593	Dissolved Antimony (Sb)	2019/12/03	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.42	20
9695593	Dissolved Arsenic (As)	2019/12/03	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.35	20
9695593	Dissolved Barium (Ba)	2019/12/03	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.66	20
9695593	Dissolved Beryllium (Be)	2019/12/03	95	80 - 120	96	80 - 120	<0.000010	mg/L	NC	20
9695593	Dissolved Bismuth (Bi)	2019/12/03	97	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9695593	Dissolved Boron (B)	2019/12/03	94	80 - 120	93	80 - 120	<0.010	mg/L	0.89	20
9695593	Dissolved Cadmium (Cd)	2019/12/03	100	80 - 120	100	80 - 120	<0.0000050	mg/L	0.67	20
9695593	Dissolved Chromium (Cr)	2019/12/03	100	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9695593	Dissolved Cobalt (Co)	2019/12/03	97	80 - 120	101	80 - 120	<0.0000050	mg/L	4.4	20
9695593	Dissolved Copper (Cu)	2019/12/03	95	80 - 120	102	80 - 120	<0.000050	mg/L	1.4	20
9695593	Dissolved Iron (Fe)	2019/12/03	102	80 - 120	104	80 - 120	<0.0010	mg/L	1.7	20
9695593	Dissolved Lead (Pb)	2019/12/03	102	80 - 120	102	80 - 120	<0.0000050	mg/L	1.1	20
9695593	Dissolved Lithium (Li)	2019/12/03	96	80 - 120	95	80 - 120	<0.00050	mg/L	0.59	20
9695593	Dissolved Manganese (Mn)	2019/12/03	NC	80 - 120	102	80 - 120	<0.000050	mg/L	0.16	20
9695593	Dissolved Molybdenum (Mo)	2019/12/03	107	80 - 120	98	80 - 120	<0.000050	mg/L	2.2	20
9695593	Dissolved Nickel (Ni)	2019/12/03	95	80 - 120	102	80 - 120	<0.000020	mg/L	0.49	20
9695593	Dissolved Selenium (Se)	2019/12/03	102	80 - 120	96	80 - 120	<0.000040	mg/L	1.8	20
9695593	Dissolved Silicon (Si)	2019/12/03	99	80 - 120	99	80 - 120	<0.050	mg/L	0.0049	20
9695593	Dissolved Silver (Ag)	2019/12/03	98	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9695593	Dissolved Strontium (Sr)	2019/12/03	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.36	20
9695593	Dissolved Thallium (Tl)	2019/12/03	103	80 - 120	102	80 - 120	<0.0000020	mg/L	1.7	20
9695593	Dissolved Tin (Sn)	2019/12/03	103	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9695593	Dissolved Titanium (Ti)	2019/12/03	103	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9695593	Dissolved Uranium (U)	2019/12/03	104	80 - 120	104	80 - 120	<0.0000020	mg/L	0.99	20
9695593	Dissolved Vanadium (V)	2019/12/03	102	80 - 120	101	80 - 120	<0.00020	mg/L	2.9	20
9695593	Dissolved Zinc (Zn)	2019/12/03	NC	80 - 120	108	80 - 120	<0.00010	mg/L	0.040	20
9695593	Dissolved Zirconium (Zr)	2019/12/03	105	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9695733	Alkalinity (PP as CaCO3)	2019/12/03					<0.50	mg/L	NC	20
9695733	Alkalinity (Total as CaCO3)	2019/12/03	NC	80 - 120	98	80 - 120	<0.50	mg/L	2.9	20
9695733	Bicarbonate (HCO3)	2019/12/03					<0.50	mg/L	2.9	20
9695733	Carbonate (CO3)	2019/12/03					<0.50	mg/L	NC	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9695733	Hydroxide (OH)	2019/12/03					<0.50	mg/L	NC	20
9695734	Alkalinity (PP as CaCO3)	2019/12/04					<0.50	mg/L	NC	20
9695734	Alkalinity (Total as CaCO3)	2019/12/04	NC	80 - 120	96	80 - 120	<0.50	mg/L	1.8	20
9695734	Bicarbonate (HCO3)	2019/12/04					<0.50	mg/L	1.8	20
9695734	Carbonate (CO3)	2019/12/04					<0.50	mg/L	NC	20
9695734	Hydroxide (OH)	2019/12/04					<0.50	mg/L	NC	20
9695779	Nitrate plus Nitrite (N)	2019/12/03			109	80 - 120	<0.0020	mg/L		
9695780	Nitrite (N)	2019/12/03			103	80 - 120	<0.0020	mg/L		
9695783	Nitrate plus Nitrite (N)	2019/12/03	NC	80 - 120	109	80 - 120	<0.0020	mg/L	0.35	25
9695784	Nitrite (N)	2019/12/03	101	80 - 120	103	80 - 120	<0.0020	mg/L	3.0	25
9696571	Total Ammonia (N)	2019/12/04	NC	80 - 120	99	80 - 120	<0.0050	mg/L	0.68	20
9696901	Dissolved Chloride (Cl)	2019/12/03	NC	80 - 120	99	80 - 120	<0.50	mg/L	2.4	20
9696901	Dissolved Sulphate (SO4)	2019/12/03	NC	80 - 120	100	80 - 120	<0.50	mg/L	3.7	20
9696903	Dissolved Chloride (Cl)	2019/12/03			98	80 - 120	<0.50	mg/L		
9696903	Dissolved Sulphate (SO4)	2019/12/03			106	80 - 120	0.78, RDL=0.50	mg/L		
9697222	Total Aluminum (Al)	2019/12/05	101	80 - 120	104	80 - 120	<0.00050	mg/L	0.97	20
9697222	Total Antimony (Sb)	2019/12/05	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.21	20
9697222	Total Arsenic (As)	2019/12/05	102	80 - 120	102	80 - 120	<0.000020	mg/L	0.28	20
9697222	Total Barium (Ba)	2019/12/05	NC	80 - 120	100	80 - 120	<0.000020	mg/L	1.1	20
9697222	Total Beryllium (Be)	2019/12/05	96	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
9697222	Total Bismuth (Bi)	2019/12/05	96	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9697222	Total Boron (B)	2019/12/05	93	80 - 120	96	80 - 120	<0.010	mg/L	1.7	20
9697222	Total Cadmium (Cd)	2019/12/05	98	80 - 120	104	80 - 120	<0.0000050	mg/L	9.4	20
9697222	Total Chromium (Cr)	2019/12/05	102	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9697222	Total Cobalt (Co)	2019/12/05	95	80 - 120	99	80 - 120	<0.0000050	mg/L	4.1	20
9697222	Total Copper (Cu)	2019/12/05	94	80 - 120	103	80 - 120	<0.000050	mg/L	1.4	20
9697222	Total Iron (Fe)	2019/12/05	103	80 - 120	103	80 - 120	<0.0010	mg/L	6.7	20
9697222	Total Lead (Pb)	2019/12/05	103	80 - 120	100	80 - 120	<0.0000050	mg/L	6.6	20
9697222	Total Lithium (Li)	2019/12/05	97	80 - 120	102	80 - 120	<0.00050	mg/L	0.62	20
9697222	Total Manganese (Mn)	2019/12/05	100	80 - 120	101	80 - 120	<0.000050	mg/L	0.65	20
9697222	Total Molybdenum (Mo)	2019/12/05	109	80 - 120	101	80 - 120	<0.000050	mg/L	1.6	20
9697222	Total Nickel (Ni)	2019/12/05	96	80 - 120	103	80 - 120	<0.000020	mg/L	0.35	20



BV Labs Job #: B9A3685
Report Date: 2019/12/06

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9697222	Total Selenium (Se)	2019/12/05	100	80 - 120	103	80 - 120	<0.000040	mg/L	4.5	20
9697222	Total Silicon (Si)	2019/12/05	105	80 - 120	104	80 - 120	<0.050	mg/L	0.57	20
9697222	Total Silver (Ag)	2019/12/05	99	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9697222	Total Strontium (Sr)	2019/12/05	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.33	20
9697222	Total Thallium (Tl)	2019/12/05	101	80 - 120	99	80 - 120	<0.0000020	mg/L	NC	20
9697222	Total Tin (Sn)	2019/12/05	99	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9697222	Total Titanium (Ti)	2019/12/05	104	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9697222	Total Uranium (U)	2019/12/05	106	80 - 120	101	80 - 120	<0.0000020	mg/L	2.2	20
9697222	Total Vanadium (V)	2019/12/05	104	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9697222	Total Zinc (Zn)	2019/12/05	91	80 - 120	110	80 - 120	<0.00010	mg/L	0.40	20
9697222	Total Zirconium (Zr)	2019/12/05	108	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9697798	Dissolved Thallium (Tl)	2019/12/05	104	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9697894	Total Ammonia (N)	2019/12/05	100	80 - 120	94	80 - 120	<0.0050	mg/L	8.9	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

BV Labs Job #: B9A3685
Report Date: 2019/12/06

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5, Toll Free (800) 665-8566

COC #:

08475604

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses)	
Contact Name:		Contact Name:	Mary Mloska, Renate Vanderhorst	P.O. #/ ATEP:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:	530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)	
Phone:		Phone:	(867) 668 6463	Site Location:	Kudz Ze Kayah	Same Day ☐ 2 Days ☐	
Email:		Email:	mmlotka@alexcoenv.com	Site #:		1 Day ☐ 3 Days ☐	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil	☐ BC CSR Water	☐ Return Cooler	USE SCENARIO # 12485			LABORATORY USE ONLY	
☐ CCME (Specify)	☐ Other (Specify)	☐ Ship Sample Bottles (Please Specify)					
☐ Drinking Water	☐ BC Water Quality						
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM				HOLD - DO NOT ANALYZE			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	ANIONS (SO4, NO2, NO3, Cl)
1	6A	02-Dec-19	10:55	Water	X	X	X
2	6B	02-Dec-19	10:35	Water	X	X	X
3	6C	02-Dec-19	10:15	Water	X	X	X
4							
5							
6							
7							
8							
9							
10							
REINQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	
						Date: (YYYY/MM/DD) Time: (HH:MM)	
						08:24	



B9A3685_COC



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08475780, 08475784

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/12/11
 Report #: R2822469
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A4734

Received: 2019/12/05, 10:00

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	13	N/A	2019/12/06	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC	10	N/A	2019/12/06	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC	3	N/A	2019/12/09	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (2)	13	N/A	2019/12/09	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	13	N/A	2019/12/09	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	7	N/A	2019/12/09	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	6	N/A	2019/12/11	BBY WI-00033	Auto Calc
Ion Balance	7	N/A	2019/12/09	BBY WI-00033	Auto Calc
Ion Balance	6	N/A	2019/12/11	BBY WI-00033	Auto Calc
Sum of cations, anions	13	N/A	2019/12/09	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	13	N/A	2019/12/09	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	13	N/A	2019/12/06	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	13	N/A	2019/12/09	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	13	N/A	2019/12/06	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved) (1)	11	N/A	2019/12/08	AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N Low Level (Preserved) (1)	2	N/A	2019/12/09	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level)	13	N/A	2019/12/06	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level)	13	N/A	2019/12/06	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc	13	N/A	2019/12/06	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals	13	N/A	2019/12/05	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08475780, 08475784

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/12/11
Report #: R2822469
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A4734

Received: 2019/12/05, 10:00

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Calgary Environmental

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		XB4491		XB4492		XB4493		XB4494		
Sampling Date		2019/12/04 10:00		2019/12/04 09:40		2019/12/04 09:20		2019/12/04 09:00		
COC Number		08475780		08475780		08475780		08475780		
	UNITS	INFL-	RDL	1A	RDL	1B	QC Batch	1C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.0	N/A	7.6	N/A	7.1	9698468	7.0	N/A	9698468
Cation Sum	meq/L	8.2	N/A	8.0	N/A	8.1	9698468	8.2	N/A	9698468
Filter and HNO ₃ Preservation	N/A	FIELD		FIELD		FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.2	0.010	1.1	0.010	1.1	9698465	1.2	0.010	9698465
Ion Balance (% Difference)	%	7.2	N/A	2.7	N/A	6.3	9698466	8.3	N/A	9698466
Nitrate (N)	mg/L	0.319	0.0020	0.524	0.0020	0.657	9698471	0.758	0.0020	9698471

Misc. Inorganics

Alkalinity (Total as CaCO ₃)	mg/L	76.3	0.50	74.8	0.50	76.0	9699356	76.7	0.50	9699356
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	9699356	<0.50	0.50	9699356
Bicarbonate (HCO ₃)	mg/L	93.1	0.50	91.3	0.50	92.7	9699356	93.6	0.50	9699356
Carbonate (CO ₃)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	9699356	<0.50	0.50	9699356
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	0.50	<0.50	9699356	<0.50	0.50	9699356

Anions

Dissolved Chloride (Cl)	mg/L	61	0.50	64	0.50	62	9700216	63	0.50	9700216
Dissolved Sulphate (SO ₄)	mg/L	180	0.50	210 (1)	5.0	180	9700216	170	0.50	9700216

Nutrients

Total Ammonia (N)	mg/L	0.73 (1)	0.010	0.46	0.0050	0.30	9699663	0.10	0.0050	9701667
Nitrate plus Nitrite (N)	mg/L	0.334	0.0020	0.602	0.0020	0.709	9700062	0.786	0.0020	9700062
Nitrite (N)	mg/L	0.0146	0.0020	0.0785	0.0020	0.0513	9700066	0.0278	0.0020	9700066

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XB4495		XB4496		XB4497			XB4498		
Sampling Date		2019/12/04 09:45		2019/12/04 09:25		2019/12/04 09:05			2019/12/04 09:50		
COC Number		08475780		08475780		08475780			08475780		
	UNITS	3A	RDL	3B	QC Batch	3C	RDL	QC Batch	4A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	9.4	N/A	7.6	9698468	7.4	N/A	9698468	8.0	N/A	9698468
Cation Sum	meq/L	8.2	N/A	8.3	9698468	8.1	N/A	9698468	8.4	N/A	9698468
Filter and HNO3 Preservation	N/A	FIELD		FIELD	ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.88	0.010	1.1	9698465	1.1	0.010	9698465	1.0	0.010	9698465
Ion Balance (% Difference)	%	6.6	N/A	4.2	9698466	4.4	N/A	9698466	0.98	N/A	9698466
Nitrate (N)	mg/L	0.368	0.0020	0.428	9698471	0.385	0.0020	9698471	0.305	0.0020	9698471

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	75.3	0.50	78.5	9699356	79.1	0.50	9699356	76.4	0.50	9699356
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	9699356	<0.50	0.50	9699356	<0.50	0.50	9699356
Bicarbonate (HCO3)	mg/L	91.9	0.50	95.8	9699356	96.4	0.50	9699356	93.1	0.50	9699356
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	9699356	<0.50	0.50	9699356	<0.50	0.50	9699356
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	9699356	<0.50	0.50	9699356	<0.50	0.50	9699356

Anions

Dissolved Chloride (Cl)	mg/L	66	0.50	65	9700216	62	0.50	9700216	62	0.50	9700216
Dissolved Sulphate (SO4)	mg/L	290 (1)	5.0	200	9700216	190	0.50	9700216	220 (1)	5.0	9700216

Nutrients

Total Ammonia (N)	mg/L	0.42	0.0050	0.13	9699663	0.067	0.0050	9701667	0.33	0.0050	9699663
Nitrate plus Nitrite (N)	mg/L	0.469	0.0020	0.469	9700062	0.416	0.0020	9700062	0.347	0.0020	9700062
Nitrite (N)	mg/L	0.101	0.0020	0.0402	9700066	0.0303	0.0020	9700066	0.0421	0.0020	9700066

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		XB4499		XB4500	XB4501		XB4502		XB4503		
Sampling Date		2019/12/04 09:30		2019/12/04 09:10	2019/12/04 09:55		2019/12/04 09:35		2019/12/04 09:15		
COC Number		08475780		08475780	08475784		08475784		08475784		
	UNITS	4B	RDL	4C	6A	RDL	6B	RDL	6C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	9.2	N/A	7.4	7.5	N/A	8.0	N/A	7.6	N/A	9698468
Cation Sum	meq/L	8.4	N/A	8.6	8.3	N/A	8.3	N/A	8.6	N/A	9698468
Filter and HNO3 Preservation	N/A	FIELD		FIELD	FIELD		FIELD		FIELD		ONSITE
Ion Balance	N/A	0.91	0.010	1.1	1.1	0.010	1.0	0.010	1.1	0.010	9698465
Ion Balance (% Difference)	%	4.7	N/A	6.3	4.9	N/A	1.0	N/A	4.8	N/A	9698466
Nitrate (N)	mg/L	0.0451	0.0020	<0.0020	0.291	0.0020	0.0520	0.0020	<0.0020	0.0020	9698471

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	78.9	0.50	82.5	76.9	0.50	79.7	0.50	82.7	0.50	9699356
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9699356
Bicarbonate (HCO3)	mg/L	96.2	0.50	101	93.8	0.50	97.2	0.50	101	0.50	9699356
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9699356
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	9699356

Anions

Dissolved Chloride (Cl)	mg/L	66	0.50	66	68	0.50	64	0.50	62	0.50	9700216
Dissolved Sulphate (SO4)	mg/L	280 (1)	5.0	190	200	0.50	220 (1)	5.0	200	0.50	9700216

Nutrients

Total Ammonia (N)	mg/L	0.012	0.0050	0.0082	0.45	0.0050	0.015	0.0050	0.0061	0.0050	9699663
Nitrate plus Nitrite (N)	mg/L	0.0497	0.0020	<0.0020	0.327	0.0020	0.0520	0.0020	<0.0020	0.0020	9700062
Nitrite (N)	mg/L	0.0046	0.0020	<0.0020	0.0354	0.0020	<0.0020	0.0020	<0.0020	0.0020	9700066

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
VERITAS

BV Labs Job #: B9A4734
Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB4491	XB4492	XB4493	XB4494	XB4495		
Sampling Date		2019/12/04 10:00	2019/12/04 09:40	2019/12/04 09:20	2019/12/04 09:00	2019/12/04 09:45		
COC Number		08475780	08475780	08475780	08475780	08475780		
	UNITS	INFL-	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	346	339	342	349	350	0.50	9698217
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00920	0.00634	0.00288	0.00103	0.00567	0.00050	9699297
Dissolved Antimony (Sb)	mg/L	0.0197	0.0195	0.0197	0.0203	0.0204	0.000020	9699297
Dissolved Arsenic (As)	mg/L	0.0603	0.0588	0.0588	0.0575	0.0609	0.000020	9699297
Dissolved Barium (Ba)	mg/L	0.0560	0.0551	0.0551	0.0574	0.0557	0.000020	9699297
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9699297
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9699297
Dissolved Boron (B)	mg/L	0.033	0.032	0.032	0.035	0.026	0.010	9699297
Dissolved Cadmium (Cd)	mg/L	0.00210	0.00174	0.00146	0.000974	0.00175	0.0000050	9699297
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9699297
Dissolved Cobalt (Co)	mg/L	0.00268	0.00116	0.000326	0.0000569	0.000420	0.0000050	9699297
Dissolved Copper (Cu)	mg/L	0.0153	0.0105	0.00662	0.00343	0.00938	0.000050	9699297
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	0.0010	9699297
Dissolved Lead (Pb)	mg/L	0.00971	0.00457	0.00127	0.000193	0.00172	0.0000050	9699297
Dissolved Lithium (Li)	mg/L	0.0107	0.0104	0.0106	0.0110	0.0108	0.00050	9699297
Dissolved Manganese (Mn)	mg/L	0.0478	0.0219	0.00655	0.00124	0.00915	0.000050	9699297
Dissolved Molybdenum (Mo)	mg/L	0.00158	0.00150	0.00152	0.00151	0.00162	0.000050	9699297
Dissolved Nickel (Ni)	mg/L	0.00846	0.00835	0.00798	0.00772	0.00820	0.000020	9699297
Dissolved Selenium (Se)	mg/L	0.00727	0.00713	0.00706	0.00741	0.00726	0.000040	9699297
Dissolved Silicon (Si)	mg/L	0.434	0.381	0.366	0.350	0.398	0.050	9699297
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9699297
Dissolved Strontium (Sr)	mg/L	0.595	0.579	0.593	0.608	0.599	0.000050	9699297
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9699297
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9699297
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9699297
Dissolved Uranium (U)	mg/L	0.0289	0.0287	0.0273	0.0244	0.0305	0.0000020	9699297
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9699297
Dissolved Zinc (Zn)	mg/L	0.172	0.171	0.174	0.173	0.160	0.00010	9699297
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9699297
Dissolved Calcium (Ca)	mg/L	111	109	110	112	113	0.050	9698508
Dissolved Magnesium (Mg)	mg/L	16.6	16.3	16.6	17.1	16.5	0.050	9698508

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B9A4734
Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB4491	XB4492	XB4493	XB4494	XB4495		
Sampling Date		2019/12/04 10:00	2019/12/04 09:40	2019/12/04 09:20	2019/12/04 09:00	2019/12/04 09:45		
COC Number		08475780	08475780	08475780	08475780	08475780		
	UNITS	INFL-	1A	1B	1C	3A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.77	3.61	3.78	3.89	3.87	0.050	9698508
Dissolved Sodium (Na)	mg/L	25.5	24.9	25.4	26.1	25.6	0.050	9698508
Dissolved Sulphur (S)	mg/L	81.9	80.6	83.4	85.1	82.7	3.0	9698508
RDL = Reportable Detection Limit								

BUREAU
VERITAS

BV Labs Job #: B9A4734

Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB4496	XB4497		XB4498	XB4499		
Sampling Date		2019/12/04 09:25	2019/12/04 09:05		2019/12/04 09:50	2019/12/04 09:30		
COC Number		08475780	08475780		08475780	08475780		
	UNITS	3B	3C	QC Batch	4A	4B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	353	344	9698217	357	356	0.50	9698217
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00162	0.00085	9699297	0.00514	0.00132	0.00050	9699352
Dissolved Antimony (Sb)	mg/L	0.0210	0.0204	9699297	0.0213	0.0208	0.000020	9699352
Dissolved Arsenic (As)	mg/L	0.0588	0.0561	9699297	0.0576	0.0471	0.000020	9699352
Dissolved Barium (Ba)	mg/L	0.0571	0.0560	9699297	0.0599	0.0599	0.000020	9699352
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	9699297	<0.000010	<0.000010	0.000010	9699352
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	9699297	<0.0000050	<0.0000050	0.0000050	9699352
Dissolved Boron (B)	mg/L	0.033	0.031	9699297	0.024	0.023	0.010	9699352
Dissolved Cadmium (Cd)	mg/L	0.00141	0.000960	9699297	0.00132	0.000509	0.0000050	9699352
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	9699297	<0.00010	<0.00010	0.00010	9699352
Dissolved Cobalt (Co)	mg/L	0.000101	0.0000510	9699297	0.000548	0.0000687	0.0000050	9699352
Dissolved Copper (Cu)	mg/L	0.00562	0.00302	9699297	0.00663	0.00282	0.000050	9699352
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	9699297	0.0011	0.0013	0.0010	9699352
Dissolved Lead (Pb)	mg/L	0.000470	0.000148	9699297	0.00227	0.000321	0.0000050	9699352
Dissolved Lithium (Li)	mg/L	0.0112	0.0107	9699297	0.0106	0.0106	0.00050	9699352
Dissolved Manganese (Mn)	mg/L	0.00236	0.000607	9699297	0.0104	0.00165	0.000050	9699352
Dissolved Molybdenum (Mo)	mg/L	0.00152	0.00150	9699297	0.00162	0.00146	0.000050	9699352
Dissolved Nickel (Ni)	mg/L	0.00871	0.00834	9699297	0.00763	0.00730	0.000020	9699352
Dissolved Selenium (Se)	mg/L	0.00741	0.00719	9699297	0.00770	0.00672	0.000040	9699352
Dissolved Silicon (Si)	mg/L	0.373	0.358	9699297	0.497	0.515	0.050	9699352
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	9699297	<0.0000050	<0.0000050	0.0000050	9699352
Dissolved Strontium (Sr)	mg/L	0.604	0.594	9699297	0.627	0.647	0.000050	9699352
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	9699297	<0.0000020	<0.0000020	0.0000020	9699352
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	9699297	<0.00020	<0.00020	0.00020	9699352
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	9699297	<0.00050	<0.00050	0.00050	9699352
Dissolved Uranium (U)	mg/L	0.0272	0.0256	9699297	0.0330	0.0287	0.0000020	9699352
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	9699297	<0.00020	<0.00020	0.00020	9699352
Dissolved Zinc (Zn)	mg/L	0.183	0.166	9699297	0.138	0.114	0.00010	9699352
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	9699297	<0.00010	<0.00010	0.00010	9699352
Dissolved Calcium (Ca)	mg/L	114	111	9698508	114	113	0.050	9698508
Dissolved Magnesium (Mg)	mg/L	16.7	16.4	9698508	17.4	17.7	0.050	9698508

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB4496	XB4497		XB4498	XB4499		
Sampling Date		2019/12/04 09:25	2019/12/04 09:05		2019/12/04 09:50	2019/12/04 09:30		
COC Number		08475780	08475780		08475780	08475780		
	UNITS	3B	3C	QC Batch	4A	4B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.82	3.92	9698508	3.97	3.96	0.050	9698508
Dissolved Sodium (Na)	mg/L	25.5	25.2	9698508	26.6	26.7	0.050	9698508
Dissolved Sulphur (S)	mg/L	83.7	81.5	9698508	86.5	86.5	3.0	9698508
RDL = Reportable Detection Limit								

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BV Labs Job #: B9A4734

Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB4500	XB4501	XB4502	XB4503		
Sampling Date		2019/12/04 09:10	2019/12/04 09:55	2019/12/04 09:35	2019/12/04 09:15		
COC Number		08475780	08475784	08475784	08475784		
	UNITS	4C	6A	6B	6C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	365	352	354	365	0.50	9698217
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00142	0.00578	0.00141	0.00104	0.00050	9699352
Dissolved Antimony (Sb)	mg/L	0.0199	0.0211	0.0215	0.0205	0.000020	9699352
Dissolved Arsenic (As)	mg/L	0.0375	0.0604	0.0472	0.0442	0.000020	9699352
Dissolved Barium (Ba)	mg/L	0.0600	0.0592	0.0597	0.0610	0.000020	9699352
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9699352
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9699352
Dissolved Boron (B)	mg/L	0.013	0.026	0.026	0.019	0.010	9699352
Dissolved Cadmium (Cd)	mg/L	0.000153	0.00125	0.000340	0.000142	0.0000050	9699352
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9699352
Dissolved Cobalt (Co)	mg/L	0.0000432	0.00113	0.000105	0.0000456	0.0000050	9699352
Dissolved Copper (Cu)	mg/L	0.00141	0.00719	0.00313	0.00254	0.000050	9699352
Dissolved Iron (Fe)	mg/L	0.0028	0.0027	0.0029	0.0031	0.0010	9699352
Dissolved Lead (Pb)	mg/L	0.000150	0.00246	0.000346	0.000162	0.0000050	9699352
Dissolved Lithium (Li)	mg/L	0.0108	0.0105	0.0106	0.0110	0.00050	9699352
Dissolved Manganese (Mn)	mg/L	0.00238	0.0217	0.00429	0.00250	0.000050	9699352
Dissolved Molybdenum (Mo)	mg/L	0.00133	0.00164	0.00146	0.00145	0.000050	9699352
Dissolved Nickel (Ni)	mg/L	0.00600	0.00741	0.00672	0.00534	0.000020	9699352
Dissolved Selenium (Se)	mg/L	0.00618	0.00794	0.00678	0.00664	0.000040	9699352
Dissolved Silicon (Si)	mg/L	0.538	0.527	0.552	0.576	0.050	9699352
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9699352
Dissolved Strontium (Sr)	mg/L	0.640	0.644	0.637	0.660	0.000050	9699352
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9699352
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9699352
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9699352
Dissolved Uranium (U)	mg/L	0.0235	0.0324	0.0274	0.0244	0.0000020	9699352
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9699352
Dissolved Zinc (Zn)	mg/L	0.0727	0.135	0.0925	0.0586	0.00010	9699352
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9699352
Dissolved Calcium (Ca)	mg/L	116	112	112	117	0.050	9698508
Dissolved Magnesium (Mg)	mg/L	18.1	17.2	17.9	18.0	0.050	9698508

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB4500	XB4501	XB4502	XB4503		
Sampling Date		2019/12/04 09:10	2019/12/04 09:55	2019/12/04 09:35	2019/12/04 09:15		
COC Number		08475780	08475784	08475784	08475784		
	UNITS	4C	6A	6B	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.07	3.98	4.13	4.30	0.050	9698508
Dissolved Sodium (Na)	mg/L	28.0	26.3	26.7	27.1	0.050	9698508
Dissolved Sulphur (S)	mg/L	89.1	86.3	85.9	88.3	3.0	9698508
RDL = Reportable Detection Limit							



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BV Labs Job #: B9A4734
Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB4491	XB4492	XB4493	XB4494	XB4495		
Sampling Date		2019/12/04 10:00	2019/12/04 09:40	2019/12/04 09:20	2019/12/04 09:00	2019/12/04 09:45		
COC Number		08475780	08475780	08475780	08475780	08475780		
	UNITS	INFL-	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	341	341	343	347	352	0.50	9698045
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0156	0.00956	0.00573	0.00252	0.00979	0.00050	9698857
Total Antimony (Sb)	mg/L	0.0199	0.0197	0.0200	0.0201	0.0204	0.000020	9698857
Total Arsenic (As)	mg/L	0.0606	0.0594	0.0590	0.0568	0.0609	0.000020	9698857
Total Barium (Ba)	mg/L	0.0583	0.0580	0.0584	0.0587	0.0576	0.000020	9698857
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9698857
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9698857
Total Boron (B)	mg/L	0.031	0.031	0.031	0.033	0.026	0.010	9698857
Total Cadmium (Cd)	mg/L	0.00207	0.00174	0.00142	0.000945	0.00175	0.0000050	9698857
Total Chromium (Cr)	mg/L	0.00010	0.00037	<0.00010	<0.00010	0.00019	0.00010	9698857
Total Cobalt (Co)	mg/L	0.00266	0.00117	0.000338	0.0000586	0.000430	0.0000050	9698857
Total Copper (Cu)	mg/L	0.0161	0.0112	0.00708	0.00354	0.00991	0.000050	9698857
Total Iron (Fe)	mg/L	0.0063	0.0048	0.0031	0.0030	0.0039	0.0010	9698857
Total Lead (Pb)	mg/L	0.0196	0.00860	0.00299	0.000306	0.00478	0.0000050	9698857
Total Lithium (Li)	mg/L	0.00960	0.00968	0.00973	0.0102	0.0101	0.00050	9698857
Total Manganese (Mn)	mg/L	0.0515	0.0239	0.00757	0.00138	0.0111	0.000050	9698857
Total Molybdenum (Mo)	mg/L	0.00155	0.00151	0.00150	0.00149	0.00165	0.000050	9698857
Total Nickel (Ni)	mg/L	0.00810	0.00785	0.00767	0.00724	0.00794	0.000020	9698857
Total Selenium (Se)	mg/L	0.00755	0.00757	0.00756	0.00751	0.00763	0.000040	9698857
Total Silicon (Si)	mg/L	0.497	0.434	0.422	0.420	0.455	0.050	9698857
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9698857
Total Strontium (Sr)	mg/L	0.613	0.609	0.602	0.608	0.612	0.000050	9698857
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9698857
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9698857
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9698857
Total Uranium (U)	mg/L	0.0298	0.0295	0.0288	0.0248	0.0314	0.0000020	9698857
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9698857
Total Zinc (Zn)	mg/L	0.164	0.163	0.165	0.161	0.152	0.00010	9698857
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9698857
Total Calcium (Ca)	mg/L	109	109	110	111	113	0.050	9698110
Total Magnesium (Mg)	mg/L	16.9	16.8	16.8	17.0	17.0	0.050	9698110

RDL = Reportable Detection Limit



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BV Labs Job #: B9A4734
Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB4491	XB4492	XB4493	XB4494	XB4495		
Sampling Date		2019/12/04 10:00	2019/12/04 09:40	2019/12/04 09:20	2019/12/04 09:00	2019/12/04 09:45		
COC Number		08475780	08475780	08475780	08475780	08475780		
	UNITS	INFL-	1A	1B	1C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.83	3.76	3.86	4.00	3.94	0.050	9698110
Total Sodium (Na)	mg/L	26.0	25.7	26.1	26.6	26.2	0.050	9698110
Total Sulphur (S)	mg/L	82.9	82.6	83.2	84.4	84.1	3.0	9698110
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B9A4734
Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB4496	XB4497	XB4498	XB4499	XB4500		
Sampling Date		2019/12/04 09:25	2019/12/04 09:05	2019/12/04 09:50	2019/12/04 09:30	2019/12/04 09:10		
COC Number		08475780	08475780	08475780	08475780	08475780		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	345	347	345	357	355	0.50	9698045
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.00380	0.00219	0.00768	0.00296	0.00178	0.00050	9698857
Total Antimony (Sb)	mg/L	0.0208	0.0203	0.0207	0.0209	0.0193	0.000020	9698857
Total Arsenic (As)	mg/L	0.0582	0.0564	0.0558	0.0471	0.0371	0.000020	9698857
Total Barium (Ba)	mg/L	0.0612	0.0589	0.0573	0.0589	0.0584	0.000020	9698857
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9698857
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9698857
Total Boron (B)	mg/L	0.031	0.031	0.024	0.022	0.013	0.010	9698857
Total Cadmium (Cd)	mg/L	0.00138	0.000954	0.00127	0.000503	0.000146	0.0000050	9698857
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	0.00010	9698857
Total Cobalt (Co)	mg/L	0.000110	0.0000507	0.000565	0.0000769	0.0000439	0.0000050	9698857
Total Copper (Cu)	mg/L	0.00569	0.00313	0.00686	0.00302	0.00156	0.000050	9698857
Total Iron (Fe)	mg/L	0.0026	0.0020	0.0048	0.0030	0.0043	0.0010	9698857
Total Lead (Pb)	mg/L	0.000889	0.000232	0.00535	0.000761	0.000214	0.0000050	9698857
Total Lithium (Li)	mg/L	0.0100	0.0101	0.0101	0.0102	0.0103	0.00050	9698857
Total Manganese (Mn)	mg/L	0.00278	0.000788	0.0121	0.00241	0.00247	0.000050	9698857
Total Molybdenum (Mo)	mg/L	0.00154	0.00152	0.00157	0.00146	0.00132	0.000050	9698857
Total Nickel (Ni)	mg/L	0.00826	0.00766	0.00732	0.00704	0.00590	0.000020	9698857
Total Selenium (Se)	mg/L	0.00764	0.00761	0.00722	0.00678	0.00580	0.000040	9698857
Total Silicon (Si)	mg/L	0.484	0.417	0.481	0.503	0.520	0.050	9698857
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9698857
Total Strontium (Sr)	mg/L	0.608	0.613	0.611	0.635	0.642	0.000050	9698857
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9698857
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9698857
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9698857
Total Uranium (U)	mg/L	0.0275	0.0259	0.0320	0.0279	0.0228	0.0000020	9698857
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9698857
Total Zinc (Zn)	mg/L	0.171	0.156	0.131	0.113	0.0700	0.00010	9698857
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9698857
Total Calcium (Ca)	mg/L	110	111	110	114	113	0.050	9698110
Total Magnesium (Mg)	mg/L	16.9	17.1	16.7	17.4	17.6	0.050	9698110

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB4496	XB4497	XB4498	XB4499	XB4500		
Sampling Date		2019/12/04 09:25	2019/12/04 09:05	2019/12/04 09:50	2019/12/04 09:30	2019/12/04 09:10		
COC Number		08475780	08475780	08475780	08475780	08475780		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	4.02	4.00	3.85	3.93	3.99	0.050	9698110
Total Sodium (Na)	mg/L	26.4	25.9	25.5	26.1	26.6	0.050	9698110
Total Sulphur (S)	mg/L	83.3	83.1	83.0	86.2	86.6	3.0	9698110

RDL = Reportable Detection Limit



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BV Labs Job #: B9A4734
Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB4501	XB4502	XB4503		
Sampling Date		2019/12/04 09:55	2019/12/04 09:35	2019/12/04 09:15		
COC Number		08475784	08475784	08475784		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	344	349	354	0.50	9698045
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.00947	0.00385	0.00197	0.00050	9698857
Total Antimony (Sb)	mg/L	0.0207	0.0205	0.0199	0.000020	9698857
Total Arsenic (As)	mg/L	0.0606	0.0461	0.0432	0.000020	9698857
Total Barium (Ba)	mg/L	0.0586	0.0584	0.0604	0.000020	9698857
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9698857
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9698857
Total Boron (B)	mg/L	0.026	0.026	0.019	0.010	9698857
Total Cadmium (Cd)	mg/L	0.00125	0.000349	0.000148	0.0000050	9698857
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9698857
Total Cobalt (Co)	mg/L	0.00114	0.000110	0.0000474	0.0000050	9698857
Total Copper (Cu)	mg/L	0.00792	0.00418	0.00292	0.000050	9698857
Total Iron (Fe)	mg/L	0.0075	0.0074	0.0060	0.0010	9698857
Total Lead (Pb)	mg/L	0.00614	0.000699	0.000225	0.0000050	9698857
Total Lithium (Li)	mg/L	0.0102	0.0103	0.0108	0.00050	9698857
Total Manganese (Mn)	mg/L	0.0231	0.00469	0.00253	0.000050	9698857
Total Molybdenum (Mo)	mg/L	0.00163	0.00142	0.00144	0.000050	9698857
Total Nickel (Ni)	mg/L	0.00741	0.00640	0.00533	0.000020	9698857
Total Selenium (Se)	mg/L	0.00759	0.00654	0.00641	0.000040	9698857
Total Silicon (Si)	mg/L	0.539	0.536	0.606	0.050	9698857
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9698857
Total Strontium (Sr)	mg/L	0.640	0.623	0.640	0.000050	9698857
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9698857
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9698857
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9698857
Total Uranium (U)	mg/L	0.0313	0.0263	0.0241	0.0000020	9698857
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9698857
Total Zinc (Zn)	mg/L	0.132	0.0891	0.0551	0.00010	9698857
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9698857
Total Calcium (Ca)	mg/L	110	112	113	0.050	9698110
Total Magnesium (Mg)	mg/L	17.0	17.0	17.4	0.050	9698110
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB4501	XB4502	XB4503		
Sampling Date		2019/12/04 09:55	2019/12/04 09:35	2019/12/04 09:15		
COC Number		08475784	08475784	08475784		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Potassium (K)	mg/L	3.96	3.94	4.10	0.050	9698110
Total Sodium (Na)	mg/L	25.9	25.9	26.3	0.050	9698110
Total Sulphur (S)	mg/L	84.7	84.5	85.4	3.0	9698110
RDL = Reportable Detection Limit						



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C
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Results relate only to the items tested.



QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9698857	Total Aluminum (Al)	2019/12/06	94	80 - 120	95	80 - 120	<0.00050	mg/L	0.96	20
9698857	Total Antimony (Sb)	2019/12/06	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.95	20
9698857	Total Arsenic (As)	2019/12/06	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.73	20
9698857	Total Barium (Ba)	2019/12/06	NC	80 - 120	104	80 - 120	<0.000020	mg/L	0.52	20
9698857	Total Beryllium (Be)	2019/12/06	88	80 - 120	92	80 - 120	<0.000010	mg/L	NC	20
9698857	Total Bismuth (Bi)	2019/12/06	99	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9698857	Total Boron (B)	2019/12/06	91	80 - 120	93	80 - 120	<0.010	mg/L	1.2	20
9698857	Total Cadmium (Cd)	2019/12/06	102	80 - 120	102	80 - 120	<0.0000050	mg/L	0.16	20
9698857	Total Chromium (Cr)	2019/12/06	101	80 - 120	99	80 - 120	<0.00010	mg/L	5.5	20
9698857	Total Cobalt (Co)	2019/12/06	98	80 - 120	98	80 - 120	<0.0000050	mg/L	1.5	20
9698857	Total Copper (Cu)	2019/12/06	93	80 - 120	98	80 - 120	<0.000050	mg/L	0.016	20
9698857	Total Iron (Fe)	2019/12/06	104	80 - 120	107	80 - 120	<0.0010	mg/L	1.5	20
9698857	Total Lead (Pb)	2019/12/06	105	80 - 120	103	80 - 120	<0.0000050	mg/L	0.60	20
9698857	Total Lithium (Li)	2019/12/06	87	80 - 120	92	80 - 120	<0.00050	mg/L	0.68	20
9698857	Total Manganese (Mn)	2019/12/06	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.10	20
9698857	Total Molybdenum (Mo)	2019/12/06	110	80 - 120	101	80 - 120	<0.000050	mg/L	0.82	20
9698857	Total Nickel (Ni)	2019/12/06	96	80 - 120	98	80 - 120	<0.000020	mg/L	2.9	20
9698857	Total Selenium (Se)	2019/12/06	101	80 - 120	100	80 - 120	<0.000040	mg/L	1.9	20
9698857	Total Silicon (Si)	2019/12/06	98	80 - 120	96	80 - 120	<0.050	mg/L	1.8	20
9698857	Total Silver (Ag)	2019/12/06	101	80 - 120	97	80 - 120	<0.0000050	mg/L	1.9	20
9698857	Total Strontium (Sr)	2019/12/06	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.15	20
9698857	Total Thallium (Tl)	2019/12/06	104	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9698857	Total Tin (Sn)	2019/12/06	104	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9698857	Total Titanium (Ti)	2019/12/06	105	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9698857	Total Uranium (U)	2019/12/06	105	80 - 120	102	80 - 120	<0.0000020	mg/L	0.070	20
9698857	Total Vanadium (V)	2019/12/06	102	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9698857	Total Zinc (Zn)	2019/12/06	NC	80 - 120	103	80 - 120	<0.00010	mg/L	0.0096	20
9698857	Total Zirconium (Zr)	2019/12/06	107	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9699297	Dissolved Aluminum (Al)	2019/12/06	97	80 - 120	100	80 - 120	<0.00050	mg/L	1.3	20
9699297	Dissolved Antimony (Sb)	2019/12/06	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.35	20
9699297	Dissolved Arsenic (As)	2019/12/06	NC	80 - 120	101	80 - 120	<0.000020	mg/L	1.0	20
9699297	Dissolved Barium (Ba)	2019/12/06	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.71	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9699297	Dissolved Beryllium (Be)	2019/12/06	99	80 - 120	107	80 - 120	<0.000010	mg/L	NC	20
9699297	Dissolved Bismuth (Bi)	2019/12/06	95	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9699297	Dissolved Boron (B)	2019/12/06	96	80 - 120	101	80 - 120	<0.010	mg/L	0.68	20
9699297	Dissolved Cadmium (Cd)	2019/12/06	102	80 - 120	106	80 - 120	<0.0000050	mg/L	0.11	20
9699297	Dissolved Chromium (Cr)	2019/12/06	99	80 - 120	104	80 - 120	<0.000010	mg/L	NC	20
9699297	Dissolved Cobalt (Co)	2019/12/06	101	80 - 120	110	80 - 120	<0.0000050	mg/L	0.38	20
9699297	Dissolved Copper (Cu)	2019/12/06	91	80 - 120	101	80 - 120	<0.000050	mg/L	0.11	20
9699297	Dissolved Iron (Fe)	2019/12/06	107	80 - 120	112	80 - 120	<0.0010	mg/L	NC	20
9699297	Dissolved Lead (Pb)	2019/12/06	100	80 - 120	105	80 - 120	<0.0000050	mg/L	0.64	20
9699297	Dissolved Lithium (Li)	2019/12/06	95	80 - 120	105	80 - 120	<0.00050	mg/L	0.25	20
9699297	Dissolved Manganese (Mn)	2019/12/06	NC	80 - 120	106	80 - 120	<0.000050	mg/L	0.13	20
9699297	Dissolved Molybdenum (Mo)	2019/12/06	110	80 - 120	105	80 - 120	<0.000050	mg/L	0.16	20
9699297	Dissolved Nickel (Ni)	2019/12/06	95	80 - 120	107	80 - 120	<0.000020	mg/L	1.7	20
9699297	Dissolved Selenium (Se)	2019/12/06	99	80 - 120	98	80 - 120	<0.000040	mg/L	0.61	20
9699297	Dissolved Silicon (Si)	2019/12/06	95	80 - 120	96	80 - 120	<0.050	mg/L	0.94	20
9699297	Dissolved Silver (Ag)	2019/12/06	102	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
9699297	Dissolved Strontium (Sr)	2019/12/06	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.76	20
9699297	Dissolved Thallium (Tl)	2019/12/06	101	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9699297	Dissolved Tin (Sn)	2019/12/06	101	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9699297	Dissolved Titanium (Ti)	2019/12/06	103	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
9699297	Dissolved Uranium (U)	2019/12/06	103	80 - 120	106	80 - 120	<0.0000020	mg/L	0.21	20
9699297	Dissolved Vanadium (V)	2019/12/06	100	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9699297	Dissolved Zinc (Zn)	2019/12/06	NC	80 - 120	111	80 - 120	<0.00010	mg/L	0.047	20
9699297	Dissolved Zirconium (Zr)	2019/12/06	107	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9699352	Dissolved Aluminum (Al)	2019/12/06	100	80 - 120	99	80 - 120	<0.00050	mg/L	0.38	20
9699352	Dissolved Antimony (Sb)	2019/12/06	104	80 - 120	101	80 - 120	<0.000020	mg/L	3.9	20
9699352	Dissolved Arsenic (As)	2019/12/06	103	80 - 120	98	80 - 120	<0.000020	mg/L	8.9	20
9699352	Dissolved Barium (Ba)	2019/12/06	NC	80 - 120	105	80 - 120	<0.000020	mg/L	1.3	20
9699352	Dissolved Beryllium (Be)	2019/12/06	96	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
9699352	Dissolved Bismuth (Bi)	2019/12/06	102	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9699352	Dissolved Boron (B)	2019/12/06	97	80 - 120	96	80 - 120	<0.010	mg/L	NC	20
9699352	Dissolved Cadmium (Cd)	2019/12/06	103	80 - 120	101	80 - 120	<0.0000050	mg/L	4.3	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9699352	Dissolved Chromium (Cr)	2019/12/06	100	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9699352	Dissolved Cobalt (Co)	2019/12/06	98	80 - 120	96	80 - 120	<0.0000050	mg/L	2.7	20
9699352	Dissolved Copper (Cu)	2019/12/06	96	80 - 120	95	80 - 120	<0.000050	mg/L	2.3	20
9699352	Dissolved Iron (Fe)	2019/12/06	104	80 - 120	107	80 - 120	<0.0010	mg/L	0.45	20
9699352	Dissolved Lead (Pb)	2019/12/06	106	80 - 120	103	80 - 120	<0.0000050	mg/L	0.24	20
9699352	Dissolved Lithium (Li)	2019/12/06	97	80 - 120	95	80 - 120	<0.00050	mg/L	0.32	20
9699352	Dissolved Manganese (Mn)	2019/12/06	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.20	20
9699352	Dissolved Molybdenum (Mo)	2019/12/06	105	80 - 120	101	80 - 120	<0.000050	mg/L	0.045	20
9699352	Dissolved Nickel (Ni)	2019/12/06	97	80 - 120	96	80 - 120	<0.000020	mg/L	0.61	20
9699352	Dissolved Selenium (Se)	2019/12/06	106	80 - 120	101	80 - 120	<0.000040	mg/L	6.2	20
9699352	Dissolved Silicon (Si)	2019/12/06	NC	80 - 120	102	80 - 120	<0.050	mg/L	0.75	20
9699352	Dissolved Silver (Ag)	2019/12/06	99	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9699352	Dissolved Strontium (Sr)	2019/12/06	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.51	20
9699352	Dissolved Thallium (Tl)	2019/12/06	106	80 - 120	102	80 - 120	<0.0000020	mg/L	1.9	20
9699352	Dissolved Tin (Sn)	2019/12/06	101	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9699352	Dissolved Titanium (Ti)	2019/12/06	104	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9699352	Dissolved Uranium (U)	2019/12/06	109	80 - 120	104	80 - 120	<0.0000020	mg/L	0.037	20
9699352	Dissolved Vanadium (V)	2019/12/06	102	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9699352	Dissolved Zinc (Zn)	2019/12/06	NC	80 - 120	101	80 - 120	<0.00010	mg/L	0.59	20
9699352	Dissolved Zirconium (Zr)	2019/12/06	103	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9699356	Alkalinity (PP as CaCO3)	2019/12/06					<0.50	mg/L	NC	20
9699356	Alkalinity (Total as CaCO3)	2019/12/06	NC	80 - 120	94	80 - 120	<0.50	mg/L	0.33	20
9699356	Bicarbonate (HCO3)	2019/12/06					<0.50	mg/L	0.33	20
9699356	Carbonate (CO3)	2019/12/06					<0.50	mg/L	NC	20
9699356	Hydroxide (OH)	2019/12/06					<0.50	mg/L	NC	20
9699663	Total Ammonia (N)	2019/12/08	114	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
9700062	Nitrate plus Nitrite (N)	2019/12/06			107	80 - 120	<0.0020	mg/L		
9700066	Nitrite (N)	2019/12/06			105	80 - 120	<0.0020	mg/L		
9700216	Dissolved Chloride (Cl)	2019/12/06	NC	80 - 120	102	80 - 120	<0.50	mg/L	5.7	20
9700216	Dissolved Sulphate (SO4)	2019/12/06	NC	80 - 120	104	80 - 120	0.64, RDL=0.50	mg/L	3.9	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9701667	Total Ammonia (N)	2019/12/09	90	80 - 120	95	80 - 120	<0.0050	mg/L	0.038	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.										
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.										
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.										
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.										
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)										
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).										



BUREAU
VERITAS

BV Labs Job #: B9A4734
Report Date: 2019/12/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Harry (Peng) Liang, Senior Analyst

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RECORD

08475784

BBY FCD-00077/05

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

COC #:

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Invoice Information Company Name: BMC MINERALS LTD. Contact Name: _____ Address: 530-1130 WEST PENDER ST Vancouver, BC PC V6E 4A4 Phone: _____ Email: _____		Report Information (if differs from Invoice) Company Name: ALEXCO ENVIRONMENTAL Contact Name: Mary Mitoska; Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC V1A 2V3 Phone: (867) 668-6463 Email: mmitska@alexcoenvy.com		Project Information (where applicable) Quotation #: B60751 P.O. #/ A/E/C: _____ Project #: BMC-16-02 Site Location: Kudt Ze Kayah Site #: _____ Sampled By: _____		Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analyses) Rush TAT (Surcharges will be applied) Same Day ☐ 2 Days 1 Day ☐ 3 Days	
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO 2 12485		Analysis Requested Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity Ammonia		Rush Confirmation #: CUSTOMER SEAL: 9 COOLER TEMPERATURES Temperature: _____ COOLING MEDIA PRESENT: _____ COMMENTS:	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1 6A		04-Dec-19	9:55	Water	6		Metals preserved with HNO3, dissolved
2 6B		04-Dec-19	9:35	Water	6		Metals preserved with HNO3, dissolved
3 6C		04-Dec-19	9:15	Water	6		Metals preserved with HNO3, dissolved
4							
5							
6							
7							
8							
9							
10							
RELINQUISHED BY: (Signature/Print) _____		DATE: (YYYY/MM/DD) _____		TIME: (HH:MM) _____		RECEIVED BY: (Signature/Print) M. VANDERHORST	
						DATE: (YYYY/MM/DD) 2019/12/05	
						TIME: (HH:MM) 10:00	

17-00

B9A4734_COC

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Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08475836, 08475840

Attention: KAI WOLOSHYN
 ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/12/13
 Report #: R2823992
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A5240
Received: 2019/12/06, 10:00

Sample Matrix: Water
 # Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	5	N/A	2019/12/09	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	13	N/A	2019/12/09	BBY6SOP-00026	SM 22 2320 B m
Biochemical Oxygen Demand (1)	5	2019/12/07	2019/12/12	BBY6SOP-00045	SM 23 5210 B m
Low level chloride/sulphate by AC (1)	13	N/A	2019/12/09	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
COD by Colorimeter (1)	5	N/A	2019/12/11	BBY6SOP-00024	SM 23 5220 D m
Carbon (DOC) (2)	5	N/A	2019/12/11	AB SOP-00087	MMCW 119 1996 m
Hardness Total (calculated as CaCO ₃) (1, 3)	13	N/A	2019/12/12	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	13	N/A	2019/12/10	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	13	N/A	2019/12/10	BBY WI-00033	Auto Calc
Ion Balance (1)	13	N/A	2019/12/10	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	13	N/A	2019/12/10	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	13	N/A	2019/12/10	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	13	N/A	2019/12/10	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	13	N/A	2019/12/12	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	13	N/A	2019/12/11	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	13	N/A	2019/12/12	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level) (1)	13	N/A	2019/12/07	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	13	N/A	2019/12/07	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	12	N/A	2019/12/07	BBY WI-00033	Auto Calc
Nitrogen - Nitrate (as N) Low Level Calc (1)	1	N/A	2019/12/09	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	13	N/A	2019/12/07	BBY7 WI-00004	SM 23 3030B m
Carbon (Total Organic) (4)	5	N/A	2019/12/11	AB SOP-00087	MMCW 119 1996 m
Total Suspended Solids (NFR) (1)	5	2019/12/09	2019/12/10	BBY6SOP-00034	SM 23 2540 D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08475836, 08475840

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/12/13
Report #: R2823992
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A5240

Received: 2019/12/06, 10:00

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by BV Labs Vancouver
- (2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
- (4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XB7161			XB7162	XB7163			XB7164		
Sampling Date		2019/12/06 10:00			2019/12/06 09:40	2019/12/06 09:20			2019/12/06 09:00		
COC Number		08475836			08475836	08475836			08475836		
	UNITS	INFLUENT-75	RDL	QC Batch	1A	1B	RDL	QC Batch	1C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.9	N/A	9700759	8.4	7.8	N/A	9700759	8.0	N/A	9700759
Cation Sum	meq/L	8.3	N/A	9700759	8.3	8.3	N/A	9700759	8.3	N/A	9700759
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9700757	0.99	1.1	0.010	9700757	1.0	0.010	9700757
Ion Balance (% Difference)	%	2.4	N/A	9700758	0.45	2.8	N/A	9700758	1.7	N/A	9700758
Nitrate (N)	mg/L	0.293	0.0020	9700762	0.561	0.726	0.0020	9700762	0.816	0.0020	9700762

Demand Parameters

Biochemical Oxygen Demand	mg/L	<2.0	2.0	9700969					<2.0	2.0	9700969
Chemical Oxygen Demand	mg/L	35	10	9703262					<10	10	9703264

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L	3.6	0.50	9703687					3.4	0.50	9703687
Acidity (pH 4.5)	mg/L	<1.0	1.0	9702381					<1.0	1.0	9702381
Alkalinity (Total as CaCO ₃)	mg/L	77.2	0.50	9701788	75.7	73.0	0.50	9701788	73.4	0.50	9701788
Total Organic Carbon (C)	mg/L	3.1	0.50	9702717					2.7	0.50	9702717
Acidity (pH 8.3)	mg/L	5.4	1.0	9702381					1.6	1.0	9702381
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9701788	<0.50	<0.50	0.50	9701788	<0.50	0.50	9701788
Bicarbonate (HCO ₃)	mg/L	94.2	0.50	9701788	92.4	89.1	0.50	9701788	89.5	0.50	9701788
Carbonate (CO ₃)	mg/L	<0.50	0.50	9701788	<0.50	<0.50	0.50	9701788	<0.50	0.50	9701788
Hydroxide (OH)	mg/L	<0.50	0.50	9701788	<0.50	<0.50	0.50	9701788	<0.50	0.50	9701788
Total Suspended Solids	mg/L	1.4	1.0	9701723					<1.0	1.0	9701723

Anions

Dissolved Chloride (Cl)	mg/L	62	0.50	9702398	62	63	0.50	9702398	62	0.50	9702398
Dissolved Sulphate (SO ₄)	mg/L	220 (1)	5.0	9702398	240 (1)	220 (1)	5.0	9702398	230 (1)	5.0	9702398

Nutrients

Total Ammonia (N)	mg/L	0.86 (2)	0.050	9706065	0.53	0.27	0.0050	9706065	0.11	0.0050	9706065
Nitrate plus Nitrite (N)	mg/L	0.293	0.0020	9701043	0.659	0.800	0.0020	9701043	0.857	0.0020	9701043
Nitrite (N)	mg/L	<0.0020	0.0020	9701044	0.0975	0.0732	0.0020	9701044	0.0408	0.0020	9701044

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

(2) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XB7165	XB7166			XB7167			XB7168		
Sampling Date		2019/12/06 09:45	2019/12/06 09:25			2019/12/06 09:05			2019/12/06 09:50		
COC Number		08475836	08475836			08475836			08475836		
	UNITS	3A	3B	RDL	QC Batch	3C	RDL	QC Batch	4A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.1	7.9	N/A	9700759	9.0	N/A	9700759	8.3	N/A	9700759
Cation Sum	meq/L	8.4	8.3	N/A	9700759	8.2	N/A	9700759	8.3	N/A	9700759
Filter and HNO3 Preservation	N/A	FIELD	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.0	1.0	0.010	9700757	0.91	0.010	9700757	1.0	0.010	9700757
Ion Balance (% Difference)	%	2.1	2.3	N/A	9700758	4.7	N/A	9700758	0.033	N/A	9700758
Nitrate (N)	mg/L	0.342	0.458	0.0020	9700762	0.447	0.0020	9700762	0.345	0.0020	9700762

Demand Parameters

Biochemical Oxygen Demand	mg/L					<2.0	2.0	9700969			
Chemical Oxygen Demand	mg/L					11	10	9703264			

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L					3.4	0.50	9703687			
Acidity (pH 4.5)	mg/L					<1.0	1.0	9702381			
Alkalinity (Total as CaCO3)	mg/L	75.7	75.8	0.50	9701788	76.1	0.50	9701788	76.2	0.50	9701788
Total Organic Carbon (C)	mg/L					3.0	0.50	9702717			
Acidity (pH 8.3)	mg/L					1.8	1.0	9702381			
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	9701788	<0.50	0.50	9701788	<0.50	0.50	9701788
Bicarbonate (HCO3)	mg/L	92.3	92.5	0.50	9701788	92.9	0.50	9701788	92.9	0.50	9701788
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	9701788	<0.50	0.50	9701788	<0.50	0.50	9701788
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9701788	<0.50	0.50	9701788	<0.50	0.50	9701788
Total Suspended Solids	mg/L					<1.0	1.0	9701723			

Anions

Dissolved Chloride (Cl)	mg/L	62	62	0.50	9702398	62	0.50	9702398	61	0.50	9702398
Dissolved Sulphate (SO4)	mg/L	230 (1)	220 (1)	5.0	9702398	270 (1)	5.0	9702398	240 (1)	5.0	9702398

Nutrients

Total Ammonia (N)	mg/L	0.50	0.18	0.0050	9706065	0.13	0.0050	9706065	0.49	0.0050	9706065
Nitrate plus Nitrite (N)	mg/L	0.478	0.516	0.0020	9701043	0.494	0.0020	9701043	0.483	0.0020	9701043
Nitrite (N)	mg/L	0.136	0.0586	0.0020	9701044	0.0469	0.0020	9701044	0.138	0.0020	9701044

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		XB7169			XB7170			XB7175		
Sampling Date		2019/12/06 09:30			2019/12/06 09:10			2019/12/06 09:55		
COC Number		08475836			08475836			08475840		
	UNITS	4B	RDL	QC Batch	4C	RDL	QC Batch	6A	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	7.7	N/A	9700759	8.3	N/A	9700759	7.9	N/A	9700759
Cation Sum	meq/L	8.3	N/A	9700759	8.6	N/A	9700759	8.4	N/A	9700759
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	9700757	1.0	0.010	9700757	1.1	0.010	9700757
Ion Balance (% Difference)	%	4.0	N/A	9700758	1.8	N/A	9700758	3.2	N/A	9700758
Nitrate (N)	mg/L	0.0553	0.0020	9700762	<0.0020	0.0020	9700762	0.347	0.0020	9700762
Demand Parameters										
Biochemical Oxygen Demand	mg/L				<2.0	2.0	9700969			
Chemical Oxygen Demand	mg/L				<10	10	9703264			
Misc. Inorganics										
Dissolved Organic Carbon (C)	mg/L				3.2	0.50	9703687			
Acidity (pH 4.5)	mg/L				<1.0	1.0	9702381			
Alkalinity (Total as CaCO ₃)	mg/L	76.5	0.50	9701788	78.3	0.50	9701788	75.4	0.50	9701814
Total Organic Carbon (C)	mg/L				3.0	0.50	9702717			
Acidity (pH 8.3)	mg/L				2.8	1.0	9702381			
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9701788	<0.50	0.50	9701788	<0.50	0.50	9701814
Bicarbonate (HCO ₃)	mg/L	93.3	0.50	9701788	95.5	0.50	9701788	92.0	0.50	9701814
Carbonate (CO ₃)	mg/L	<0.50	0.50	9701788	<0.50	0.50	9701788	<0.50	0.50	9701814
Hydroxide (OH)	mg/L	<0.50	0.50	9701788	<0.50	0.50	9701788	<0.50	0.50	9701814
Total Suspended Solids	mg/L				<1.0	1.0	9701723			
Anions										
Dissolved Chloride (Cl)	mg/L	62	0.50	9702398	62	0.50	9702398	61	0.50	9702398
Dissolved Sulphate (SO ₄)	mg/L	210 (1)	5.0	9702398	240 (1)	5.0	9702398	220 (1)	5.0	9702398
Nutrients										
Total Ammonia (N)	mg/L	0.013	0.0050	9706065	0.0084	0.0050	9706065	0.50	0.0050	9706065
Nitrate plus Nitrite (N)	mg/L	0.0618	0.0020	9701043	<0.0020	0.0020	9701043	0.484	0.0020	9701043
Nitrite (N)	mg/L	0.0065	0.0020	9701044	<0.0020	0.0020	9701044	0.137	0.0020	9701044
RDL = Reportable Detection Limit										
N/A = Not Applicable										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										



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BV Labs Job #: B9A5240

Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XB7176			XB7177		
Sampling Date		2019/12/06 09:35			2019/12/06 09:15		
COC Number		08475840			08475840		
	UNITS	6B	RDL	QC Batch	6C	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	8.8	N/A	9700759	8.2	N/A	9700759
Cation Sum	meq/L	8.4	N/A	9700759	8.4	N/A	9700759
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.96	0.010	9700757	1.0	0.010	9700757
Ion Balance (% Difference)	%	2.2	N/A	9700758	1.1	N/A	9700758
Nitrate (N)	mg/L	0.0425	0.0020	9700762	<0.0020	0.0020	9700762
Demand Parameters							
Biochemical Oxygen Demand	mg/L				<2.0	2.0	9700969
Chemical Oxygen Demand	mg/L				<10	10	9703264
Misc. Inorganics							
Dissolved Organic Carbon (C)	mg/L				3.3	0.50	9703687
Acidity (pH 4.5)	mg/L				<1.0	1.0	9702381
Alkalinity (Total as CaCO3)	mg/L	77.5	0.50	9701788	76.9	0.50	9701788
Total Organic Carbon (C)	mg/L				3.3	0.50	9702717
Acidity (pH 8.3)	mg/L				3.0	1.0	9702381
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9701788	<0.50	0.50	9701788
Bicarbonate (HCO3)	mg/L	94.5	0.50	9701788	93.8	0.50	9701788
Carbonate (CO3)	mg/L	<0.50	0.50	9701788	<0.50	0.50	9701788
Hydroxide (OH)	mg/L	<0.50	0.50	9701788	<0.50	0.50	9701788
Total Suspended Solids	mg/L				<1.0	1.0	9701723
Anions							
Dissolved Chloride (Cl)	mg/L	62	0.50	9702398	64	0.50	9702398
Dissolved Sulphate (SO4)	mg/L	260 (1)	5.0	9702398	240 (1)	5.0	9702398
Nutrients							
Total Ammonia (N)	mg/L	0.012	0.0050	9706065	0.0069	0.0050	9706065
Nitrate plus Nitrite (N)	mg/L	0.0455	0.0020	9701043	<0.0020	0.0020	9701043
Nitrite (N)	mg/L	0.0030	0.0020	9701044	<0.0020	0.0020	9701044
RDL = Reportable Detection Limit							
N/A = Not Applicable							
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.							



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BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB7161	XB7162	XB7163	XB7164	XB7165		
Sampling Date		2019/12/06 10:00	2019/12/06 09:40	2019/12/06 09:20	2019/12/06 09:00	2019/12/06 09:45		
COC Number		08475836	08475836	08475836	08475836	08475836		
	UNITS	INFLUENT-75	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	351	351	351	353	355	0.50	9700563
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00994	0.00538	0.00267	0.00210	0.00520	0.00050	9702078
Dissolved Antimony (Sb)	mg/L	0.0200	0.0198	0.0199	0.0198	0.0200	0.000020	9702078
Dissolved Arsenic (As)	mg/L	0.0626	0.0606	0.0595	0.0567	0.0599	0.000020	9702078
Dissolved Barium (Ba)	mg/L	0.0594	0.0585	0.0584	0.0589	0.0602	0.000020	9702078
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9702078
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9702078
Dissolved Boron (B)	mg/L	0.036	0.036	0.037	0.037	0.035	0.010	9702078
Dissolved Cadmium (Cd)	mg/L	0.00207	0.00178	0.00145	0.00108	0.00192	0.0000050	9702078
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9702078
Dissolved Cobalt (Co)	mg/L	0.00274	0.00104	0.000269	0.0000599	0.000380	0.0000050	9702078
Dissolved Copper (Cu)	mg/L	0.0775	0.0246	0.00923	0.00410	0.0142	0.000050	9702078
Dissolved Iron (Fe)	mg/L	0.0020	<0.0010	<0.0010	0.0022	0.0012	0.0010	9702078
Dissolved Lead (Pb)	mg/L	0.0188	0.00603	0.00135	0.000223	0.00200	0.0000050	9702078
Dissolved Lithium (Li)	mg/L	0.0110	0.0112	0.0112	0.0109	0.0112	0.00050	9702078
Dissolved Manganese (Mn)	mg/L	0.0537	0.0209	0.00519	0.00162	0.00980	0.000050	9702078
Dissolved Molybdenum (Mo)	mg/L	0.00159	0.00156	0.00157	0.00149	0.00160	0.000050	9702078
Dissolved Nickel (Ni)	mg/L	0.00844	0.00826	0.00806	0.00786	0.00822	0.000020	9702078
Dissolved Selenium (Se)	mg/L	0.00801	0.00778	0.00767	0.00730	0.00778	0.000040	9702078
Dissolved Silicon (Si)	mg/L	0.458	0.437	0.414	0.393	0.427	0.050	9702078
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9702078
Dissolved Strontium (Sr)	mg/L	0.613	0.610	0.624	0.605	0.611	0.000050	9702078
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	<0.0000020	<0.0000020	0.0000020	9702078
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9702078
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9702078
Dissolved Uranium (U)	mg/L	0.0307	0.0295	0.0300	0.0261	0.0314	0.0000020	9702078
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9702078
Dissolved Zinc (Zn)	mg/L	0.174	0.156	0.159	0.166	0.157	0.00010	9702078
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9702078
Dissolved Calcium (Ca)	mg/L	112	112	111	112	113	0.050	9700760
Dissolved Magnesium (Mg)	mg/L	17.1	17.5	17.5	17.6	17.5	0.050	9700760

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB7161	XB7162	XB7163	XB7164	XB7165		
Sampling Date		2019/12/06 10:00	2019/12/06 09:40	2019/12/06 09:20	2019/12/06 09:00	2019/12/06 09:45		
COC Number		08475836	08475836	08475836	08475836	08475836		
	UNITS	INFLUENT-75	1A	1B	1C	3A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.77	3.81	3.86	3.88	3.86	0.050	9700760
Dissolved Sodium (Na)	mg/L	25.8	26.1	26.5	26.4	26.7	0.050	9700760
Dissolved Sulphur (S)	mg/L	84.0	83.7	83.6	83.5	84.0	3.0	9700760
RDL = Reportable Detection Limit								



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BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB7166	XB7167	XB7168	XB7169	XB7170		
Sampling Date		2019/12/06 09:25	2019/12/06 09:05	2019/12/06 09:50	2019/12/06 09:30	2019/12/06 09:10		
COC Number		08475836	08475836	08475836	08475836	08475836		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	353	347	350	352	364	0.50	9700563
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00181	0.00069	0.00552	0.00120	0.00093	0.00050	9702078
Dissolved Antimony (Sb)	mg/L	0.0203	0.0197	0.0198	0.0192	0.0190	0.000020	9702078
Dissolved Arsenic (As)	mg/L	0.0578	0.0558	0.0603	0.0452	0.0391	0.000020	9702078
Dissolved Barium (Ba)	mg/L	0.0582	0.0568	0.0598	0.0574	0.0595	0.000020	9702078
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9702078
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9702078
Dissolved Boron (B)	mg/L	0.036	0.034	0.035	0.027	0.019	0.010	9702078
Dissolved Cadmium (Cd)	mg/L	0.00146	0.00110	0.00188	0.000596	0.000215	0.0000050	9702078
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9702078
Dissolved Cobalt (Co)	mg/L	0.0000941	0.0000492	0.000377	0.0000617	0.0000453	0.0000050	9702078
Dissolved Copper (Cu)	mg/L	0.00681	0.00360	0.0139	0.00360	0.00174	0.000050	9702078
Dissolved Iron (Fe)	mg/L	0.0026	0.0012	0.0017	0.0023	0.0027	0.0010	9702078
Dissolved Lead (Pb)	mg/L	0.000505	0.000164	0.00176	0.000350	0.000144	0.0000050	9702078
Dissolved Lithium (Li)	mg/L	0.0111	0.0106	0.0114	0.0110	0.0113	0.00050	9702078
Dissolved Manganese (Mn)	mg/L	0.00277	0.000655	0.00955	0.00181	0.00238	0.000050	9702078
Dissolved Molybdenum (Mo)	mg/L	0.00152	0.00148	0.00162	0.00144	0.00134	0.000050	9702078
Dissolved Nickel (Ni)	mg/L	0.00894	0.00815	0.00823	0.00776	0.00684	0.000020	9702078
Dissolved Selenium (Se)	mg/L	0.00758	0.00755	0.00784	0.00646	0.00595	0.000040	9702078
Dissolved Silicon (Si)	mg/L	0.416	0.393	0.456	0.487	0.529	0.050	9702078
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9702078
Dissolved Strontium (Sr)	mg/L	0.607	0.599	0.617	0.618	0.632	0.000050	9702078
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9702078
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9702078
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9702078
Dissolved Uranium (U)	mg/L	0.0296	0.0275	0.0304	0.0290	0.0236	0.0000020	9702078
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9702078
Dissolved Zinc (Zn)	mg/L	0.166	0.161	0.153	0.117	0.0895	0.00010	9702078
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9702078
Dissolved Calcium (Ca)	mg/L	113	111	111	112	116	0.050	9700760
Dissolved Magnesium (Mg)	mg/L	17.4	17.2	17.6	17.8	18.0	0.050	9700760

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB7166	XB7167	XB7168	XB7169	XB7170		
Sampling Date		2019/12/06 09:25	2019/12/06 09:05	2019/12/06 09:50	2019/12/06 09:30	2019/12/06 09:10		
COC Number		08475836	08475836	08475836	08475836	08475836		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.94	3.88	3.92	3.88	3.94	0.050	9700760
Dissolved Sodium (Na)	mg/L	26.3	25.7	26.4	26.6	27.2	0.050	9700760
Dissolved Sulphur (S)	mg/L	83.6	82.2	84.5	84.7	86.0	3.0	9700760
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB7175	XB7176	XB7177		
Sampling Date		2019/12/06 09:55	2019/12/06 09:35	2019/12/06 09:15		
COC Number		08475840	08475840	08475840		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	355	358	359	0.50	9700563
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00569	0.00157	0.00088	0.00050	9702078
Dissolved Antimony (Sb)	mg/L	0.0201	0.0209	0.0201	0.000020	9702078
Dissolved Arsenic (As)	mg/L	0.0618	0.0471	0.0437	0.000020	9702078
Dissolved Barium (Ba)	mg/L	0.0606	0.0581	0.0584	0.000020	9702078
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9702078
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9702078
Dissolved Boron (B)	mg/L	0.036	0.030	0.024	0.010	9702078
Dissolved Cadmium (Cd)	mg/L	0.00195	0.000369	0.000183	0.0000050	9702078
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9702078
Dissolved Cobalt (Co)	mg/L	0.000388	0.0000854	0.0000466	0.0000050	9702078
Dissolved Copper (Cu)	mg/L	0.0143	0.00343	0.00281	0.000050	9702078
Dissolved Iron (Fe)	mg/L	<0.0010	0.0027	0.0028	0.0010	9702078
Dissolved Lead (Pb)	mg/L	0.00206	0.000196	0.000122	0.0000050	9702078
Dissolved Lithium (Li)	mg/L	0.0116	0.0110	0.0112	0.00050	9702078
Dissolved Manganese (Mn)	mg/L	0.00983	0.00402	0.00247	0.000050	9702078
Dissolved Molybdenum (Mo)	mg/L	0.00163	0.00146	0.00139	0.000050	9702078
Dissolved Nickel (Ni)	mg/L	0.00847	0.00696	0.00617	0.000020	9702078
Dissolved Selenium (Se)	mg/L	0.00803	0.00651	0.00644	0.000040	9702078
Dissolved Silicon (Si)	mg/L	0.462	0.536	0.570	0.050	9702078
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9702078
Dissolved Strontium (Sr)	mg/L	0.637	0.618	0.623	0.000050	9702078
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9702078
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9702078
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9702078
Dissolved Uranium (U)	mg/L	0.0311	0.0285	0.0248	0.0000020	9702078
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9702078
Dissolved Zinc (Zn)	mg/L	0.156	0.0982	0.0754	0.00010	9702078
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9702078
Dissolved Calcium (Ca)	mg/L	113	114	115	0.050	9700760
Dissolved Magnesium (Mg)	mg/L	17.7	17.8	17.6	0.050	9700760
RDL = Reportable Detection Limit						



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB7175	XB7176	XB7177		
Sampling Date		2019/12/06 09:55	2019/12/06 09:35	2019/12/06 09:15		
COC Number		08475840	08475840	08475840		
	UNITS	6A	6B	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.95	4.06	4.05	0.050	9700760
Dissolved Sodium (Na)	mg/L	26.7	26.8	26.5	0.050	9700760
Dissolved Sulphur (S)	mg/L	85.4	85.0	85.5	3.0	9700760
RDL = Reportable Detection Limit						

BUREAU
VERITASBV Labs Job #: B9A5240
Report Date: 2019/12/13ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XB7161	XB7162	XB7163	XB7164	XB7165		
Sampling Date		2019/12/06 10:00	2019/12/06 09:40	2019/12/06 09:20	2019/12/06 09:00	2019/12/06 09:45		
COC Number		08475836	08475836	08475836	08475836	08475836		
	UNITS	INFLUENT-75	1A	1B	1C	3A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	345	334	338	343	340	0.50	9700476
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0392	0.0123	0.00691	0.00375	0.0130	0.00050	9704052
Total Antimony (Sb)	mg/L	0.0199	0.0188	0.0190	0.0191	0.0194	0.000020	9704052
Total Arsenic (As)	mg/L	0.0643	0.0601	0.0604	0.0585	0.0622	0.000020	9704052
Total Barium (Ba)	mg/L	0.0573	0.0557	0.0562	0.0569	0.0583	0.000020	9704052
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9704052
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9704052
Total Boron (B)	mg/L	0.033	0.032	0.032	0.033	0.031	0.010	9704052
Total Cadmium (Cd)	mg/L	0.00208	0.00168	0.00137	0.00105	0.00185	0.0000050	9704052
Total Chromium (Cr)	mg/L	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9704052
Total Cobalt (Co)	mg/L	0.00283	0.00106	0.000285	0.0000677	0.000428	0.0000050	9704052
Total Copper (Cu)	mg/L	0.0822	0.0255	0.00960	0.00443	0.0154	0.000050	9704052
Total Iron (Fe)	mg/L	0.0182	0.0051	0.0040	0.0037	0.0049	0.0010	9704052
Total Lead (Pb)	mg/L	0.0250	0.00979	0.00327	0.000444	0.00551	0.0000050	9704052
Total Lithium (Li)	mg/L	0.0108	0.0104	0.0106	0.0106	0.0106	0.00050	9704052
Total Manganese (Mn)	mg/L	0.0566	0.0223	0.00669	0.00192	0.0126	0.000050	9704052
Total Molybdenum (Mo)	mg/L	0.00156	0.00151	0.00153	0.00150	0.00161	0.000050	9704052
Total Nickel (Ni)	mg/L	0.00855	0.00783	0.00781	0.00777	0.00812	0.000020	9704052
Total Selenium (Se)	mg/L	0.00795	0.00757	0.00753	0.00740	0.00787	0.000040	9704052
Total Silicon (Si)	mg/L	0.539	0.420	0.425	0.396	0.452	0.050	9704052
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9704052
Total Strontium (Sr)	mg/L	0.621	0.598	0.611	0.628	0.622	0.000050	9704052
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9704052
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9704052
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9704052
Total Uranium (U)	mg/L	0.0292	0.0277	0.0285	0.0250	0.0295	0.0000020	9704052
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9704052
Total Zinc (Zn)	mg/L	0.171	0.148	0.149	0.159	0.150	0.00010	9704052
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9704052
Total Calcium (Ca)	mg/L	110	106	108	109	108	0.050	9700761
Total Magnesium (Mg)	mg/L	17.1	16.7	16.7	17.0	17.1	0.050	9700761

RDL = Reportable Detection Limit



**BUREAU
VERITAS**

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB7161	XB7162	XB7163	XB7164	XB7165		
Sampling Date		2019/12/06 10:00	2019/12/06 09:40	2019/12/06 09:20	2019/12/06 09:00	2019/12/06 09:45		
COC Number		08475836	08475836	08475836	08475836	08475836		
	UNITS	INFLUENT-75	1A	1B	1C	3A	RDL	QC Batch
Total Potassium (K)	mg/L	3.85	3.78	3.84	3.90	3.98	0.050	9700761
Total Sodium (Na)	mg/L	26.0	25.6	26.2	26.2	26.7	0.050	9700761
Total Sulphur (S)	mg/L	85.4	82.7	83.4	84.5	83.7	3.0	9700761
RDL = Reportable Detection Limit								

BUREAU
VERITAS

BV Labs Job #: B9A5240

Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB7166	XB7167	XB7168	XB7169	XB7170		
Sampling Date		2019/12/06 09:25	2019/12/06 09:05	2019/12/06 09:50	2019/12/06 09:30	2019/12/06 09:10		
COC Number		08475836	08475836	08475836	08475836	08475836		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	337	343	330	338	352	0.50	9700476
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.00444	0.00221	0.0123	0.00459	0.00228	0.00050	9704052
Total Antimony (Sb)	mg/L	0.0197	0.0200	0.0192	0.0187	0.0183	0.000020	9704052
Total Arsenic (As)	mg/L	0.0589	0.0590	0.0610	0.0464	0.0397	0.000020	9704052
Total Barium (Ba)	mg/L	0.0562	0.0568	0.0580	0.0558	0.0575	0.000020	9704052
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9704052
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9704052
Total Boron (B)	mg/L	0.031	0.031	0.030	0.024	0.016	0.010	9704052
Total Cadmium (Cd)	mg/L	0.00142	0.00112	0.00186	0.000568	0.000217	0.0000050	9704052
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9704052
Total Cobalt (Co)	mg/L	0.000107	0.0000575	0.000411	0.0000755	0.0000438	0.0000050	9704052
Total Copper (Cu)	mg/L	0.00700	0.00393	0.0151	0.00393	0.00191	0.000050	9704052
Total Iron (Fe)	mg/L	0.0027	0.0025	0.0048	0.0035	0.0046	0.0010	9704052
Total Lead (Pb)	mg/L	0.00122	0.000340	0.00535	0.00106	0.000384	0.0000050	9704052
Total Lithium (Li)	mg/L	0.0104	0.0106	0.0103	0.0107	0.0109	0.00050	9704052
Total Manganese (Mn)	mg/L	0.00342	0.000984	0.0121	0.00312	0.00275	0.000050	9704052
Total Molybdenum (Mo)	mg/L	0.00153	0.00152	0.00156	0.00141	0.00132	0.000050	9704052
Total Nickel (Ni)	mg/L	0.00834	0.00845	0.00814	0.00752	0.00657	0.000020	9704052
Total Selenium (Se)	mg/L	0.00751	0.00773	0.00772	0.00631	0.00590	0.000040	9704052
Total Silicon (Si)	mg/L	0.407	0.401	0.428	0.492	0.522	0.050	9704052
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9704052
Total Strontium (Sr)	mg/L	0.616	0.632	0.599	0.626	0.615	0.000050	9704052
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9704052
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9704052
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9704052
Total Uranium (U)	mg/L	0.0290	0.0265	0.0291	0.0275	0.0228	0.0000020	9704052
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9704052
Total Zinc (Zn)	mg/L	0.156	0.160	0.148	0.110	0.0847	0.00010	9704052
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9704052
Total Calcium (Ca)	mg/L	107	109	105	107	112	0.050	9700761
Total Magnesium (Mg)	mg/L	16.7	17.1	16.6	17.1	17.5	0.050	9700761

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB7166	XB7167	XB7168	XB7169	XB7170		
Sampling Date		2019/12/06 09:25	2019/12/06 09:05	2019/12/06 09:50	2019/12/06 09:30	2019/12/06 09:10		
COC Number		08475836	08475836	08475836	08475836	08475836		
	UNITS	3B	3C	4A	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	3.88	3.97	3.83	3.83	3.89	0.050	9700761
Total Sodium (Na)	mg/L	25.7	26.5	25.8	26.0	26.7	0.050	9700761
Total Sulphur (S)	mg/L	82.2	85.1	80.4	83.5	85.8	3.0	9700761
RDL = Reportable Detection Limit								

BUREAU
VERITAS

BV Labs Job #: B9A5240

Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB7175	XB7176	XB7177		
Sampling Date		2019/12/06 09:55	2019/12/06 09:35	2019/12/06 09:15		
COC Number		08475840	08475840	08475840		
	UNITS	6A	6B	6C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	335	338	344	0.50	9700476
Total Metals by ICPMS						
Total Aluminum (Al)	mg/L	0.0122	0.00296	0.00196	0.00050	9704052
Total Antimony (Sb)	mg/L	0.0194	0.0200	0.0195	0.000020	9704052
Total Arsenic (As)	mg/L	0.0612	0.0478	0.0446	0.000020	9704052
Total Barium (Ba)	mg/L	0.0582	0.0559	0.0569	0.000020	9704052
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9704052
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9704052
Total Boron (B)	mg/L	0.031	0.026	0.021	0.010	9704052
Total Cadmium (Cd)	mg/L	0.00187	0.000349	0.000189	0.0000050	9704052
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9704052
Total Cobalt (Co)	mg/L	0.000430	0.0000913	0.0000493	0.0000050	9704052
Total Copper (Cu)	mg/L	0.0151	0.00473	0.00364	0.000050	9704052
Total Iron (Fe)	mg/L	0.0052	0.0061	0.0061	0.0010	9704052
Total Lead (Pb)	mg/L	0.00546	0.000422	0.000217	0.0000050	9704052
Total Lithium (Li)	mg/L	0.0105	0.0105	0.0106	0.00050	9704052
Total Manganese (Mn)	mg/L	0.0123	0.00442	0.00295	0.000050	9704052
Total Molybdenum (Mo)	mg/L	0.00158	0.00143	0.00139	0.000050	9704052
Total Nickel (Ni)	mg/L	0.00810	0.00695	0.00602	0.000020	9704052
Total Selenium (Se)	mg/L	0.00774	0.00645	0.00618	0.000040	9704052
Total Silicon (Si)	mg/L	0.432	0.520	0.537	0.050	9704052
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9704052
Total Strontium (Sr)	mg/L	0.613	0.612	0.611	0.000050	9704052
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9704052
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9704052
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9704052
Total Uranium (U)	mg/L	0.0295	0.0272	0.0238	0.0000020	9704052
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9704052
Total Zinc (Zn)	mg/L	0.149	0.0932	0.0731	0.00010	9704052
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9704052
Total Calcium (Ca)	mg/L	107	107	110	0.050	9700761
Total Magnesium (Mg)	mg/L	16.6	17.0	17.0	0.050	9700761
RDL = Reportable Detection Limit						



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB7175	XB7176	XB7177		
Sampling Date		2019/12/06 09:55	2019/12/06 09:35	2019/12/06 09:15		
COC Number		08475840	08475840	08475840		
	UNITS	6A	6B	6C	RDL	QC Batch
Total Potassium (K)	mg/L	3.84	4.00	4.01	0.050	9700761
Total Sodium (Na)	mg/L	25.9	26.6	26.1	0.050	9700761
Total Sulphur (S)	mg/L	82.1	84.3	83.7	3.0	9700761
RDL = Reportable Detection Limit						



BUREAU
VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB7161
Sample ID: INFLUENT-75
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9702381	N/A	2019/12/09	Coco Guo
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9700969	2019/12/07	2019/12/12	Isabel Choi
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
COD by Colorimeter	M/PROB	9703262	N/A	2019/12/11	Kristoffer Ryan
Carbon (DOC)	TECH	9703687	N/A	2019/12/11	Taylor Mullings
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/09	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel
Carbon (Total Organic)	TECH	9702717	N/A	2019/12/11	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9701723	2019/12/09	2019/12/10	William Zou

BV Labs ID: XB7162
Sample ID: 1A
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel



BUREAU
VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB7163
Sample ID: 1B
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Report Automation Engine
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel

BV Labs ID: XB7163 Dup
Sample ID: 1B
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa

BV Labs ID: XB7164
Sample ID: 1C
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9702381	N/A	2019/12/09	Coco Guo
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9700969	2019/12/07	2019/12/12	Isabel Choi
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
COD by Colorimeter	M/PROB	9703264	N/A	2019/12/11	Kristoffer Ryan
Carbon (DOC)	TECH	9703687	N/A	2019/12/11	Taylor Mullings
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin



BUREAU
VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB7164
Sample ID: 1C
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel
Carbon (Total Organic)	TECH	9702717	N/A	2019/12/11	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9701723	2019/12/09	2019/12/10	William Zou

BV Labs ID: XB7165
Sample ID: 3A
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel

BV Labs ID: XB7165 Dup
Sample ID: 3A
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin

BV Labs ID: XB7166
Sample ID: 3B
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B9A5240

Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB7166

Sample ID: 3B

Matrix: Water

Collected: 2019/12/06

Shipped:

Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel

BV Labs ID: XB7167

Sample ID: 3C

Matrix: Water

Collected: 2019/12/06

Shipped:

Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9702381	N/A	2019/12/09	Coco Guo
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9700969	2019/12/07	2019/12/12	Isabel Choi
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
COD by Colorimeter	M/PROB	9703264	N/A	2019/12/11	Kristoffer Ryan
Carbon (DOC)	TECH	9703687	N/A	2019/12/11	Taylor Mullings
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel
Carbon (Total Organic)	TECH	9702717	N/A	2019/12/11	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9701723	2019/12/09	2019/12/10	William Zou

BV Labs ID: XB7167 Dup

Sample ID: 3C

Matrix: Water

Collected: 2019/12/06

Shipped:

Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand	DO/PROB	9700969	2019/12/07	2019/12/12	Isabel Choi



BUREAU
VERITAS

BV Labs Job #: B9A5240

Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB7168

Sample ID: 4A

Matrix: Water

Collected: 2019/12/06

Shipped:

Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel

BV Labs ID: XB7169

Sample ID: 4B

Matrix: Water

Collected: 2019/12/06

Shipped:

Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel

BV Labs ID: XB7170

Sample ID: 4C

Matrix: Water

Collected: 2019/12/06

Shipped:

Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9702381	N/A	2019/12/09	Coco Guo
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo



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VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB7170
Sample ID: 4C
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand	DO/PROB	9700969	2019/12/07	2019/12/12	Isabel Choi
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
COD by Colorimeter	M/PROB	9703264	N/A	2019/12/11	Kristoffer Ryan
Carbon (DOC)	TECH	9703687	N/A	2019/12/11	Taylor Mullings
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel
Carbon (Total Organic)	TECH	9702717	N/A	2019/12/11	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9701723	2019/12/09	2019/12/10	William Zou

BV Labs ID: XB7175
Sample ID: 6A
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9701814	N/A	2019/12/09	Coco Guo
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Report Automation Engine
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel



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BV Labs Job #: B9A5240

Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB7176

Sample ID: 6B

Matrix: Water

Collected: 2019/12/06

Shipped:

Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Report Automation Engine
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel

BV Labs ID: XB7177

Sample ID: 6C

Matrix: Water

Collected: 2019/12/06

Shipped:

Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9702381	N/A	2019/12/09	Coco Guo
Alkalinity - Low Level	AT/ALK	9701788	N/A	2019/12/09	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9700969	2019/12/07	2019/12/12	Isabel Choi
Low level chloride/sulphate by AC	KONE	9702398	N/A	2019/12/09	Balwinder Bassi
COD by Colorimeter	M/PROB	9703264	N/A	2019/12/11	Kristoffer Ryan
Carbon (DOC)	TECH	9703687	N/A	2019/12/11	Taylor Mullings
Hardness Total (calculated as CaCO ₃)	CALC	9700476	N/A	2019/12/12	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9700563	N/A	2019/12/10	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9700757	N/A	2019/12/10	Automated Statchk
Ion Balance	CALC	9700758	N/A	2019/12/10	Automated Statchk
Sum of cations, anions	CALC	9700759	N/A	2019/12/10	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9700760	N/A	2019/12/10	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9700761	N/A	2019/12/12	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada
Ammonia-N Low Level (Preserved)	KONE/COL	9706065	N/A	2019/12/12	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9701043	N/A	2019/12/07	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9701044	N/A	2019/12/07	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9700762	N/A	2019/12/07	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/07	Avani Patel
Carbon (Total Organic)	TECH	9702717	N/A	2019/12/11	Taylor Mullings
Total Suspended Solids (NFR)	BAL	9701723	2019/12/09	2019/12/10	William Zou



BUREAU
VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB7177 Dup
Sample ID: 6C
Matrix: Water

Collected: 2019/12/06
Shipped:
Received: 2019/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9702078	N/A	2019/12/10	Valentina Balada
Elements by ICPMS Low Level (total)	ICP/CRCM	9704052	N/A	2019/12/11	Valentina Balada



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.3°C
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Results relate only to the items tested.



BV Labs Job #: B9A5240
Report Date: 2019/12/13

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9700969	Biochemical Oxygen Demand	2019/12/12			95	85 - 115	<2.0	mg/L	NC	20
9701043	Nitrate plus Nitrite (N)	2019/12/07	NC	80 - 120	110	80 - 120	<0.0020	mg/L	0.81	25
9701044	Nitrite (N)	2019/12/07	NC	80 - 120	104	80 - 120	<0.0020	mg/L	2.8	25
9701723	Total Suspended Solids	2019/12/10			98	80 - 120	<1.0	mg/L		
9701788	Alkalinity (PP as CaCO3)	2019/12/09					<0.50	mg/L	NC	20
9701788	Alkalinity (Total as CaCO3)	2019/12/09	NC	80 - 120	94	80 - 120	<0.50	mg/L	0.59	20
9701788	Bicarbonate (HCO3)	2019/12/09					<0.50	mg/L	0.59	20
9701788	Carbonate (CO3)	2019/12/09					<0.50	mg/L	NC	20
9701788	Hydioxide (OH)	2019/12/09					<0.50	mg/L	NC	20
9701814	Alkalinity (PP as CaCO3)	2019/12/09	0	N/A			<0.50	mg/L	NC	20
9701814	Alkalinity (Total as CaCO3)	2019/12/09	97	80 - 120	94	80 - 120	<0.50	mg/L	0.10	20
9701814	Bicarbonate (HCO3)	2019/12/09					<0.50	mg/L	0.10	20
9701814	Carbonate (CO3)	2019/12/09					<0.50	mg/L	NC	20
9701814	Hydioxide (OH)	2019/12/09					<0.50	mg/L	NC	20
9702078	Dissolved Aluminum (Al)	2019/12/10	101	80 - 120	107	80 - 120	<0.00050	mg/L	2.1	20
9702078	Dissolved Antimony (Sb)	2019/12/10	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.74	20
9702078	Dissolved Arsenic (As)	2019/12/10	102	80 - 120	100	80 - 120	<0.000020	mg/L	0.80	20
9702078	Dissolved Barium (Ba)	2019/12/10	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.0091	20
9702078	Dissolved Beryllium (Be)	2019/12/10	102	80 - 120	105	80 - 120	<0.000010	mg/L	NC	20
9702078	Dissolved Bismuth (Bi)	2019/12/10	101	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9702078	Dissolved Boron (B)	2019/12/10	104	80 - 120	109	80 - 120	<0.010	mg/L	0.36	20
9702078	Dissolved Cadmium (Cd)	2019/12/10	102	80 - 120	103	80 - 120	<0.0000050	mg/L	6.1	20
9702078	Dissolved Chromium (Cr)	2019/12/10	99	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9702078	Dissolved Cobalt (Co)	2019/12/10	97	80 - 120	100	80 - 120	<0.0000050	mg/L	3.7	20
9702078	Dissolved Copper (Cu)	2019/12/10	92	80 - 120	99	80 - 120	<0.000050	mg/L	1.1	20
9702078	Dissolved Iron (Fe)	2019/12/10	102	80 - 120	107	80 - 120	<0.0010	mg/L	1.9	20
9702078	Dissolved Lead (Pb)	2019/12/10	103	80 - 120	105	80 - 120	<0.0000050	mg/L	1.5	20
9702078	Dissolved Lithium (Li)	2019/12/10	106	80 - 120	107	80 - 120	<0.00050	mg/L	0.12	20
9702078	Dissolved Manganese (Mn)	2019/12/10	102	80 - 120	103	80 - 120	<0.000050	mg/L	3.4	20
9702078	Dissolved Molybdenum (Mo)	2019/12/10	110	80 - 120	102	80 - 120	<0.000050	mg/L	1.8	20
9702078	Dissolved Nickel (Ni)	2019/12/10	97	80 - 120	104	80 - 120	<0.000020	mg/L	0.48	20
9702078	Dissolved Selenium (Se)	2019/12/10	104	80 - 120	102	80 - 120	<0.000040	mg/L	0.14	20



BV Labs Job #: B9A5240
Report Date: 2019/12/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9702078	Dissolved Silicon (Si)	2019/12/10	103	80 - 120	105	80 - 120	<0.050	mg/L	2.0	20
9702078	Dissolved Silver (Ag)	2019/12/10	99	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9702078	Dissolved Strontium (Sr)	2019/12/10	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.84	20
9702078	Dissolved Thallium (Tl)	2019/12/10	104	80 - 120	105	80 - 120	<0.0000020	mg/L	NC	20
9702078	Dissolved Tin (Sn)	2019/12/10	102	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9702078	Dissolved Titanium (Ti)	2019/12/10	103	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9702078	Dissolved Uranium (U)	2019/12/10	110	80 - 120	108	80 - 120	<0.0000020	mg/L	0.015	20
9702078	Dissolved Vanadium (V)	2019/12/10	104	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9702078	Dissolved Zinc (Zn)	2019/12/10	NC	80 - 120	106	80 - 120	<0.00010	mg/L	0.53	20
9702078	Dissolved Zirconium (Zr)	2019/12/10	108	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9702381	Acidity (pH 4.5)	2019/12/09					<1.0	mg/L	NC	20
9702381	Acidity (pH 8.3)	2019/12/09			97	80 - 120	<1.0	mg/L	NC	20
9702398	Dissolved Chloride (Cl)	2019/12/09	95	80 - 120	103	80 - 120	0.86, RDL=0.50	mg/L	NC	20
9702398	Dissolved Sulphate (SO4)	2019/12/09	110	80 - 120	101	80 - 120	0.72, RDL=0.50	mg/L	2.3	20
9702717	Total Organic Carbon (C)	2019/12/11	102	80 - 120	115	80 - 120	<0.50	mg/L	11	20
9703262	Chemical Oxygen Demand	2019/12/11	120	80 - 120	108	80 - 120	<10	mg/L		
9703264	Chemical Oxygen Demand	2019/12/11			97	80 - 120	<10	mg/L		
9703687	Dissolved Organic Carbon (C)	2019/12/11	112	80 - 120	112	80 - 120	<0.50	mg/L	NC	20
9704052	Total Aluminum (Al)	2019/12/11	96	80 - 120	100	80 - 120	<0.00050	mg/L	6.8	20
9704052	Total Antimony (Sb)	2019/12/11	NC	80 - 120	100	80 - 120	<0.000020	mg/L	0.38	20
9704052	Total Arsenic (As)	2019/12/11	103	80 - 120	103	80 - 120	<0.000020	mg/L	0.66	20
9704052	Total Barium (Ba)	2019/12/11	NC	80 - 120	103	80 - 120	<0.000020	mg/L	0.30	20
9704052	Total Beryllium (Be)	2019/12/11	93	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9704052	Total Bismuth (Bi)	2019/12/11	95	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9704052	Total Boron (B)	2019/12/11	90	80 - 120	93	80 - 120	<0.010	mg/L	1.4	20
9704052	Total Cadmium (Cd)	2019/12/11	98	80 - 120	102	80 - 120	<0.0000050	mg/L	3.3	20
9704052	Total Chromium (Cr)	2019/12/11	100	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9704052	Total Cobalt (Co)	2019/12/11	98	80 - 120	103	80 - 120	<0.0000050	mg/L	2.7	20
9704052	Total Copper (Cu)	2019/12/11	95	80 - 120	104	80 - 120	<0.000050	mg/L	0.45	20
9704052	Total Iron (Fe)	2019/12/11	100	80 - 120	106	80 - 120	<0.0010	mg/L	0.39	20
9704052	Total Lead (Pb)	2019/12/11	104	80 - 120	107	80 - 120	<0.0000050	mg/L	2.0	20
9704052	Total Lithium (Li)	2019/12/11	91	80 - 120	95	80 - 120	<0.00050	mg/L	0.77	20



BV Labs Job #: B9A5240
Report Date: 2019/12/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9704052	Total Manganese (Mn)	2019/12/11	99	80 - 120	102	80 - 120	<0.000050	mg/L	0.51	20
9704052	Total Molybdenum (Mo)	2019/12/11	107	80 - 120	101	80 - 120	<0.000050	mg/L	2.0	20
9704052	Total Nickel (Ni)	2019/12/11	96	80 - 120	104	80 - 120	<0.000020	mg/L	1.2	20
9704052	Total Selenium (Se)	2019/12/11	104	80 - 120	103	80 - 120	<0.000040	mg/L	2.1	20
9704052	Total Silicon (Si)	2019/12/11	100	80 - 120	101	80 - 120	<0.050	mg/L	0.31	20
9704052	Total Silver (Ag)	2019/12/11	96	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9704052	Total Strontium (Sr)	2019/12/11	NC	80 - 120	103	80 - 120	<0.000050	mg/L	2.2	20
9704052	Total Thallium (Tl)	2019/12/11	100	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9704052	Total Tin (Sn)	2019/12/11	99	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9704052	Total Titanium (Ti)	2019/12/11	104	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9704052	Total Uranium (U)	2019/12/11	104	80 - 120	107	80 - 120	<0.0000020	mg/L	1.2	20
9704052	Total Vanadium (V)	2019/12/11	104	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9704052	Total Zinc (Zn)	2019/12/11	NC	80 - 120	105	80 - 120	<0.00010	mg/L	0.38	20
9704052	Total Zirconium (Zr)	2019/12/11	106	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9706065	Total Ammonia (N)	2019/12/12	NC	80 - 120	104	80 - 120	<0.0050	mg/L	0.70	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



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VERITAS

BV Labs Job #: B9A5240
Report Date: 2019/12/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Harry (Peng) Liang, Senior Analyst

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BBY FCD-00077/05

B9A5240 CQC



Burnaby: 4606 Canada Way, Burnaby, BC V5G 1M5, Toll Free (800) 665-8566

CHAIN OF CUSTODY RI



COC #: 08475840

BBV FCD-00077/05

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Invoice Information				Report Information (if differs from Invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required											
Company Name: BMC MINERALS LTD.				Company Name: ALEXCO ENVIRONMENTAL				Quotation #: 860751				☒ Regular TAT 5 days (Most analyses)											
Contact Name: _____				Contact Name: Mary Mioska, Renate Vanderhorst				P.O. # / A/F#: _____				Rush TAT (Surcharges will be applied)											
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02				Same Day ☐ 2 Days ☐ 3 Days ☐											
Vancouver, BC V6E 4A4				Whitehorse, YC V1A 2V3				Site Location: Kud Ze Fayah				Date Required: _____											
Phone: _____				Phone: (867) 668-6463				Site #: _____				Date Required: _____											
Email: _____				Email: mmioska@alexcoenv.com				Sampled By: _____				Rush Confirmation #: _____											
Regulatory Criteria				Special Instructions				Analysis Requested				Laboratory Use Only											
☐ BC CSRSol ☐ BC CSR Water				☐ Return Cooler								CUSTODY SEAL: ☒ N ☐ COOLER TEMPERATURES											
☐ CCME (Specify) ☐ Other (Specify)				☐ Ship Sample Bottles (Please Specify)								Present: ☐ Initial: ☐											
☐ Drinking Water ☐ BC Water Quality				USE SCENARIO # 12485								1 1 2 6 6 1 1 1 4 3 5											
SAMPLES MUST BE KEPT COOL (<10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												HOLD - DO NOT ANALYZE											
Sample Identification		Lab Identification		Date Sampled (YYYY/MM/DD)		Time Sampled (HH:MM)		Matrix				# OF CONTAINERS SUBMITTED		COMMENTS									
1 6A				06-Dec-19		9:55		Water				6		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved									
2 6B				06-Dec-19		9:35		Water				6		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved									
3 6C				06-Dec-19		9:15		Water				11		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved									
4																							
5																							
6																							
7																							
8																							
9																							
10																							
REINQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)				RECEIVED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)			
												Julio Pardo TROK				20191210T				10:30			

B9A5240_COC





Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08473699

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/10/16
 Report #: R2796722
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B986526

Received: 2019/10/08, 13:46

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	7	N/A	2019/10/13	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	6	N/A	2019/10/10	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	1	N/A	2019/10/11	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO3) (1, 2)	6	N/A	2019/10/10	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO3) (1, 2)	1	N/A	2019/10/12	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3) (1)	7	N/A	2019/10/11	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	7	N/A	2019/10/15	BBY WI-00033	Auto Calc
Ion Balance (1)	7	N/A	2019/10/15	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	7	N/A	2019/10/11	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	7	N/A	2019/10/11	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	7	N/A	2019/10/10	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	1	2019/10/11	2019/10/11	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	6	N/A	2019/10/10	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	N/A	2019/10/12	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	6	N/A	2019/10/10	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	7	N/A	2019/10/11	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	7	N/A	2019/10/09	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	7	N/A	2019/10/09	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	7	N/A	2019/10/10	BBY WI-00033	Auto Calc
Filter and HNO3 Preserve for Metals (1)	7	N/A	2019/10/09	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08473699

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/10/16
Report #: R2796722
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B986526

Received: 2019/10/08, 13:46

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: B986526

Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WR0684	WR0685		WR0686		WR0687	WR0688		
Sampling Date		2019/10/08 13:30	2019/10/08 12:30		2019/10/08 10:30		2019/10/08 08:30	2019/10/08 12:35		
COC Number		08473699	08473699		08473699		08473699	08473699		
	UNITS	INFLUENT	2A	QC Batch	2B	QC Batch	2C	5A	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	7.8	8.3	9620856	9.4	9620856	8.6	8.6	N/A	9620856
Cation Sum	meq/L	7.9	8.6	9620856	9.2	9620856	9.4	9.3	N/A	9620856
Filter and HNO3 Preservation	N/A	FIELD	FIELD	ONSITE	FIELD	ONSITE	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	1.0	9620852	0.98	9620852	1.1	1.1	0.010	9620852
Ion Balance (% Difference)	%	1.0	1.6	9620854	1.2	9620854	4.7	4.0	N/A	9620854
Nitrate (N)	mg/L	0.586	0.0365	9620862	<0.0020	9620862	<0.0020	0.0035	0.0020	9620862
Misc. Inorganics										
Alkalinity (Total as CaCO3)	mg/L	54.3	71.5	9626443	81.6	9626443	91.2	86.8	0.50	9626443
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	9626443	<0.50	9626443	<0.50	<0.50	0.50	9626443
Bicarbonate (HCO3)	mg/L	66.3	87.2	9626443	99.6	9626443	111	106	0.50	9626443
Carbonate (CO3)	mg/L	<0.50	<0.50	9626443	<0.50	9626443	<0.50	<0.50	0.50	9626443
Hydroxide (OH)	mg/L	<0.50	<0.50	9626443	<0.50	9626443	<0.50	<0.50	0.50	9626443
Anions										
Dissolved Chloride (Cl)	mg/L	59	64	9625091	65	9625359	66	68	0.50	9625091
Dissolved Sulphate (SO4)	mg/L	240 (1)	240 (1)	9625091	290 (1)	9625359	230 (1)	240 (1)	5.0	9625091
Nutrients										
Total Ammonia (N)	mg/L	0.020	0.032	9623810	0.036	9623810	0.031	0.025	0.0050	9623810
Nitrate plus Nitrite (N)	mg/L	1.02	0.0425	9621861	<0.0020	9621861	<0.0020	0.0035	0.0020	9621861
Nitrite (N)	mg/L	0.436	0.0060	9621863	<0.0020	9621863	<0.0020	<0.0020	0.0020	9621863
RDL = Reportable Detection Limit										
N/A = Not Applicable										
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.										



BUREAU
VERITAS

BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WR0689	WR0690		
Sampling Date		2019/10/08 10:35	2019/10/08 08:35		
COC Number		08473699	08473699		
	UNITS	5B	5C	RDL	QC Batch
Calculated Parameters					
Anion Sum	meq/L	10	11	N/A	9620856
Cation Sum	meq/L	11	12	N/A	9620856
Filter and HNO3 Preservation	N/A	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	1.0	0.010	9620852
Ion Balance (% Difference)	%	1.7	1.7	N/A	9620854
Nitrate (N)	mg/L	<0.0020	0.0023	0.0020	9620862
Misc. Inorganics					
Alkalinity (Total as CaCO3)	mg/L	115	141	0.50	9626443
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	9626443
Bicarbonate (HCO3)	mg/L	140	172	0.50	9626443
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	9626443
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	9626443
Anions					
Dissolved Chloride (Cl)	mg/L	76	86	0.50	9625091
Dissolved Sulphate (SO4)	mg/L	280 (1)	300 (1)	5.0	9625091
Nutrients					
Total Ammonia (N)	mg/L	0.017	0.025	0.0050	9623810
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0023	0.0020	9621861
Nitrite (N)	mg/L	<0.0020	<0.0020	0.0020	9621863
RDL = Reportable Detection Limit					
N/A = Not Applicable					
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.					



BUREAU
VERITAS

BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WR0684	WR0685	WR0686	WR0687	WR0688		
Sampling Date		2019/10/08 13:30	2019/10/08 12:30	2019/10/08 10:30	2019/10/08 08:30	2019/10/08 12:35		
COC Number		08473699	08473699	08473699	08473699	08473699		
	UNITS	INFLUENT	2A	2B	2C	5A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	336	363	390	402	400	0.50	9620850
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0196	0.00210	0.00137	0.00084	0.00393	0.00050	9623008
Dissolved Antimony (Sb)	mg/L	0.0191	0.0145	0.0126	0.0110	0.00564	0.000020	9623008
Dissolved Arsenic (As)	mg/L	0.0587	0.0423	0.0330	0.0248	0.0203	0.000020	9623008
Dissolved Barium (Ba)	mg/L	0.0529	0.0541	0.0567	0.0564	0.0585	0.000020	9623008
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9623008
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9623008
Dissolved Boron (B)	mg/L	0.036	0.033	0.024	0.025	0.022	0.010	9623008
Dissolved Cadmium (Cd)	mg/L	0.00193	0.000742	0.000385	0.000205	0.0000968	0.0000050	9623008
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9623008
Dissolved Cobalt (Co)	mg/L	0.00241	0.000130	0.0000451	0.0000264	0.000350	0.0000050	9623008
Dissolved Copper (Cu)	mg/L	0.0143	0.00740	0.00499	0.00238	0.00147	0.000050	9623008
Dissolved Iron (Fe)	mg/L	0.0012	0.0037	0.0068	0.0069	0.0117	0.0010	9623008
Dissolved Lead (Pb)	mg/L	0.0147	0.000157	0.0000129	0.0000094	0.000284	0.0000050	9623008
Dissolved Lithium (Li)	mg/L	0.0114	0.0126	0.0133	0.0133	0.0132	0.00050	9623008
Dissolved Manganese (Mn)	mg/L	0.0498	0.00458	0.00319	0.00126	0.0358	0.000050	9623008
Dissolved Molybdenum (Mo)	mg/L	0.00150	0.00107	0.000944	0.000927	0.000543	0.000050	9623008
Dissolved Nickel (Ni)	mg/L	0.00704	0.00486	0.00460	0.00423	0.00533	0.000020	9623008
Dissolved Selenium (Se)	mg/L	0.00737	0.00458	0.00318	0.00208	0.00111	0.000040	9623008
Dissolved Silicon (Si)	mg/L	0.640	0.118	0.239	0.484	0.774	0.050	9623008
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9623008
Dissolved Strontium (Sr)	mg/L	0.607	0.628	0.661	0.661	0.656	0.000050	9623008
Dissolved Thallium (Tl)	mg/L	0.0000033	0.0000025	<0.0000020	<0.0000020	<0.0000020	0.0000020	9623008
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9623008
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9623008
Dissolved Uranium (U)	mg/L	0.0281	0.0266	0.0294	0.0308	0.0148	0.0000020	9623008
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9623008
Dissolved Zinc (Zn)	mg/L	0.136	0.0842	0.0637	0.0495	0.0222	0.00010	9623008
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9623008
Dissolved Calcium (Ca)	mg/L	107	115	124	129	127	0.050	9621327

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WR0684	WR0685	WR0686	WR0687	WR0688		
Sampling Date		2019/10/08 13:30	2019/10/08 12:30	2019/10/08 10:30	2019/10/08 08:30	2019/10/08 12:35		
COC Number		08473699	08473699	08473699	08473699	08473699		
	UNITS	INFLUENT	2A	2B	2C	5A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.6	18.3	19.2	19.2	19.9	0.050	9621327
Dissolved Potassium (K)	mg/L	3.62	4.08	3.78	3.62	1.92	0.050	9621327
Dissolved Sodium (Na)	mg/L	25.5	28.1	29.8	29.7	29.6	0.050	9621327
Dissolved Sulphur (S)	mg/L	83.3	89.1	94.2	89.8	93.0	3.0	9621327
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B986526
Report Date: 2019/10/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		WR0689	WR0690		
Sampling Date		2019/10/08 10:35	2019/10/08 08:35		
COC Number		08473699	08473699		
	UNITS	5B	5C	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	458	511	0.50	9620850
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00108	0.00094	0.00050	9623008
Dissolved Antimony (Sb)	mg/L	0.00240	0.00224	0.000020	9623008
Dissolved Arsenic (As)	mg/L	0.0116	0.00725	0.000020	9623008
Dissolved Barium (Ba)	mg/L	0.0613	0.0670	0.000020	9623008
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9623008
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9623008
Dissolved Boron (B)	mg/L	<0.010	<0.010	0.010	9623008
Dissolved Cadmium (Cd)	mg/L	0.0000180	0.0000065	0.0000050	9623008
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9623008
Dissolved Cobalt (Co)	mg/L	0.000157	0.0000879	0.0000050	9623008
Dissolved Copper (Cu)	mg/L	0.000531	0.000233	0.000050	9623008
Dissolved Iron (Fe)	mg/L	0.0108	0.0191	0.0010	9623008
Dissolved Lead (Pb)	mg/L	0.0000418	0.0000130	0.0000050	9623008
Dissolved Lithium (Li)	mg/L	0.0151	0.0169	0.00050	9623008
Dissolved Manganese (Mn)	mg/L	0.0261	0.0271	0.000050	9623008
Dissolved Molybdenum (Mo)	mg/L	0.000230	0.000126	0.000050	9623008
Dissolved Nickel (Ni)	mg/L	0.00362	0.00246	0.000020	9623008
Dissolved Selenium (Se)	mg/L	0.000494	0.000424	0.000040	9623008
Dissolved Silicon (Si)	mg/L	0.921	1.29	0.050	9623008
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9623008
Dissolved Strontium (Sr)	mg/L	0.733	0.789	0.000050	9623008
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9623008
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9623008
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9623008
Dissolved Uranium (U)	mg/L	0.00974	0.00587	0.0000020	9623008
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9623008
Dissolved Zinc (Zn)	mg/L	0.00585	0.00351	0.00010	9623008
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9623008
Dissolved Calcium (Ca)	mg/L	147	163	0.050	9621327
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WR0689	WR0690		
Sampling Date		2019/10/08 10:35	2019/10/08 08:35		
COC Number		08473699	08473699		
	UNITS	5B	5C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	22.0	25.5	0.050	9621327
Dissolved Potassium (K)	mg/L	1.29	0.723	0.050	9621327
Dissolved Sodium (Na)	mg/L	32.7	36.5	0.050	9621327
Dissolved Sulphur (S)	mg/L	98.0	108	3.0	9621327
RDL = Reportable Detection Limit					

BUREAU
VERITASBV Labs Job #: B986526
Report Date: 2019/10/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		WR0684	WR0685	WR0686	WR0687	WR0688		
Sampling Date		2019/10/08 13:30	2019/10/08 12:30	2019/10/08 10:30	2019/10/08 08:30	2019/10/08 12:35		
COC Number		08473699	08473699	08473699	08473699	08473699		
	UNITS	INFLUENT	2A	2B	2C	5A	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	335	361	380	396	403	0.50	9620571
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0556	0.00347	0.00211	0.00059	0.00343	0.00050	9621992
Total Antimony (Sb)	mg/L	0.0205	0.0143	0.0124	0.0111	0.00577	0.000020	9621992
Total Arsenic (As)	mg/L	0.0613	0.0424	0.0322	0.0248	0.0210	0.000020	9621992
Total Barium (Ba)	mg/L	0.0535	0.0533	0.0552	0.0552	0.0579	0.000020	9621992
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9621992
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621992
Total Boron (B)	mg/L	0.037	0.032	0.024	0.024	0.022	0.010	9621992
Total Cadmium (Cd)	mg/L	0.00192	0.000877	0.000376	0.000209	0.000108	0.0000050	9621992
Total Chromium (Cr)	mg/L	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9621992
Total Cobalt (Co)	mg/L	0.00252	0.000161	0.0000460	0.0000272	0.000373	0.0000050	9621992
Total Copper (Cu)	mg/L	0.0207	0.00791	0.00506	0.00244	0.00173	0.000050	9621992
Total Iron (Fe)	mg/L	0.0309	0.0079	0.0088	0.0073	0.0216	0.0010	9621992
Total Lead (Pb)	mg/L	0.0294	0.000249	0.0000257	0.0000086	0.000394	0.0000050	9621992
Total Lithium (Li)	mg/L	0.0114	0.0118	0.0125	0.0128	0.0127	0.00050	9621992
Total Manganese (Mn)	mg/L	0.0548	0.00495	0.00319	0.00125	0.0360	0.000050	9621992
Total Molybdenum (Mo)	mg/L	0.00153	0.00107	0.000933	0.000900	0.000532	0.000050	9621992
Total Nickel (Ni)	mg/L	0.00738	0.00485	0.00448	0.00430	0.00524	0.000020	9621992
Total Selenium (Se)	mg/L	0.00729	0.00464	0.00317	0.00212	0.00115	0.000040	9621992
Total Silicon (Si)	mg/L	0.706	0.115	0.225	0.464	0.759	0.050	9621992
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9621992
Total Strontium (Sr)	mg/L	0.576	0.600	0.637	0.646	0.655	0.000050	9621992
Total Thallium (Tl)	mg/L	0.0000040	0.0000029	0.0000025	0.0000022	<0.0000020	0.0000020	9621992
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9621992
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9621992
Total Uranium (U)	mg/L	0.0277	0.0265	0.0290	0.0309	0.0150	0.0000020	9621992
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9621992
Total Zinc (Zn)	mg/L	0.165	0.0859	0.0614	0.0499	0.0221	0.00010	9621992
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9621992
Total Calcium (Ca)	mg/L	107	115	122	127	129	0.050	9621328

RDL = Reportable Detection Limit



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BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WR0684	WR0685	WR0686	WR0687	WR0688		
Sampling Date		2019/10/08 13:30	2019/10/08 12:30	2019/10/08 10:30	2019/10/08 08:30	2019/10/08 12:35		
COC Number		08473699	08473699	08473699	08473699	08473699		
	UNITS	INFLUENT	2A	2B	2C	5A	RDL	QC Batch
Total Magnesium (Mg)	mg/L	16.6	17.9	18.4	19.2	20.0	0.050	9621328
Total Potassium (K)	mg/L	3.52	4.05	3.62	3.60	1.90	0.050	9621328
Total Sodium (Na)	mg/L	25.3	27.7	28.8	29.8	30.5	0.050	9621328
Total Sulphur (S)	mg/L	80.6	85.6	87.9	89.8	92.4	3.0	9621328
RDL = Reportable Detection Limit								



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BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WR0689			WR0690		
Sampling Date		2019/10/08 10:35			2019/10/08 08:35		
COC Number		08473699			08473699		
	UNITS	5B	RDL	QC Batch	5C	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	394	0.50	9620571	517	0.50	9620571
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0045	0.0030	9624231	0.00076	0.00050	9621992
Total Antimony (Sb)	mg/L	0.00233	0.000020	9624231	0.00228	0.000020	9621992
Total Arsenic (As)	mg/L	0.0115	0.000020	9624231	0.00780	0.000020	9621992
Total Barium (Ba)	mg/L	0.0618	0.000050	9624231	0.0680	0.000020	9621992
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9624231	<0.000010	0.000010	9621992
Total Bismuth (Bi)	mg/L	<0.000010	0.000010	9624231	<0.0000050	0.0000050	9621992
Total Boron (B)	mg/L	<0.010	0.010	9624231	<0.010	0.010	9621992
Total Cadmium (Cd)	mg/L	0.0000208	0.0000050	9624231	0.0000079	0.0000050	9621992
Total Chromium (Cr)	mg/L	<0.00010	0.00010	9624231	<0.00010	0.00010	9621992
Total Cobalt (Co)	mg/L	0.000161	0.000010	9624231	0.0000889	0.0000050	9621992
Total Copper (Cu)	mg/L	0.00064	0.00010	9624231	0.000266	0.000050	9621992
Total Iron (Fe)	mg/L	0.0181	0.0050	9624231	0.0518	0.0010	9621992
Total Lead (Pb)	mg/L	0.000069	0.000020	9624231	0.0000164	0.0000050	9621992
Total Lithium (Li)	mg/L	0.0134	0.00050	9624231	0.0163	0.00050	9621992
Total Manganese (Mn)	mg/L	0.0259	0.00010	9624231	0.0275	0.000050	9621992
Total Molybdenum (Mo)	mg/L	0.000242	0.000050	9624231	0.000145	0.000050	9621992
Total Nickel (Ni)	mg/L	0.00353	0.00010	9624231	0.00268	0.000020	9621992
Total Phosphorus (P)	mg/L	0.0091	0.0050	9624231			
Total Selenium (Se)	mg/L	0.000488	0.000040	9624231	0.000429	0.000040	9621992
Total Silicon (Si)	mg/L	0.845	0.050	9624231	1.26	0.050	9621992
Total Silver (Ag)	mg/L	<0.000010	0.000010	9624231	<0.0000050	0.0000050	9621992
Total Strontium (Sr)	mg/L	0.721	0.000050	9624231	0.796	0.000050	9621992
Total Thallium (Tl)	mg/L	<0.0000020	0.0000020	9624231	<0.0000020	0.0000020	9621992
Total Tin (Sn)	mg/L	<0.00020	0.00020	9624231	<0.00020	0.00020	9621992
Total Titanium (Ti)	mg/L	<0.0020	0.0020	9624231	<0.00050	0.00050	9621992
Total Uranium (U)	mg/L	0.00950	0.0000050	9624231	0.00578	0.0000020	9621992
Total Vanadium (V)	mg/L	<0.00020	0.00020	9624231	<0.00020	0.00020	9621992
Total Zinc (Zn)	mg/L	0.0060	0.0010	9624231	0.00353	0.00010	9621992
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	9624231	<0.00010	0.00010	9621992
RDL = Reportable Detection Limit							



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BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WR0689			WR0690		
Sampling Date		2019/10/08 10:35			2019/10/08 08:35		
COC Number		08473699			08473699		
	UNITS	5B	RDL	QC Batch	5C	RDL	QC Batch
Total Calcium (Ca)	mg/L	123	0.25	9621328	165	0.050	9621328
Total Magnesium (Mg)	mg/L	20.8	0.25	9621328	25.7	0.050	9621328
Total Potassium (K)	mg/L	1.28	0.25	9621328	0.714	0.050	9621328
Total Sodium (Na)	mg/L	30.7	0.25	9621328	37.0	0.050	9621328
Total Sulphur (S)	mg/L	95.6	0.60	9624231	106	3.0	9621328
RDL = Reportable Detection Limit							



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VERITAS

BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

TEST SUMMARY

BV Labs ID: WR0684
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/10/08
Shipped:
Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9626443	N/A	2019/10/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9625091	N/A	2019/10/10	Mauro Oselin
Hardness Total (calculated as CaCO3)	CALC	9620571	N/A	2019/10/10	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9620850	N/A	2019/10/11	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9620852	N/A	2019/10/15	Automated Statchk
Ion Balance	CALC	9620854	N/A	2019/10/15	Rob Reinert
Sum of cations, anions	CALC	9620856	N/A	2019/10/11	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9621327	N/A	2019/10/11	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9623008	N/A	2019/10/10	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9621328	N/A	2019/10/10	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9621992	N/A	2019/10/10	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9623810	N/A	2019/10/11	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9621861	N/A	2019/10/09	Isabel Choi
Nitrite (N) (low level)	TRAA/COL	9621863	N/A	2019/10/09	Isabel Choi
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9620862	N/A	2019/10/10	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/09	Marilou Kriss

BV Labs ID: WR0684 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/10/08
Shipped:
Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9626443	N/A	2019/10/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9625091	N/A	2019/10/10	Mauro Oselin

BV Labs ID: WR0685
Sample ID: 2A
Matrix: Water

Collected: 2019/10/08
Shipped:
Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9626443	N/A	2019/10/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9625091	N/A	2019/10/10	Mauro Oselin
Hardness Total (calculated as CaCO3)	CALC	9620571	N/A	2019/10/10	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9620850	N/A	2019/10/11	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9620852	N/A	2019/10/15	Report Automation Engine
Ion Balance	CALC	9620854	N/A	2019/10/15	Rob Reinert
Sum of cations, anions	CALC	9620856	N/A	2019/10/11	Report Automation Engine
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9621327	N/A	2019/10/11	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9623008	N/A	2019/10/10	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9621328	N/A	2019/10/10	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9621992	N/A	2019/10/10	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9623810	N/A	2019/10/11	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9621861	N/A	2019/10/09	Isabel Choi
Nitrite (N) (low level)	TRAA/COL	9621863	N/A	2019/10/09	Isabel Choi
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9620862	N/A	2019/10/10	Automated Statchk



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BV Labs Job #: B986526

Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

TEST SUMMARY

BV Labs ID: WR0685

Sample ID: 2A

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/09	Marilou Kriss

BV Labs ID: WR0686

Sample ID: 2B

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9626443	N/A	2019/10/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9625359	N/A	2019/10/11	Mauro Oselin
Hardness Total (calculated as CaCO3)	CALC	9620571	N/A	2019/10/10	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9620850	N/A	2019/10/11	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9620852	N/A	2019/10/15	Automated Statchk
Ion Balance	CALC	9620854	N/A	2019/10/15	Automated Statchk
Sum of cations, anions	CALC	9620856	N/A	2019/10/11	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9621327	N/A	2019/10/11	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9623008	N/A	2019/10/10	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9621328	N/A	2019/10/10	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9621992	N/A	2019/10/10	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9623810	N/A	2019/10/11	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9621861	N/A	2019/10/09	Isabel Choi
Nitrite (N) (low level)	TRAA/COL	9621863	N/A	2019/10/09	Isabel Choi
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9620862	N/A	2019/10/10	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/09	Marilou Kriss

BV Labs ID: WR0687

Sample ID: 2C

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9626443	N/A	2019/10/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9625091	N/A	2019/10/10	Mauro Oselin
Hardness Total (calculated as CaCO3)	CALC	9620571	N/A	2019/10/10	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9620850	N/A	2019/10/11	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9620852	N/A	2019/10/15	Automated Statchk
Ion Balance	CALC	9620854	N/A	2019/10/15	Automated Statchk
Sum of cations, anions	CALC	9620856	N/A	2019/10/11	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9621327	N/A	2019/10/11	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9623008	N/A	2019/10/10	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9621328	N/A	2019/10/10	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9621992	N/A	2019/10/10	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9623810	N/A	2019/10/11	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9621861	N/A	2019/10/09	Isabel Choi
Nitrite (N) (low level)	TRAA/COL	9621863	N/A	2019/10/09	Isabel Choi
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9620862	N/A	2019/10/10	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/09	Marilou Kriss



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BV Labs Job #: B986526

Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

TEST SUMMARY

BV Labs ID: WR0688

Sample ID: 5A

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9626443	N/A	2019/10/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9625091	N/A	2019/10/10	Mauro Oselin
Hardness Total (calculated as CaCO3)	CALC	9620571	N/A	2019/10/10	Report Automation Engine
Hardness (calculated as CaCO3)	CALC	9620850	N/A	2019/10/11	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9620852	N/A	2019/10/15	Automated Statchk
Ion Balance	CALC	9620854	N/A	2019/10/15	Rob Reinert
Sum of cations, anions	CALC	9620856	N/A	2019/10/11	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9621327	N/A	2019/10/11	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9623008	N/A	2019/10/10	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9621328	N/A	2019/10/10	Report Automation Engine
Elements by ICPMS Low Level (total)	ICP/CRCM	9621992	N/A	2019/10/10	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9623810	N/A	2019/10/11	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9621861	N/A	2019/10/09	Isabel Choi
Nitrite (N) (low level)	TRAA/COL	9621863	N/A	2019/10/09	Isabel Choi
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9620862	N/A	2019/10/10	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/09	Marilou Kriss

BV Labs ID: WR0688 Dup

Sample ID: 5A

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate+Nitrite (N) (low level)	TRAA/COL	9621861	N/A	2019/10/09	Isabel Choi
Nitrite (N) (low level)	TRAA/COL	9621863	N/A	2019/10/09	Isabel Choi

BV Labs ID: WR0689

Sample ID: 5B

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9626443	N/A	2019/10/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9625091	N/A	2019/10/10	Mauro Oselin
Hardness Total (calculated as CaCO3)	CALC	9620571	N/A	2019/10/12	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9620850	N/A	2019/10/11	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9620852	N/A	2019/10/15	Automated Statchk
Ion Balance	CALC	9620854	N/A	2019/10/15	Automated Statchk
Sum of cations, anions	CALC	9620856	N/A	2019/10/11	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9621327	N/A	2019/10/11	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9623008	N/A	2019/10/10	Andrew An
Elements by ICPMS Digested LL (total)	ICP/CRCM	9624231	2019/10/11	2019/10/11	Valentina Balada
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9621328	N/A	2019/10/12	Automated Statchk
Ammonia-N Low Level (Preserved)	KONE/COL	9623810	N/A	2019/10/11	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9621861	N/A	2019/10/09	Isabel Choi
Nitrite (N) (low level)	TRAA/COL	9621863	N/A	2019/10/09	Isabel Choi
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9620862	N/A	2019/10/10	Report Automation Engine



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BV Labs Job #: B986526

Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

TEST SUMMARY

BV Labs ID: WR0689

Sample ID: 5B

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/09	Marilou Kriss

BV Labs ID: WR0690

Sample ID: 5C

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9626443	N/A	2019/10/13	Coco Guo
Low level chloride/sulphate by AC	KONE	9625091	N/A	2019/10/10	Mauro Oselin
Hardness Total (calculated as CaCO3)	CALC	9620571	N/A	2019/10/10	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9620850	N/A	2019/10/11	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9620852	N/A	2019/10/15	Automated Statchk
Ion Balance	CALC	9620854	N/A	2019/10/15	Rob Reinert
Sum of cations, anions	CALC	9620856	N/A	2019/10/11	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9621327	N/A	2019/10/11	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9623008	N/A	2019/10/10	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9621328	N/A	2019/10/10	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9621992	N/A	2019/10/10	Andrew An
Ammonia-N Low Level (Preserved)	KONE/COL	9623810	N/A	2019/10/11	Fadia Mostafa
Nitrate+Nitrite (N) (low level)	TRAA/COL	9621861	N/A	2019/10/09	Isabel Choi
Nitrite (N) (low level)	TRAA/COL	9621863	N/A	2019/10/09	Isabel Choi
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9620862	N/A	2019/10/10	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/10/09	Marilou Kriss

BV Labs ID: WR0690 Dup

Sample ID: 5C

Matrix: Water

Collected: 2019/10/08

Shipped:

Received: 2019/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9621992	N/A	2019/10/10	Andrew An



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VERITAS

BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	20.0°C
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Sample WR0689 [5B] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

LOW LEVEL TOTAL METALS IN WATER (WATER) Comments

Matrix Spike Elements by ICPMS Digested LL (total): RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.



BV Labs Job #: B986526
Report Date: 2019/10/16

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9621861	Nitrate plus Nitrite (N)	2019/10/09	94	80 - 120	109	80 - 120	<0.0020	mg/L	5.9	25
9621863	Nitrite (N)	2019/10/09	87	80 - 120	101	80 - 120	<0.0020	mg/L	NC	25
9621992	Total Aluminum (Al)	2019/10/10	97	80 - 120	98	80 - 120	<0.00050	mg/L	0.46	20
9621992	Total Antimony (Sb)	2019/10/10	99	80 - 120	97	80 - 120	<0.000020	mg/L	0.95	20
9621992	Total Arsenic (As)	2019/10/10	102	80 - 120	98	80 - 120	<0.000020	mg/L	0.12	20
9621992	Total Barium (Ba)	2019/10/10	NC	80 - 120	96	80 - 120	<0.000020	mg/L	0.80	20
9621992	Total Beryllium (Be)	2019/10/10	95	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9621992	Total Bismuth (Bi)	2019/10/10	96	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9621992	Total Boron (B)	2019/10/10	94	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
9621992	Total Cadmium (Cd)	2019/10/10	97	80 - 120	99	80 - 120	<0.0000050	mg/L	9.3	20
9621992	Total Chromium (Cr)	2019/10/10	95	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9621992	Total Cobalt (Co)	2019/10/10	92	80 - 120	96	80 - 120	<0.0000050	mg/L	0.56	20
9621992	Total Copper (Cu)	2019/10/10	91	80 - 120	98	80 - 120	<0.000050	mg/L	2.2	20
9621992	Total Iron (Fe)	2019/10/10	102	80 - 120	100	80 - 120	<0.0010	mg/L	0.45	20
9621992	Total Lead (Pb)	2019/10/10	100	80 - 120	100	80 - 120	<0.0000050	mg/L	14	20
9621992	Total Lithium (Li)	2019/10/10	91	80 - 120	96	80 - 120	<0.00050	mg/L	0.32	20
9621992	Total Manganese (Mn)	2019/10/10	97	80 - 120	100	80 - 120	<0.000050	mg/L	1.7	20
9621992	Total Molybdenum (Mo)	2019/10/10	103	80 - 120	99	80 - 120	<0.000050	mg/L	0	20
9621992	Total Nickel (Ni)	2019/10/10	93	80 - 120	100	80 - 120	<0.000020	mg/L	3.4	20
9621992	Total Selenium (Se)	2019/10/10	104	80 - 120	100	80 - 120	<0.000040	mg/L	2.9	20
9621992	Total Silicon (Si)	2019/10/10	105	80 - 120	99	80 - 120	<0.050	mg/L	0.20	20
9621992	Total Silver (Ag)	2019/10/10	95	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9621992	Total Strontium (Sr)	2019/10/10	NC	80 - 120	94	80 - 120	<0.000050	mg/L	0.98	20
9621992	Total Thallium (Tl)	2019/10/10	97	80 - 120	97	80 - 120	<0.0000020	mg/L	NC	20
9621992	Total Tin (Sn)	2019/10/10	93	80 - 120	92	80 - 120	<0.00020	mg/L	NC	20
9621992	Total Titanium (Ti)	2019/10/10	101	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9621992	Total Uranium (U)	2019/10/10	102	80 - 120	99	80 - 120	0.0000028, RDL=0.0000020 (1)	mg/L	1.7	20
9621992	Total Vanadium (V)	2019/10/10	100	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9621992	Total Zinc (Zn)	2019/10/10	93	80 - 120	101	80 - 120	<0.00010	mg/L	1.5	20
9621992	Total Zirconium (Zr)	2019/10/10	102	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20



BV Labs Job #: B986526
Report Date: 2019/10/16

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9623008	Dissolved Aluminum (Al)	2019/10/10	97	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9623008	Dissolved Antimony (Sb)	2019/10/10	96	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9623008	Dissolved Arsenic (As)	2019/10/10	98	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9623008	Dissolved Barium (Ba)	2019/10/10	97	80 - 120	95	80 - 120	<0.000020	mg/L	5.8	20
9623008	Dissolved Beryllium (Be)	2019/10/10	96	80 - 120	96	80 - 120	<0.000010	mg/L	NC	20
9623008	Dissolved Bismuth (Bi)	2019/10/10	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9623008	Dissolved Boron (B)	2019/10/10	98	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9623008	Dissolved Cadmium (Cd)	2019/10/10	99	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9623008	Dissolved Chromium (Cr)	2019/10/10	95	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9623008	Dissolved Cobalt (Co)	2019/10/10	93	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9623008	Dissolved Copper (Cu)	2019/10/10	95	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
9623008	Dissolved Iron (Fe)	2019/10/10	99	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
9623008	Dissolved Lead (Pb)	2019/10/10	99	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9623008	Dissolved Lithium (Li)	2019/10/10	98	80 - 120	96	80 - 120	<0.00050	mg/L	NC	20
9623008	Dissolved Manganese (Mn)	2019/10/10	98	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9623008	Dissolved Molybdenum (Mo)	2019/10/10	97	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
9623008	Dissolved Nickel (Ni)	2019/10/10	98	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9623008	Dissolved Selenium (Se)	2019/10/10	100	80 - 120	101	80 - 120	<0.000040	mg/L	NC	20
9623008	Dissolved Silicon (Si)	2019/10/10	99	80 - 120	99	80 - 120	<0.050	mg/L	NC	20
9623008	Dissolved Silver (Ag)	2019/10/10	97	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9623008	Dissolved Strontium (Sr)	2019/10/10	94	80 - 120	95	80 - 120	<0.000050	mg/L	1.7	20
9623008	Dissolved Thallium (Tl)	2019/10/10	96	80 - 120	99	80 - 120	<0.0000020	mg/L	NC	20
9623008	Dissolved Tin (Sn)	2019/10/10	91	80 - 120	93	80 - 120	<0.00020	mg/L	NC	20
9623008	Dissolved Titanium (Ti)	2019/10/10	98	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9623008	Dissolved Uranium (U)	2019/10/10	101	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9623008	Dissolved Vanadium (V)	2019/10/10	97	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9623008	Dissolved Zinc (Zn)	2019/10/10	100	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9623008	Dissolved Zirconium (Zr)	2019/10/10	95	80 - 120	94	80 - 120	<0.00010	mg/L	NC	20
9623810	Total Ammonia (N)	2019/10/11	NC	80 - 120	95	80 - 120	<0.0050	mg/L	2.2	20
9624231	Total Aluminum (Al)	2019/10/11	102	80 - 120	96	80 - 120	<0.0030	mg/L	12	20
9624231	Total Antimony (Sb)	2019/10/11	98	80 - 120	96	80 - 120	<0.000020	mg/L	1.6	20
9624231	Total Arsenic (As)	2019/10/11	109	80 - 120	99	80 - 120	<0.000020	mg/L	0.75	20



BV Labs Job #: B986526
Report Date: 2019/10/16

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9624231	Total Barium (Ba)	2019/10/11	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.057	20
9624231	Total Beryllium (Be)	2019/10/11	98	80 - 120	94	80 - 120	<0.000010	mg/L	15	20
9624231	Total Bismuth (Bi)	2019/10/11	99	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9624231	Total Boron (B)	2019/10/11	97	80 - 120	92	80 - 120	<0.010	mg/L	4.4	20
9624231	Total Cadmium (Cd)	2019/10/11	101	80 - 120	99	80 - 120	<0.0000050	mg/L	10	20
9624231	Total Chromium (Cr)	2019/10/11	100	80 - 120	100	80 - 120	<0.00010	mg/L	0.064	20
9624231	Total Cobalt (Co)	2019/10/11	98	80 - 120	99	80 - 120	<0.000010	mg/L	3.8	20
9624231	Total Copper (Cu)	2019/10/11	97	80 - 120	99	80 - 120	<0.00010	mg/L	0.90	20
9624231	Total Iron (Fe)	2019/10/11	100	80 - 120	96	80 - 120	<0.0050	mg/L	1.7	20
9624231	Total Lead (Pb)	2019/10/11	101	80 - 120	101	80 - 120	<0.000020	mg/L	0.51	20
9624231	Total Lithium (Li)	2019/10/11	96	80 - 120	94	80 - 120	<0.00050	mg/L	2.8	20
9624231	Total Manganese (Mn)	2019/10/11	103	80 - 120	99	80 - 120	<0.00010	mg/L	0.82	20
9624231	Total Molybdenum (Mo)	2019/10/11	103	80 - 120	100	80 - 120	<0.000050	mg/L	1.5	20
9624231	Total Nickel (Ni)	2019/10/11	100	80 - 120	99	80 - 120	<0.00010	mg/L	0.77	20
9624231	Total Phosphorus (P)	2019/10/11	104	80 - 120	95	80 - 120	<0.0050	mg/L		
9624231	Total Selenium (Se)	2019/10/11	109	80 - 120	100	80 - 120	<0.000040	mg/L	4.5	20
9624231	Total Silicon (Si)	2019/10/11	98	80 - 120	94	80 - 120	<0.050	mg/L	1.1	20
9624231	Total Silver (Ag)	2019/10/11	95	80 - 120	98	80 - 120	<0.000010	mg/L	12	20
9624231	Total Strontium (Sr)	2019/10/11	NC	80 - 120	98	80 - 120	<0.000050	mg/L	3.4	20
9624231	Total Sulphur (S)	2019/10/11	NC	80 - 120	97	80 - 120	<0.60	mg/L		
9624231	Total Thallium (Tl)	2019/10/11	95	80 - 120	99	80 - 120	<0.000020	mg/L	4.9	20
9624231	Total Tin (Sn)	2019/10/11	94	80 - 120	91	80 - 120	<0.00020	mg/L	NC	20
9624231	Total Titanium (Ti)	2019/10/11	103	80 - 120	102	80 - 120	<0.0020	mg/L	NC	20
9624231	Total Uranium (U)	2019/10/11	106	80 - 120	101	80 - 120	<0.0000050	mg/L	0.81	20
9624231	Total Vanadium (V)	2019/10/11	100	80 - 120	99	80 - 120	<0.00020	mg/L	0.63	20
9624231	Total Zinc (Zn)	2019/10/11	103	80 - 120	99	80 - 120	<0.0010	mg/L	9.7	20
9624231	Total Zirconium (Zr)	2019/10/11	96	80 - 120	98	80 - 120	<0.00010	mg/L	0.47	20
9625091	Dissolved Chloride (Cl)	2019/10/10	NC	80 - 120	103	80 - 120	<0.50	mg/L	NC	20
9625091	Dissolved Sulphate (SO4)	2019/10/10	NC	80 - 120	102	80 - 120	<0.50	mg/L	0.21	20
9625359	Dissolved Chloride (Cl)	2019/10/11	100	80 - 120	101	80 - 120	<0.50	mg/L	NC	20
9625359	Dissolved Sulphate (SO4)	2019/10/11	100	80 - 120	103	80 - 120	0.76, RDL=0.50	mg/L	NC	20
9626443	Alkalinity (PP as CaCO3)	2019/10/13					<0.50	mg/L	NC	20



BV Labs Job #: B986526
Report Date: 2019/10/16

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9626443	Alkalinity (Total as CaCO ₃)	2019/10/13	NC	80 - 120	97	80 - 120	<0.50	mg/L	1.2	20
9626443	Bicarbonate (HCO ₃)	2019/10/13					<0.50	mg/L	1.2	20
9626443	Carbonate (CO ₃)	2019/10/13					<0.50	mg/L	NC	20
9626443	Hydioxide (OH)	2019/10/13					<0.50	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for U- 2X RDL acceptable for low level metals determination.



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VERITAS

BV Labs Job #: B986526
Report Date: 2019/10/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY RE

08473699

BBY FCD-00077/05

COC #:

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Invoice Information			Report Information (if differs from invoice)			Project Information (where applicable)			Turnaround Time (TAT) Required		
Company Name:	BMC MINERALS LTD.		Company Name:	ALESCO ENVIRONMENTAL		Quotation #:	B60751		☒ Regular TAT 5 days (Most analyses) ☐ Rush TAT (Surcharges will be applied)		
Contact Name:	Mary Miodas, Renate Vanderhorst		Contact Name:	UNIT 3 151 INDUSTRIAL RD		P.O. #/ A/F#:	BMC-18-02		Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 1 Day ☐ 2 Days ☐ 3 Days		
Address:	530-1130 WEST PENDER ST Vancouver, BC V6E 4A4		Address:	Whitmore, BC V6E 4A4		Project #:	Kudr Ze Kayah		Date Required:		
Phone:	[867] 668-6463		Phone:	[867] 668-6463		Site Location:	Kudr Ze Kayah		Rush Confirmation #: (Lab/Project/Use Only)		
Email:	mmioska@alexcocenvy.com		Email:	vanderhorst@alexcocenvy.com		Site #:			COMMENTS:		
Regulatory Criteria			Special Instructions			Analysis Requested			Rush Confirmation #:		
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality			☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485								
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM											
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Ammonia	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1 Influent		08-Oct-19	13:30	Water	X	X	X	X	X	7	Metals preserved with HNO3, dissolved metals field filtered
2 2A		08-Oct-19	12:30	Water	X	X	X	X	X	7	Metals preserved with HNO3, dissolved metals field filtered
3 2B		08-Oct-19	10:30	Water	X	X	X	X	X	7	Metals preserved with HNO3, dissolved metals field filtered
4 2C		08-Oct-19	8:30	Water	X	X	X	X	X	7	Metals preserved with HNO3, dissolved metals field filtered
5 5A		08-Oct-19	12:35	Water	X	X	X	X	X	7	Metals preserved with HNO3, dissolved metals field filtered
6 5B		08-Oct-19	10:35	Water	X	X	X	X	X	7	Metals preserved with HNO3, dissolved metals field filtered
7 5C		08-Oct-19	8:35	Water	X	X	X	X	X	7	Metals preserved with HNO3, dissolved metals field filtered
8											
9											
10											
RETURNED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)				

476

CS-1

08/20/2019 1346

08/20/2019 8:20

Temp: 20.20/20

BBY FCD-00077/05

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Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08474477

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/11/13
 Report #: R2810389
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B995644

Received: 2019/11/04, 15:15

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	7	N/A	2019/11/07	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	7	N/A	2019/11/06	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1, 2)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Ion Balance (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	7	N/A	2019/11/06	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	7	N/A	2019/11/07	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	7	N/A	2019/11/12	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	7	N/A	2019/11/06	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	7	N/A	2019/11/06	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	7	N/A	2019/11/07	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	7	N/A	2019/11/06	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08474477

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/11/13
Report #: R2810389
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B995644

Received: 2019/11/04, 15:15

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		WW4134		WW4135	WW4136	WW4137	WW4138	WW4139		
Sampling Date		2019/11/04 15:00		2019/11/04 14:40	2019/11/04 10:50	2019/11/04 09:10	2019/11/04 14:30	2019/11/04 10:40		
COC Number		08474477		08474477	08474477	08474477	08474477	08474477		
	UNITS	INFL-61	RDL	2A	2B	2C	5A	5B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.0	N/A	8.1	8.5	9.0	9.5	11	N/A	9659832
Cation Sum	meq/L	8.3	N/A	8.7	9.1	9.5	9.8	12	N/A	9659832
Filter and HNO3 Preservation	N/A	FIELD		FIELD	FIELD	FIELD	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	1.1	1.1	1.1	1.0	1.1	0.010	9659830
Ion Balance (% Difference)	%	2.1	N/A	3.8	3.5	3.1	1.7	2.6	N/A	9659831
Nitrate (N)	mg/L	0.385	0.0020	0.0368	0.0047	<0.0020	<0.0020	<0.0020	0.0020	9659854

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	44.9	0.50	66.8	72.3	83.3	84.0	112	0.50	9660736
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9660736
Bicarbonate (HCO3)	mg/L	54.7	0.50	81.4	88.2	102	102	137	0.50	9660736
Carbonate (CO3)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9660736
Hydroxide (OH)	mg/L	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9660736

Anions

Dissolved Chloride (Cl)	mg/L	79	0.50	66	65	69	72 (1)	87 (2)	0.50	9660854
Dissolved Sulphate (SO4)	mg/L	230	5.0	230	250	260	280 (3)	310 (4)	5.0	9660854

Nutrients

Total Ammonia (N)	mg/L	0.80 (5)	0.010	0.011	0.0081	0.0079	0.064	0.011	0.0050	9666703
Nitrate plus Nitrite (N)	mg/L	0.388	0.0020	0.0368	0.0047	<0.0020	<0.0020	<0.0020	0.0020	9660918
Nitrite (N)	mg/L	0.0028	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	9660919

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) nov11

(2) sep9

(3) dec12

(4) oct10

(5) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WW4140		
Sampling Date		2019/11/04 09:00		
COC Number		08474477		
	UNITS	5C	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	13	N/A	9659832
Cation Sum	meq/L	14	N/A	9659832
Filter and HNO3 Preservation	N/A	FIELD		ONSITE
Ion Balance	N/A	1.0	0.010	9659830
Ion Balance (% Difference)	%	1.9	N/A	9659831
Nitrate (N)	mg/L	<0.0020	0.0020	9659854
Misc. Inorganics				
Alkalinity (Total as CaCO3)	mg/L	146	0.50	9660736
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9660736
Bicarbonate (HCO3)	mg/L	178	0.50	9660736
Carbonate (CO3)	mg/L	<0.50	0.50	9660736
Hydroxide (OH)	mg/L	<0.50	0.50	9660736
Anions				
Dissolved Chloride (Cl)	mg/L	98 (1)	0.50	9660854
Dissolved Sulphate (SO4)	mg/L	360 (2)	5.0	9660854
Nutrients				
Total Ammonia (N)	mg/L	0.011	0.0050	9666703
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	9660918
Nitrite (N)	mg/L	<0.0020	0.0020	9660919
RDL = Reportable Detection Limit N/A = Not Applicable (1) jul7 (2) aug8				



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BV Labs Job #: B995644

Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW4134		WW4135	WW4136	WW4137		
Sampling Date		2019/11/04 15:00		2019/11/04 14:40	2019/11/04 10:50	2019/11/04 09:10		
COC Number		08474477		08474477	08474477	08474477		
	UNITS	INFL-61	QC Batch	2A	2B	2C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	351	9659188	370	387	407	0.50	9659188
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0130	9660184	0.00184	0.00141	0.00091	0.00050	9660184
Dissolved Antimony (Sb)	mg/L	0.0192	9660184	0.0165	0.0158	0.0141	0.000020	9660184
Dissolved Arsenic (As)	mg/L	0.0581	9660184	0.0494	0.0353	0.0274	0.000020	9660184
Dissolved Barium (Ba)	mg/L	0.0538	9660184	0.0542	0.0561	0.0564	0.000020	9660184
Dissolved Beryllium (Be)	mg/L	<0.000010	9660184	<0.000010	<0.000010	<0.000010	0.000010	9660184
Dissolved Bismuth (Bi)	mg/L	<0.0000050	9660184	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660184
Dissolved Boron (B)	mg/L	0.035	9660184	0.035	0.027	0.022	0.010	9660184
Dissolved Cadmium (Cd)	mg/L	0.00211	9660184	0.000781	0.000403	0.000188	0.0000050	9660184
Dissolved Chromium (Cr)	mg/L	<0.00010	9660184	<0.00010	<0.00010	<0.00010	0.00010	9660184
Dissolved Cobalt (Co)	mg/L	0.00271	9660184	0.0000910	0.0000463	0.0000326	0.0000050	9660184
Dissolved Copper (Cu)	mg/L	0.0186	9660184	0.00592	0.00398	0.00224	0.000050	9660184
Dissolved Iron (Fe)	mg/L	<0.0010	9660184	0.0018	0.0068	0.0041	0.0010	9660184
Dissolved Lead (Pb)	mg/L	0.0145	9660184	0.0000962	0.0000110	0.0000050	0.0000050	9660184
Dissolved Lithium (Li)	mg/L	0.0114	9660184	0.0122	0.0126	0.0129	0.00050	9660184
Dissolved Manganese (Mn)	mg/L	0.0489	9660184	0.00391	0.00339	0.000356	0.000050	9660184
Dissolved Molybdenum (Mo)	mg/L	0.00152	9660184	0.00110	0.00106	0.00101	0.000050	9660184
Dissolved Nickel (Ni)	mg/L	0.00832	9660184	0.00564	0.00474	0.00385	0.000020	9660184
Dissolved Selenium (Se)	mg/L	0.00745	9660184	0.00554	0.00484	0.00376	0.000040	9660184
Dissolved Silicon (Si)	mg/L	0.559	9660184	0.146	0.194	0.324	0.050	9660184
Dissolved Silver (Ag)	mg/L	<0.0000050	9660184	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660184
Dissolved Strontium (Sr)	mg/L	0.593	9660184	0.622	0.641	0.672	0.000050	9660184
Dissolved Thallium (Tl)	mg/L	<0.0000020	9664321	0.0000033	<0.0000020	<0.0000020	0.0000020	9660184
Dissolved Tin (Sn)	mg/L	<0.00020	9660184	<0.00020	<0.00020	<0.00020	0.00020	9660184
Dissolved Titanium (Ti)	mg/L	<0.00050	9660184	<0.00050	<0.00050	<0.00050	0.00050	9660184
Dissolved Uranium (U)	mg/L	0.0271	9660184	0.0233	0.0214	0.0221	0.0000020	9660184
Dissolved Vanadium (V)	mg/L	<0.00020	9660184	<0.00020	<0.00020	<0.00020	0.00020	9660184
Dissolved Zinc (Zn)	mg/L	0.172	9660184	0.103	0.0751	0.0499	0.00010	9660184
Dissolved Zirconium (Zr)	mg/L	<0.00010	9660184	<0.00010	<0.00010	<0.00010	0.00010	9660184
Dissolved Calcium (Ca)	mg/L	113	9659189	119	125	132	0.050	9659189

RDL = Reportable Detection Limit



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VERITAS

BV Labs Job #: B995644
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW4134		WW4135	WW4136	WW4137		
Sampling Date		2019/11/04 15:00		2019/11/04 14:40	2019/11/04 10:50	2019/11/04 09:10		
COC Number		08474477		08474477	08474477	08474477		
	UNITS	INFL-61	QC Batch	2A	2B	2C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.5	9659189	18.0	18.4	18.9	0.050	9659189
Dissolved Potassium (K)	mg/L	3.70	9659189	4.28	4.27	4.45	0.050	9659189
Dissolved Sodium (Na)	mg/L	26.0	9659189	27.7	28.7	29.5	0.050	9659189
Dissolved Sulphur (S)	mg/L	83.0	9659189	90.1	93.1	93.9	3.0	9659189
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B995644

Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

Sampler Initials: BR

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW4138	WW4139	WW4140		
Sampling Date		2019/11/04 14:30	2019/11/04 10:40	2019/11/04 09:00		
COC Number		08474477	08474477	08474477		
	UNITS	5A	5B	5C	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	420	504	595	0.50	9659188
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00402	0.00127	0.00086	0.00050	9660184
Dissolved Antimony (Sb)	mg/L	0.00879	0.00358	0.00343	0.000020	9660184
Dissolved Arsenic (As)	mg/L	0.0226	0.0107	0.00603	0.000020	9660184
Dissolved Barium (Ba)	mg/L	0.0592	0.0649	0.0717	0.000020	9660184
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9660184
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660184
Dissolved Boron (B)	mg/L	0.022	<0.010	<0.010	0.010	9660184
Dissolved Cadmium (Cd)	mg/L	0.000151	0.0000181	<0.0000050	0.0000050	9660184
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9660184
Dissolved Cobalt (Co)	mg/L	0.000191	0.000164	0.0000788	0.0000050	9660184
Dissolved Copper (Cu)	mg/L	0.00138	0.000443	0.000184	0.000050	9660184
Dissolved Iron (Fe)	mg/L	0.0064	0.0331	0.0138	0.0010	9660184
Dissolved Lead (Pb)	mg/L	0.000170	0.0000245	0.0000071	0.0000050	9660184
Dissolved Lithium (Li)	mg/L	0.0135	0.0158	0.0184	0.00050	9660184
Dissolved Manganese (Mn)	mg/L	0.0210	0.0240	0.0214	0.000050	9660184
Dissolved Molybdenum (Mo)	mg/L	0.000607	0.000256	0.000158	0.000050	9660184
Dissolved Nickel (Ni)	mg/L	0.00635	0.00390	0.00290	0.000020	9660184
Dissolved Selenium (Se)	mg/L	0.00154	0.000621	0.000464	0.000040	9660184
Dissolved Silicon (Si)	mg/L	0.591	0.693	0.913	0.050	9660184
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660184
Dissolved Strontium (Sr)	mg/L	0.684	0.782	0.898	0.000050	9660184
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000020	9660184
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9660184
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9660184
Dissolved Uranium (U)	mg/L	0.0161	0.0100	0.00760	0.0000020	9660184
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9660184
Dissolved Zinc (Zn)	mg/L	0.0356	0.00812	0.00307	0.00010	9660184
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9660184
Dissolved Calcium (Ca)	mg/L	135	162	190	0.050	9659189
RDL = Reportable Detection Limit						



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		WW4138	WW4139	WW4140		
Sampling Date		2019/11/04 14:30	2019/11/04 10:40	2019/11/04 09:00		
COC Number		08474477	08474477	08474477		
	UNITS	5A	5B	5C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	20.3	24.0	29.1	0.050	9659189
Dissolved Potassium (K)	mg/L	2.14	1.27	0.627	0.050	9659189
Dissolved Sodium (Na)	mg/L	31.1	35.8	42.3	0.050	9659189
Dissolved Sulphur (S)	mg/L	96.4	109	127	3.0	9659189
RDL = Reportable Detection Limit						



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BV Labs Job #: B995644
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW4134	WW4135	WW4136	WW4137	WW4138		
Sampling Date		2019/11/04 15:00	2019/11/04 14:40	2019/11/04 10:50	2019/11/04 09:10	2019/11/04 14:30		
COC Number		08474477	08474477	08474477	08474477	08474477		
	UNITS	INFL-61	2A	2B	2C	5A	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	356	370	376	400	417	0.50	9659278
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0210	0.00285	0.00169	0.00099	0.00485	0.00050	9660945
Total Antimony (Sb)	mg/L	0.0194	0.0165	0.0159	0.0140	0.00894	0.000020	9660945
Total Arsenic (As)	mg/L	0.0599	0.0508	0.0354	0.0277	0.0231	0.000020	9660945
Total Barium (Ba)	mg/L	0.0542	0.0540	0.0551	0.0563	0.0600	0.000020	9660945
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9660945
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660945
Total Boron (B)	mg/L	0.036	0.034	0.028	0.023	0.022	0.010	9660945
Total Cadmium (Cd)	mg/L	0.00209	0.000800	0.000406	0.000193	0.000147	0.0000050	9660945
Total Chromium (Cr)	mg/L	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9660945
Total Cobalt (Co)	mg/L	0.00279	0.000105	0.0000469	0.0000336	0.000212	0.0000050	9660945
Total Copper (Cu)	mg/L	0.0199	0.00629	0.00412	0.00235	0.00170	0.000050	9660945
Total Iron (Fe)	mg/L	0.0056	0.0040	0.0081	0.0039	0.0159	0.0010	9660945
Total Lead (Pb)	mg/L	0.0186	0.000185	0.0000227	0.0000072	0.000293	0.0000050	9660945
Total Lithium (Li)	mg/L	0.0115	0.0123	0.0127	0.0135	0.0139	0.00050	9660945
Total Manganese (Mn)	mg/L	0.0537	0.00407	0.00343	0.000349	0.0226	0.000050	9660945
Total Molybdenum (Mo)	mg/L	0.00159	0.00115	0.00107	0.00101	0.000612	0.000050	9660945
Total Nickel (Ni)	mg/L	0.00850	0.00559	0.00469	0.00388	0.00654	0.000020	9660945
Total Selenium (Se)	mg/L	0.00767	0.00563	0.00482	0.00370	0.00155	0.000040	9660945
Total Silicon (Si)	mg/L	0.562	0.142	0.181	0.320	0.583	0.050	9660945
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9660945
Total Strontium (Sr)	mg/L	0.594	0.611	0.625	0.651	0.669	0.000050	9660945
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9660945
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00028	<0.00020	<0.00020	0.00020	9660945
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9660945
Total Uranium (U)	mg/L	0.0279	0.0231	0.0215	0.0221	0.0163	0.0000020	9660945
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9660945
Total Zinc (Zn)	mg/L	0.175	0.0996	0.0742	0.0487	0.0356	0.00010	9660945
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9660945
Total Calcium (Ca)	mg/L	114	117	119	128	132	0.050	9659852

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW4134	WW4135	WW4136	WW4137	WW4138		
Sampling Date		2019/11/04 15:00	2019/11/04 14:40	2019/11/04 10:50	2019/11/04 09:10	2019/11/04 14:30		
COC Number		08474477	08474477	08474477	08474477	08474477		
	UNITS	INFL-61	2A	2B	2C	5A	RDL	QC Batch
Total Magnesium (Mg)	mg/L	17.3	18.7	18.9	19.7	21.2	0.050	9659852
Total Potassium (K)	mg/L	3.84	4.33	4.31	4.39	2.14	0.050	9659852
Total Sodium (Na)	mg/L	27.0	29.0	29.3	30.5	32.3	0.050	9659852
Total Sulphur (S)	mg/L	81.6	86.4	88.9	95.0	99.2	3.0	9659852
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B995644
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW4139	WW4140		
Sampling Date		2019/11/04 10:40	2019/11/04 09:00		
COC Number		08474477	08474477		
	UNITS	5B	5C	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	498	578	0.50	9659278
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00157	0.00098	0.00050	9660945
Total Antimony (Sb)	mg/L	0.00364	0.00347	0.000020	9660945
Total Arsenic (As)	mg/L	0.0113	0.00623	0.000020	9660945
Total Barium (Ba)	mg/L	0.0648	0.0728	0.000020	9660945
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9660945
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9660945
Total Boron (B)	mg/L	<0.010	<0.010	0.010	9660945
Total Cadmium (Cd)	mg/L	0.0000178	<0.0000050	0.0000050	9660945
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9660945
Total Cobalt (Co)	mg/L	0.000181	0.0000781	0.0000050	9660945
Total Copper (Cu)	mg/L	0.000568	0.000251	0.000050	9660945
Total Iron (Fe)	mg/L	0.0284	0.0418	0.0010	9660945
Total Lead (Pb)	mg/L	0.0000467	0.0000180	0.0000050	9660945
Total Lithium (Li)	mg/L	0.0163	0.0186	0.00050	9660945
Total Manganese (Mn)	mg/L	0.0263	0.0219	0.000050	9660945
Total Molybdenum (Mo)	mg/L	0.000217	0.000161	0.000050	9660945
Total Nickel (Ni)	mg/L	0.00400	0.00289	0.000020	9660945
Total Selenium (Se)	mg/L	0.000651	0.000451	0.000040	9660945
Total Silicon (Si)	mg/L	0.690	0.880	0.050	9660945
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9660945
Total Strontium (Sr)	mg/L	0.789	0.897	0.000050	9660945
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9660945
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9660945
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9660945
Total Uranium (U)	mg/L	0.0101	0.00756	0.0000020	9660945
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9660945
Total Zinc (Zn)	mg/L	0.00803	0.00302	0.00010	9660945
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9660945
Total Calcium (Ca)	mg/L	159	183	0.050	9659852
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: B995644
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		WW4139	WW4140		
Sampling Date		2019/11/04 10:40	2019/11/04 09:00		
COC Number		08474477	08474477		
	UNITS	5B	5C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	24.8	29.5	0.050	9659852
Total Potassium (K)	mg/L	1.30	0.598	0.050	9659852
Total Sodium (Na)	mg/L	37.3	43.1	0.050	9659852
Total Sulphur (S)	mg/L	111	126	3.0	9659852
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: B995644
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.3°C
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Sample WW4134, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.



BUREAU
VERITAS
BV Labs Job #: B995644
Report Date: 2019/11/13

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9660184	Dissolved Aluminum (Al)	2019/11/06	100	80 - 120	100	80 - 120	<0.00050	mg/L	9.2	20
9660184	Dissolved Antimony (Sb)	2019/11/06	102	80 - 120	99	80 - 120	<0.000020	mg/L	0.029	20
9660184	Dissolved Arsenic (As)	2019/11/06	112	80 - 120	101	80 - 120	<0.000020	mg/L	1.2	20
9660184	Dissolved Barium (Ba)	2019/11/06	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.086	20
9660184	Dissolved Beryllium (Be)	2019/11/06	97	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9660184	Dissolved Bismuth (Bi)	2019/11/06	99	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9660184	Dissolved Boron (B)	2019/11/06	NC	80 - 120	97	80 - 120	<0.010	mg/L	2.2	20
9660184	Dissolved Cadmium (Cd)	2019/11/06	98	80 - 120	103	80 - 120	<0.0000050	mg/L	0.071	20
9660184	Dissolved Chromium (Cr)	2019/11/06	95	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9660184	Dissolved Cobalt (Co)	2019/11/06	96	80 - 120	104	80 - 120	<0.0000050	mg/L	2.8	20
9660184	Dissolved Copper (Cu)	2019/11/06	87	80 - 120	99	80 - 120	<0.000050	mg/L	0.61	20
9660184	Dissolved Iron (Fe)	2019/11/06	NC	80 - 120	102	80 - 120	<0.0010	mg/L	0.018	20
9660184	Dissolved Lead (Pb)	2019/11/06	103	80 - 120	99	80 - 120	<0.0000050	mg/L	0.71	20
9660184	Dissolved Lithium (Li)	2019/11/06	98	80 - 120	98	80 - 120	<0.00050	mg/L	1.6	20
9660184	Dissolved Manganese (Mn)	2019/11/06	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.92	20
9660184	Dissolved Molybdenum (Mo)	2019/11/06	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.82	20
9660184	Dissolved Nickel (Ni)	2019/11/06	90	80 - 120	103	80 - 120	<0.000020	mg/L	2.1	20
9660184	Dissolved Selenium (Se)	2019/11/06	112	80 - 120	100	80 - 120	<0.000040	mg/L	1.2	20
9660184	Dissolved Silicon (Si)	2019/11/06	NC	80 - 120	99	80 - 120	<0.050	mg/L	0.43	20
9660184	Dissolved Silver (Ag)	2019/11/06	98	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9660184	Dissolved Strontium (Sr)	2019/11/06	NC	80 - 120	98	80 - 120	<0.000050	mg/L	1.2	20
9660184	Dissolved Thallium (Tl)	2019/11/06	104	80 - 120	99	80 - 120	<0.0000020	mg/L	0.45	20
9660184	Dissolved Tin (Sn)	2019/11/06	93	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9660184	Dissolved Titanium (Ti)	2019/11/06	104	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9660184	Dissolved Uranium (U)	2019/11/06	111	80 - 120	100	80 - 120	<0.0000020	mg/L	1.7	20
9660184	Dissolved Vanadium (V)	2019/11/06	99	80 - 120	98	80 - 120	<0.00020	mg/L	1.7	20
9660184	Dissolved Zinc (Zn)	2019/11/06	88	80 - 120	106	80 - 120	<0.00010	mg/L	0.36	20
9660184	Dissolved Zirconium (Zr)	2019/11/06	116	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9660736	Alkalinity (PP as CaCO3)	2019/11/06					<0.50	mg/L		
9660736	Alkalinity (Total as CaCO3)	2019/11/06			94	80 - 120	<0.50	mg/L		
9660736	Bicarbonate (HCO3)	2019/11/06					<0.50	mg/L		
9660736	Carbonate (CO3)	2019/11/06					<0.50	mg/L		



BV Labs Job #: B995644
Report Date: 2019/11/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9660736	Hydioxide (OH)	2019/11/06					<0.50	mg/L		
9660854	Dissolved Chloride (Cl)	2019/11/06			101	80 - 120	<0.50	mg/L		
9660854	Dissolved Sulphate (SO4)	2019/11/06			98	80 - 120	<0.50	mg/L		
9660918	Nitrate plus Nitrite (N)	2019/11/06	102	80 - 120	109	80 - 120	<0.0020	mg/L	1.3	25
9660919	Nitrite (N)	2019/11/06	100	80 - 120	106	80 - 120	<0.0020	mg/L	10	25
9660945	Total Aluminum (Al)	2019/11/07	101	80 - 120	102	80 - 120	<0.00050	mg/L	7.4	20
9660945	Total Antimony (Sb)	2019/11/07	NC	80 - 120	102	80 - 120	0.000023, RDL=0.000020 (1)	mg/L	1.3	20
9660945	Total Arsenic (As)	2019/11/07	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.12	20
9660945	Total Barium (Ba)	2019/11/07	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.66	20
9660945	Total Beryllium (Be)	2019/11/07	103	80 - 120	104	80 - 120	<0.000010	mg/L	NC	20
9660945	Total Bismuth (Bi)	2019/11/07	100	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9660945	Total Boron (B)	2019/11/07	97	80 - 120	100	80 - 120	<0.010	mg/L	1.3	20
9660945	Total Cadmium (Cd)	2019/11/07	104	80 - 120	104	80 - 120	<0.0000050	mg/L	0.0058	20
9660945	Total Chromium (Cr)	2019/11/07	101	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9660945	Total Cobalt (Co)	2019/11/07	103	80 - 120	104	80 - 120	<0.0000050	mg/L	2.4	20
9660945	Total Copper (Cu)	2019/11/07	95	80 - 120	101	80 - 120	<0.000050	mg/L	0.52	20
9660945	Total Iron (Fe)	2019/11/07	105	80 - 120	104	80 - 120	<0.0010	mg/L	3.2	20
9660945	Total Lead (Pb)	2019/11/07	104	80 - 120	104	80 - 120	<0.0000050	mg/L	3.2	20
9660945	Total Lithium (Li)	2019/11/07	99	80 - 120	101	80 - 120	<0.00050	mg/L	3.0	20
9660945	Total Manganese (Mn)	2019/11/07	NC	80 - 120	105	80 - 120	<0.000050	mg/L	0.62	20
9660945	Total Molybdenum (Mo)	2019/11/07	110	80 - 120	101	80 - 120	<0.000050	mg/L	0.36	20
9660945	Total Nickel (Ni)	2019/11/07	100	80 - 120	106	80 - 120	<0.000020	mg/L	0.30	20
9660945	Total Selenium (Se)	2019/11/07	107	80 - 120	102	80 - 120	<0.000040	mg/L	0.59	20
9660945	Total Silicon (Si)	2019/11/07	99	80 - 120	94	80 - 120	<0.050	mg/L	1.9	20
9660945	Total Silver (Ag)	2019/11/07	104	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9660945	Total Strontium (Sr)	2019/11/07	NC	80 - 120	97	80 - 120	<0.000050	mg/L	1.5	20
9660945	Total Thallium (Tl)	2019/11/07	104	80 - 120	102	80 - 120	<0.0000020	mg/L	1.4	20
9660945	Total Tin (Sn)	2019/11/07	96	80 - 120	94	80 - 120	<0.00020	mg/L	NC	20
9660945	Total Titanium (Ti)	2019/11/07	104	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9660945	Total Uranium (U)	2019/11/07	106	80 - 120	102	80 - 120	<0.0000020	mg/L	0.63	20



BUREAU
VERITAS
BV Labs Job #: B995644
Report Date: 2019/11/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: BR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9660945	Total Vanadium (V)	2019/11/07	104	80 - 120	102	80 - 120	<0.00020	mg/L	1.0	20
9660945	Total Zinc (Zn)	2019/11/07	NC	80 - 120	106	80 - 120	<0.00010	mg/L	0.68	20
9660945	Total Zirconium (Zr)	2019/11/07	107	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9664321	Dissolved Thallium (Tl)	2019/11/08	107	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9666703	Total Ammonia (N)	2019/11/12	104	80 - 120	101	80 - 120	<0.0050	mg/L	8.1	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for Sb- 2X RDL acceptable for low level metals determination.



BUREAU
VERITAS

BV Labs Job #: B995644
Report Date: 2019/11/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: BR

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY

COA # 08474477

BBV FCD-00077/05
Page 1 of 1

Invoice Information Company Name: BMC MINERALS LTD. Contact Name: 330-1130 WEST PENDER ST Address: Vancouver, BC PC: V6E 4A4 Phone: (607) 668-6463 Email: mmioska@alexcoenvy.com		Report Information (if differs from Invoice) Company Name: ALEXCO ENVIRONMENTAL Contact Name: Mary Mitoka, Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whistler, BC PC: V1A 2V3 Phone: (607) 668-6463 Email: manderhosi@alexcoenvy.com		Project Information (where applicable) Quotation #: B60751 P.O. # / A/E/R: BMC-18-02 Project #: Kud Ze Kayah Site Location: Kud Ze Kayah Site #: Sampled By: 		Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analysis) ☐ Rush TAT (Surcharges will be applied) Same Day ☐ 2 Days ☐ 3 Days Date Required: 						
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		Special Instructions ☐ Return Cooler ☐ Ship Sample bottles (Please Specify) USE SCENARIO # 12885		Analysis Requested Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity Ammonia		Rush Confirmation #: Laboratory Use Only CUSTODY SEAL Present ☒ Indict ☒ COOLER TEMPERATURES 4.6°C COOLING MEDIA PRESENT ☒						
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Ammonia	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1 Influent INFL-61		04-Nov-19	15:00	Water	X	X	X	X	X	7		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved
2 2A		04-Nov-19	14:40	Water	X	X	X	X	X	7		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved
3 2B		04-Nov-19	10:50	Water	X	X	X	X	X	7		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved
4 2C		04-Nov-19	9:10	Water	X	X	X	X	X	7		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved
5 5A		04-Nov-19	14:30	Water	X	X	X	X	X	7		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved
6 5B		04-Nov-19	10:40	Water	X	X	X	X	X	7		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved
7 5C		04-Nov-19	9:00	Water	X	X	X	X	X	7		Metals preserved with HNO3, dissolved metals field filtered, ammonia preserved
8										7		
9												
10												
RECEIVED BY: (Signature/Print) Received in Saskatoon BY: Jessie J. J. J.		DATE: (YYYY/MM/DD) 2019/11/01		TIME: (HH:MM) 15:00		DATE: (YYYY/MM/DD) 2019/11/06		TIME: (HH:MM) 08:13		B995644_COC		

0182

NOV 04 2019
18/11/13
RECEIVED BY: J. J. J.
2019/11/06 08:13



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08475704

Attention: KAI WOLOSHYN
 ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/12/12
 Report #: R2823012
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A4160
Received: 2019/12/03, 14:48

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃) (1)	3	N/A	2019/12/09	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level (1)	7	N/A	2019/12/05	BBY6SOP-00026	SM 22 2320 B m
Biochemical Oxygen Demand (1)	3	2019/12/06	2019/12/11	BBY6SOP-00045	SM 23 5210 B m
Low level chloride/sulphate by AC (1)	7	N/A	2019/12/05	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
COD by Colorimeter	3	N/A	2019/12/09	AB SOP-00016	SM 23 5220D m
Carbon (DOC) (2)	3	N/A	2019/12/09	AB SOP-00087	MMCW 119 1996 m
Hardness Total (calculated as CaCO ₃) (1, 3)	7	N/A	2019/12/09	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	1	N/A	2019/12/06	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	6	N/A	2019/12/09	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	1	N/A	2019/12/08	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	6	N/A	2019/12/09	BBY WI-00033	Auto Calc
Ion Balance (1)	1	N/A	2019/12/08	BBY WI-00033	Auto Calc
Ion Balance (1)	6	N/A	2019/12/09	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	1	N/A	2019/12/08	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	6	N/A	2019/12/09	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	1	N/A	2019/12/06	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	6	N/A	2019/12/09	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	7	N/A	2019/12/06	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	7	N/A	2019/12/09	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	7	N/A	2019/12/06	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	5	N/A	2019/12/08	AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N Low Level (Preserved)	2	N/A	2019/12/09	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	7	N/A	2019/12/05	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	7	N/A	2019/12/05	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	7	N/A	2019/12/05	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	7	N/A	2019/12/04	BBY7 WI-00004	SM 23 3030B m
Carbon (Total Organic) (4)	3	N/A	2019/12/09	AB SOP-00087	MMCW 119 1996 m
Total Suspended Solids (NFR) (1)	3	2019/12/09	2019/12/09	BBY6SOP-00034	SM 23 2540 D m

Remarks:



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08475704

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/12/12
Report #: R2823012
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A4160

Received: 2019/12/03, 14:48

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by BV Labs Vancouver
- (2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
- (4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XB1775			XB1776	XB1777			XB1778		
Sampling Date		2019/12/03 12:00			2019/12/03 11:00	2019/12/03 10:00			2019/12/03 09:00		
COC Number		08475704			08475704	08475704			08475704		
	UNITS	INFLUENT	RDL	QC Batch	2A	2B	RDL	QC Batch	2C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.8	N/A	9697400	8.2	8.5	N/A	9697400	9.1	N/A	9697400
Cation Sum	meq/L	8.2	N/A	9697400	8.6	8.8	N/A	9697400	9.4	N/A	9697400
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	0.93	0.010	9697197	1.0	1.0	0.010	9697197	1.0	0.010	9697197
Ion Balance (% Difference)	%	3.7	N/A	9697198	1.3	1.4	N/A	9697198	1.4	N/A	9697198
Nitrate (N)	mg/L	0.333	0.0020	9697353	0.0875	0.0043	0.0020	9697353	<0.0020	0.0020	9697353

Demand Parameters

Biochemical Oxygen Demand	mg/L	<2.0 (1)	2.0	9700136					<2.0 (1)	2.0	9700136
Chemical Oxygen Demand	mg/L	17	10	9701769					15	10	9701769

Misc. Inorganics

Dissolved Organic Carbon (C)	mg/L	2.3	0.50	9701625					2.8	0.50	9701625
Acidity (pH 4.5)	mg/L	<1.0	1.0	9702381					<1.0	1.0	9702381
Alkalinity (Total as CaCO3)	mg/L	72.9	0.50	9698754	78.2	82.0	0.50	9698754	88.5	0.50	9698754
Total Organic Carbon (C)	mg/L	2.3	0.50	9701217					3.0	0.50	9701217
Acidity (pH 8.3)	mg/L	3.2	1.0	9702381					3.7	1.0	9702381
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9698754	<0.50	<0.50	0.50	9698754	<0.50	0.50	9698754
Bicarbonate (HCO3)	mg/L	89.0	0.50	9698754	95.4	100	0.50	9698754	108	0.50	9698754
Carbonate (CO3)	mg/L	<0.50	0.50	9698754	<0.50	<0.50	0.50	9698754	<0.50	0.50	9698754
Hydroxide (OH)	mg/L	<0.50	0.50	9698754	<0.50	<0.50	0.50	9698754	<0.50	0.50	9698754
Total Suspended Solids	mg/L	1.0	1.0	9701652					<1.0	1.0	9701652

Anions

Dissolved Chloride (Cl)	mg/L	60	0.50	9698802	63	67	0.50	9698802	71	0.50	9698802
Dissolved Sulphate (SO4)	mg/L	270 (2)	5.0	9698802	230 (2)	240 (2)	5.0	9698802	260 (2)	5.0	9698802

Nutrients

Total Ammonia (N)	mg/L	0.76 (2)	0.010	9699663	0.016	0.0088	0.0050	9699663	0.021	0.0050	9701667
Nitrate plus Nitrite (N)	mg/L	0.345	0.0020	9698717	0.0904	0.0043	0.0020	9698717	<0.0020	0.0020	9698717
Nitrite (N)	mg/L	0.0127	0.0020	9698720	0.0029	<0.0020	0.0020	9698720	<0.0020	0.0020	9698720

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Method blank exceeds 0.2 mg/L stipulated in Reference Method. No other Quality Control measures affected.

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		XB1779		XB1780			XB1781		
Sampling Date		2019/12/03 11:05		2019/12/03 10:05			2019/12/03 09:05		
COC Number		08475704		08475704			08475704		
	UNITS	5A	QC Batch	5B	RDL	QC Batch	5C	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	9.4	9697400	11	N/A	9697400	12	N/A	9697400
Cation Sum	meq/L	10	9697400	12	N/A	9697400	14	N/A	9697400
Filter and HNO ₃ Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.1	9697197	1.0	0.010	9697197	1.1	0.010	9697197
Ion Balance (% Difference)	%	3.3	9697198	0.11	N/A	9697198	5.4	N/A	9697198
Nitrate (N)	mg/L	<0.0020	9697353	<0.0020	0.0020	9697353	<0.0020	0.0020	9697353
Demand Parameters									
Biochemical Oxygen Demand	mg/L						<2.0 (1)	2.0	9700136
Chemical Oxygen Demand	mg/L						21	10	9701769
Misc. Inorganics									
Dissolved Organic Carbon (C)	mg/L						4.3	0.50	9701625
Acidity (pH 4.5)	mg/L						<1.0	1.0	9702381
Alkalinity (Total as CaCO ₃)	mg/L	98.1	9698754	120	0.50	9698754	144	0.50	9698754
Total Organic Carbon (C)	mg/L						4.6	0.50	9701217
Acidity (pH 8.3)	mg/L						9.7	1.0	9702381
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	9698754	<0.50	0.50	9698754	<0.50	0.50	9698754
Bicarbonate (HCO ₃)	mg/L	120	9698754	147	0.50	9698754	176	0.50	9698754
Carbonate (CO ₃)	mg/L	<0.50	9698754	<0.50	0.50	9698754	<0.50	0.50	9698754
Hydroxide (OH)	mg/L	<0.50	9698754	<0.50	0.50	9698754	<0.50	0.50	9698754
Total Suspended Solids	mg/L						1.3	1.0	9701652
Anions									
Dissolved Chloride (Cl)	mg/L	70	9698802	86	0.50	9698802	100	0.50	9698802
Dissolved Sulphate (SO ₄)	mg/L	260 (2)	9698802	320 (2)	5.0	9698802	310 (2)	5.0	9698802
Nutrients									
Total Ammonia (N)	mg/L	0.0085	9701667	0.015	0.0050	9699663	0.020	0.0050	9699663
Nitrate plus Nitrite (N)	mg/L	<0.0020	9698717	<0.0020	0.0020	9698717	<0.0020	0.0020	9698717
Nitrite (N)	mg/L	<0.0020	9698720	<0.0020	0.0020	9698720	<0.0020	0.0020	9698720
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Method blank exceeds 0.2 mg/L stipulated in Reference Method. No other Quality Control measures affected.									
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.									



BUREAU
VERITAS

BV Labs Job #: B9A4160
Report Date: 2019/12/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB1775	XB1776	XB1777	XB1778	XB1779		
Sampling Date		2019/12/03 12:00	2019/12/03 11:00	2019/12/03 10:00	2019/12/03 09:00	2019/12/03 11:05		
COC Number		08475704	08475704	08475704	08475704	08475704		
	UNITS	INFLUENT	2A	2B	2C	5A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	346	365	373	400	427	0.50	9696176
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00825	0.00172	0.00159	0.00222	0.00314	0.00050	9699297
Dissolved Antimony (Sb)	mg/L	0.0199	0.0151	0.0142	0.0139	0.00688	0.000020	9699297
Dissolved Arsenic (As)	mg/L	0.0616	0.0658	0.0461	0.0340	0.0245	0.000020	9699297
Dissolved Barium (Ba)	mg/L	0.0557	0.0542	0.0548	0.0557	0.0612	0.000020	9699297
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9699297
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9699297
Dissolved Boron (B)	mg/L	0.034	0.032	0.027	0.026	0.020	0.010	9699297
Dissolved Cadmium (Cd)	mg/L	0.00209	0.000832	0.000457	0.000186	0.000118	0.0000050	9699297
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9699297
Dissolved Cobalt (Co)	mg/L	0.00273	0.000104	0.0000450	0.0000319	0.000119	0.0000050	9699297
Dissolved Copper (Cu)	mg/L	0.0180	0.00575	0.00395	0.00224	0.00165	0.000050	9699297
Dissolved Iron (Fe)	mg/L	<0.0010	0.0024	0.0038	0.0090 (1)	0.0057	0.0010	9699297
Dissolved Lead (Pb)	mg/L	0.0120	0.000224	0.0000230	0.0000747 (1)	0.000196	0.0000050	9699297
Dissolved Lithium (Li)	mg/L	0.0108	0.0115	0.0119	0.0131	0.0132	0.00050	9699297
Dissolved Manganese (Mn)	mg/L	0.0522	0.00319	0.00190	0.000296	0.0119	0.000050	9699297
Dissolved Molybdenum (Mo)	mg/L	0.00161	0.00137	0.00126	0.00122	0.000569	0.000050	9699297
Dissolved Nickel (Ni)	mg/L	0.00863	0.00592	0.00484	0.00400	0.00655	0.000020	9699297
Dissolved Selenium (Se)	mg/L	0.00754	0.00501	0.00418	0.00342	0.00123	0.000040	9699297
Dissolved Silicon (Si)	mg/L	0.452	0.094	0.140	0.294	0.457	0.050	9699297
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9699297
Dissolved Strontium (Sr)	mg/L	0.600	0.611	0.616	0.660	0.688	0.000050	9699297
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9699297
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00027	0.00020	9699297
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9699297
Dissolved Uranium (U)	mg/L	0.0293	0.0305	0.0300	0.0236	0.0227	0.0000020	9699297
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9699297
Dissolved Zinc (Zn)	mg/L	0.171	0.109	0.0825	0.0597	0.0325	0.00010	9699297
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9699297
Dissolved Calcium (Ca)	mg/L	111	117	120	128	137	0.050	9696178

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB1775	XB1776	XB1777	XB1778	XB1779		
Sampling Date		2019/12/03 12:00	2019/12/03 11:00	2019/12/03 10:00	2019/12/03 09:00	2019/12/03 11:05		
COC Number		08475704	08475704	08475704	08475704	08475704		
	UNITS	INFLUENT	2A	2B	2C	5A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.7	17.5	18.0	19.5	20.6	0.050	9696178
Dissolved Potassium (K)	mg/L	3.72	4.17	4.41	4.82	2.81	0.050	9696178
Dissolved Sodium (Na)	mg/L	25.6	26.6	27.6	29.5	31.4	0.050	9696178
Dissolved Sulphur (S)	mg/L	83.5	84.2	85.3	93.8	95.8	3.0	9696178
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: B9A4160
Report Date: 2019/12/12ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XB1780	XB1781		
Sampling Date		2019/12/03 10:05	2019/12/03 09:05		
COC Number		08475704	08475704		
	UNITS	5B	5C	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	503	579	0.50	9696176
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00094	0.00082	0.00050	9699297
Dissolved Antimony (Sb)	mg/L	0.00302	0.00301	0.000020	9699297
Dissolved Arsenic (As)	mg/L	0.0115	0.00562	0.000020	9699297
Dissolved Barium (Ba)	mg/L	0.0662	0.0739	0.000020	9699297
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9699297
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9699297
Dissolved Boron (B)	mg/L	<0.010	<0.010	0.010	9699297
Dissolved Cadmium (Cd)	mg/L	0.0000140	<0.0000050	0.0000050	9699297
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9699297
Dissolved Cobalt (Co)	mg/L	0.0000795	0.0000529	0.0000050	9699297
Dissolved Copper (Cu)	mg/L	0.000508	0.000210	0.000050	9699297
Dissolved Iron (Fe)	mg/L	0.0073	0.0135	0.0010	9699297
Dissolved Lead (Pb)	mg/L	0.0000241	0.0000074	0.0000050	9699297
Dissolved Lithium (Li)	mg/L	0.0152	0.0179	0.00050	9699297
Dissolved Manganese (Mn)	mg/L	0.0116	0.0152	0.000050	9699297
Dissolved Molybdenum (Mo)	mg/L	0.000167	0.000110	0.000050	9699297
Dissolved Nickel (Ni)	mg/L	0.00375	0.00275	0.000020	9699297
Dissolved Selenium (Se)	mg/L	0.000491	0.000363	0.000040	9699297
Dissolved Silicon (Si)	mg/L	0.611	0.679	0.050	9699297
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9699297
Dissolved Strontium (Sr)	mg/L	0.784	0.919	0.000050	9699297
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9699297
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9699297
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9699297
Dissolved Uranium (U)	mg/L	0.0104	0.00604	0.0000020	9699297
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9699297
Dissolved Zinc (Zn)	mg/L	0.00779	0.00341	0.00010	9699297
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9699297
Dissolved Calcium (Ca)	mg/L	162	184	0.050	9696178
Dissolved Magnesium (Mg)	mg/L	24.2	29.1	0.050	9696178
RDL = Reportable Detection Limit					



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XB1780	XB1781		
Sampling Date		2019/12/03 10:05	2019/12/03 09:05		
COC Number		08475704	08475704		
	UNITS	5B	5C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	2.58	1.37	0.050	9696178
Dissolved Sodium (Na)	mg/L	36.8	43.7	0.050	9696178
Dissolved Sulphur (S)	mg/L	109	130	3.0	9696178
RDL = Reportable Detection Limit					

BUREAU
VERITASBV Labs Job #: B9A4160
Report Date: 2019/12/12ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XB1775	XB1776	XB1777	XB1778	XB1779		
Sampling Date		2019/12/03 12:00	2019/12/03 11:00	2019/12/03 10:00	2019/12/03 09:00	2019/12/03 11:05		
COC Number		08475704	08475704	08475704	08475704	08475704		
	UNITS	INFLUENT	2A	2B	2C	5A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	334	356	371	392	421	0.50	9696175
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0285	0.00228	0.00106	0.00383	0.00503	0.00050	9698857
Total Antimony (Sb)	mg/L	0.0205	0.0150	0.0142	0.0139	0.00685	0.000020	9698857
Total Arsenic (As)	mg/L	0.0592	0.0660	0.0458	0.0342	0.0279	0.000020	9698857
Total Barium (Ba)	mg/L	0.0575	0.0571	0.0572	0.0589	0.0644	0.000020	9698857
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9698857
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9698857
Total Boron (B)	mg/L	0.032	0.034	0.026	0.024	0.019	0.010	9698857
Total Cadmium (Cd)	mg/L	0.00208	0.000811	0.000442	0.000182	0.000140	0.0000050	9698857
Total Chromium (Cr)	mg/L	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9698857
Total Cobalt (Co)	mg/L	0.00274	0.000149	0.0000482	0.0000337	0.000482	0.0000050	9698857
Total Copper (Cu)	mg/L	0.0199	0.00640	0.00415	0.00220	0.00214	0.000050	9698857
Total Iron (Fe)	mg/L	0.0170	0.0063	0.0040	0.0042	0.0705	0.0010	9698857
Total Lead (Pb)	mg/L	0.0236	0.000476	0.0000296	<0.0000050	0.00121	0.0000050	9698857
Total Lithium (Li)	mg/L	0.00995	0.0103	0.0106	0.0109	0.0117	0.00050	9698857
Total Manganese (Mn)	mg/L	0.0565	0.00464	0.00193	0.000301	0.0306	0.000050	9698857
Total Molybdenum (Mo)	mg/L	0.00157	0.00135	0.00124	0.00121	0.000583	0.000050	9698857
Total Nickel (Ni)	mg/L	0.00811	0.00579	0.00457	0.00375	0.00653	0.000020	9698857
Total Selenium (Se)	mg/L	0.00755	0.00544	0.00444	0.00362	0.00129	0.000040	9698857
Total Silicon (Si)	mg/L	0.555	0.095	0.146	0.317	0.510	0.050	9698857
Total Silver (Ag)	mg/L	0.0000051	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9698857
Total Strontium (Sr)	mg/L	0.586	0.612	0.636	0.665	0.703	0.000050	9698857
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9698857
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9698857
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9698857
Total Uranium (U)	mg/L	0.0296	0.0315	0.0315	0.0243	0.0230	0.0000020	9698857
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9698857
Total Zinc (Zn)	mg/L	0.161	0.105	0.0801	0.0575	0.0320	0.00010	9698857
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9698857
Total Calcium (Ca)	mg/L	106	113	118	125	134	0.050	9696179
Total Magnesium (Mg)	mg/L	16.9	17.9	18.4	19.6	21.0	0.050	9696179

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB1775	XB1776	XB1777	XB1778	XB1779		
Sampling Date		2019/12/03 12:00	2019/12/03 11:00	2019/12/03 10:00	2019/12/03 09:00	2019/12/03 11:05		
COC Number		08475704	08475704	08475704	08475704	08475704		
	UNITS	INFLUENT	2A	2B	2C	5A	RDL	QC Batch
Total Potassium (K)	mg/L	3.76	4.24	4.52	4.91	2.86	0.050	9696179
Total Sodium (Na)	mg/L	25.8	27.2	28.5	29.9	31.4	0.050	9696179
Total Sulphur (S)	mg/L	80.9	84.5	86.6	92.2	97.0	3.0	9696179
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B9A4160
Report Date: 2019/12/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB1780	XB1781		
Sampling Date		2019/12/03 10:05	2019/12/03 09:05		
COC Number		08475704	08475704		
	UNITS	5B	5C	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	489	574	0.50	9696175
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00128	0.00082	0.00050	9698857
Total Antimony (Sb)	mg/L	0.00303	0.00291	0.000020	9698857
Total Arsenic (As)	mg/L	0.0122	0.00561	0.000020	9698857
Total Barium (Ba)	mg/L	0.0685	0.0761	0.000020	9698857
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9698857
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9698857
Total Boron (B)	mg/L	<0.010	<0.010	0.010	9698857
Total Cadmium (Cd)	mg/L	0.0000148	0.0000052	0.0000050	9698857
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9698857
Total Cobalt (Co)	mg/L	0.000179	0.0000620	0.0000050	9698857
Total Copper (Cu)	mg/L	0.000557	0.000227	0.000050	9698857
Total Iron (Fe)	mg/L	0.0492	0.0261	0.0010	9698857
Total Lead (Pb)	mg/L	0.0000560	0.0000075	0.0000050	9698857
Total Lithium (Li)	mg/L	0.0134	0.0162	0.00050	9698857
Total Manganese (Mn)	mg/L	0.0255	0.0151	0.000050	9698857
Total Molybdenum (Mo)	mg/L	0.000151	0.000106	0.000050	9698857
Total Nickel (Ni)	mg/L	0.00389	0.00270	0.000020	9698857
Total Selenium (Se)	mg/L	0.000507	0.000393	0.000040	9698857
Total Silicon (Si)	mg/L	0.638	0.711	0.050	9698857
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9698857
Total Strontium (Sr)	mg/L	0.800	0.908	0.000050	9698857
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9698857
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9698857
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9698857
Total Uranium (U)	mg/L	0.00995	0.00622	0.0000020	9698857
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9698857
Total Zinc (Zn)	mg/L	0.00811	0.00336	0.00010	9698857
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9698857
Total Calcium (Ca)	mg/L	156	180	0.050	9696179
Total Magnesium (Mg)	mg/L	24.2	29.9	0.050	9696179
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: B9A4160
Report Date: 2019/12/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XB1780	XB1781		
Sampling Date		2019/12/03 10:05	2019/12/03 09:05		
COC Number		08475704	08475704		
	UNITS	5B	5C	RDL	QC Batch
Total Potassium (K)	mg/L	2.56	1.35	0.050	9696179
Total Sodium (Na)	mg/L	36.6	44.4	0.050	9696179
Total Sulphur (S)	mg/L	110	127	3.0	9696179
RDL = Reportable Detection Limit					



BUREAU
VERITAS

BV Labs Job #: B9A4160
Report Date: 2019/12/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB1775
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9702381	N/A	2019/12/09	Coco Guo
Alkalinity - Low Level	AT/ALK	9698754	N/A	2019/12/05	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9700136	2019/12/06	2019/12/11	Isabel Choi
Low level chloride/sulphate by AC	KONE	9698802	N/A	2019/12/05	Balwinder Bassi
COD by Colorimeter	M/PROB	9701769	N/A	2019/12/09	Preetleen Kathuria
Carbon (DOC)	TECH	9701625	N/A	2019/12/09	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9696175	N/A	2019/12/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9696176	N/A	2019/12/06	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9697197	N/A	2019/12/08	Automated Statchk
Ion Balance	CALC	9697198	N/A	2019/12/08	Report Automation Engine
Sum of cations, anions	CALC	9697400	N/A	2019/12/08	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9696178	N/A	2019/12/06	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9699297	N/A	2019/12/06	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9696179	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9698857	N/A	2019/12/06	Vanessa Chan
Ammonia-N Low Level (Preserved)	KONE/COL	9699663	N/A	2019/12/08	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9698717	N/A	2019/12/05	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9698720	N/A	2019/12/05	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9697353	N/A	2019/12/05	Automated Statchk
Filter and HNO ₃ Preserve for Metals	ICP	ONSITE	N/A	2019/12/04	Avani Patel
Carbon (Total Organic)	TECH	9701217	N/A	2019/12/09	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9701652	2019/12/09	2019/12/09	Sean Hickey

BV Labs ID: XB1775 Dup
Sample ID: INFLUENT
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9699297	N/A	2019/12/06	Andrew An
Elements by ICPMS Low Level (total)	ICP/CRCM	9698857	N/A	2019/12/06	Vanessa Chan

BV Labs ID: XB1776
Sample ID: 2A
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9698754	N/A	2019/12/05	Coco Guo
Low level chloride/sulphate by AC	KONE	9698802	N/A	2019/12/05	Balwinder Bassi
Hardness Total (calculated as CaCO ₃)	CALC	9696175	N/A	2019/12/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9696176	N/A	2019/12/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9697197	N/A	2019/12/09	Automated Statchk
Ion Balance	CALC	9697198	N/A	2019/12/09	Automated Statchk
Sum of cations, anions	CALC	9697400	N/A	2019/12/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9696178	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9699297	N/A	2019/12/06	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9696179	N/A	2019/12/09	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B9A4160
Report Date: 2019/12/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB1776
Sample ID: 2A
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (total)	ICP/CRCM	9698857	N/A	2019/12/06	Vanessa Chan
Ammonia-N Low Level (Preserved)	KONE/COL	9699663	N/A	2019/12/08	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9698717	N/A	2019/12/05	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9698720	N/A	2019/12/05	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9697353	N/A	2019/12/05	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/04	Avani Patel

BV Labs ID: XB1777
Sample ID: 2B
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9698754	N/A	2019/12/05	Coco Guo
Low level chloride/sulphate by AC	KONE	9698802	N/A	2019/12/05	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9696175	N/A	2019/12/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9696176	N/A	2019/12/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9697197	N/A	2019/12/09	Automated Statchk
Ion Balance	CALC	9697198	N/A	2019/12/09	Automated Statchk
Sum of cations, anions	CALC	9697400	N/A	2019/12/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9696178	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9699297	N/A	2019/12/06	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9696179	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9698857	N/A	2019/12/06	Vanessa Chan
Ammonia-N Low Level (Preserved)	KONE/COL	9699663	N/A	2019/12/08	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9698717	N/A	2019/12/05	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9698720	N/A	2019/12/05	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9697353	N/A	2019/12/05	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/04	Avani Patel

BV Labs ID: XB1778
Sample ID: 2C
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO3)	AT/PH	9702381	N/A	2019/12/09	Coco Guo
Alkalinity - Low Level	AT/ALK	9698754	N/A	2019/12/05	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9700136	2019/12/06	2019/12/11	Isabel Choi
Low level chloride/sulphate by AC	KONE	9698802	N/A	2019/12/05	Balwinder Bassi
COD by Colorimeter	M/PROB	9701769	N/A	2019/12/09	Preetleen Kathuria
Carbon (DOC)	TECH	9701625	N/A	2019/12/09	Kayla Ghanem
Hardness Total (calculated as CaCO3)	CALC	9696175	N/A	2019/12/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9696176	N/A	2019/12/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9697197	N/A	2019/12/09	Automated Statchk
Ion Balance	CALC	9697198	N/A	2019/12/09	Automated Statchk
Sum of cations, anions	CALC	9697400	N/A	2019/12/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9696178	N/A	2019/12/09	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B9A4160
Report Date: 2019/12/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB1778
Sample ID: 2C
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9699297	N/A	2019/12/06	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9696179	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9698857	N/A	2019/12/06	Vanessa Chan
Ammonia-N Low Level (Preserved)	KONE/COL	9701667	N/A	2019/12/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9698717	N/A	2019/12/05	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9698720	N/A	2019/12/05	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9697353	N/A	2019/12/05	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/04	Avani Patel
Carbon (Total Organic)	TECH	9701217	N/A	2019/12/09	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9701652	2019/12/09	2019/12/09	Sean Hickey

BV Labs ID: XB1779
Sample ID: 5A
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9698754	N/A	2019/12/05	Coco Guo
Low level chloride/sulphate by AC	KONE	9698802	N/A	2019/12/05	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9696175	N/A	2019/12/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9696176	N/A	2019/12/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9697197	N/A	2019/12/09	Automated Statchk
Ion Balance	CALC	9697198	N/A	2019/12/09	Automated Statchk
Sum of cations, anions	CALC	9697400	N/A	2019/12/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9696178	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9699297	N/A	2019/12/06	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9696179	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9698857	N/A	2019/12/06	Vanessa Chan
Ammonia-N Low Level (Preserved)	KONE/COL	9701667	N/A	2019/12/09	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9698717	N/A	2019/12/05	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9698720	N/A	2019/12/05	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9697353	N/A	2019/12/05	Report Automation Engine
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/04	Avani Patel

BV Labs ID: XB1780
Sample ID: 5B
Matrix: Water

Collected: 2019/12/03
Shipped:
Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9698754	N/A	2019/12/05	Coco Guo
Low level chloride/sulphate by AC	KONE	9698802	N/A	2019/12/05	Balwinder Bassi
Hardness Total (calculated as CaCO3)	CALC	9696175	N/A	2019/12/09	Automated Statchk
Hardness (calculated as CaCO3)	CALC	9696176	N/A	2019/12/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9697197	N/A	2019/12/09	Automated Statchk
Ion Balance	CALC	9697198	N/A	2019/12/09	Automated Statchk
Sum of cations, anions	CALC	9697400	N/A	2019/12/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9696178	N/A	2019/12/09	Automated Statchk



BUREAU
VERITAS

BV Labs Job #: B9A4160

Report Date: 2019/12/12

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

TEST SUMMARY

BV Labs ID: XB1780

Sample ID: 5B

Matrix: Water

Collected: 2019/12/03

Shipped:

Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9699297	N/A	2019/12/06	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9696179	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9698857	N/A	2019/12/06	Vanessa Chan
Ammonia-N Low Level (Preserved)	KONE/COL	9699663	N/A	2019/12/08	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9698717	N/A	2019/12/05	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9698720	N/A	2019/12/05	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9697353	N/A	2019/12/05	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/04	Avani Patel

BV Labs ID: XB1781

Sample ID: 5C

Matrix: Water

Collected: 2019/12/03

Shipped:

Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	AT/PH	9702381	N/A	2019/12/09	Coco Guo
Alkalinity - Low Level	AT/ALK	9698754	N/A	2019/12/05	Coco Guo
Biochemical Oxygen Demand	DO/PROB	9700136	2019/12/06	2019/12/11	Isabel Choi
Low level chloride/sulphate by AC	KONE	9698802	N/A	2019/12/05	Balwinder Bassi
COD by Colorimeter	M/PROB	9701769	N/A	2019/12/09	Preetleen Kathuria
Carbon (DOC)	TECH	9701625	N/A	2019/12/09	Kayla Ghanem
Hardness Total (calculated as CaCO ₃)	CALC	9696175	N/A	2019/12/09	Automated Statchk
Hardness (calculated as CaCO ₃)	CALC	9696176	N/A	2019/12/09	Automated Statchk
Ion Balance (as Cations/Anions Ratio)	CALC	9697197	N/A	2019/12/09	Automated Statchk
Ion Balance	CALC	9697198	N/A	2019/12/09	Automated Statchk
Sum of cations, anions	CALC	9697400	N/A	2019/12/09	Automated Statchk
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	CALC	9696178	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (dissolved)	ICP/CRCM	9699297	N/A	2019/12/06	Andrew An
Na, K, Ca, Mg, S by CRC ICPMS (total)	CALC	9696179	N/A	2019/12/09	Automated Statchk
Elements by ICPMS Low Level (total)	ICP/CRCM	9698857	N/A	2019/12/06	Vanessa Chan
Ammonia-N Low Level (Preserved)	KONE/COL	9699663	N/A	2019/12/08	Tracy (Jing) Ling
Nitrate+Nitrite (N) (low level)	TRAA/COL	9698717	N/A	2019/12/05	Mauro Oselin
Nitrite (N) (low level)	TRAA/COL	9698720	N/A	2019/12/05	Mauro Oselin
Nitrogen - Nitrate (as N) Low Level Calc	CALC	9697353	N/A	2019/12/05	Automated Statchk
Filter and HNO3 Preserve for Metals	ICP	ONSITE	N/A	2019/12/04	Avani Patel
Carbon (Total Organic)	TECH	9701217	N/A	2019/12/09	Kayla Ghanem
Total Suspended Solids (NFR)	BAL	9701652	2019/12/09	2019/12/09	Sean Hickey

BV Labs ID: XB1781 Dup

Sample ID: 5C

Matrix: Water

Collected: 2019/12/03

Shipped:

Received: 2019/12/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity - Low Level	AT/ALK	9698754	N/A	2019/12/05	Coco Guo
Carbon (DOC)	TECH	9701625	N/A	2019/12/09	Kayla Ghanem



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.7°C
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Results relate only to the items tested.



BV Labs Job #: B9A4160
Report Date: 2019/12/12

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9698717	Nitrate plus Nitrite (N)	2019/12/05			107	80 - 120	<0.0020	mg/L		
9698720	Nitrite (N)	2019/12/05			104	80 - 120	<0.0020	mg/L		
9698754	Alkalinity (PP as CaCO3)	2019/12/05					<0.50	mg/L	NC	20
9698754	Alkalinity (Total as CaCO3)	2019/12/05	NC	80 - 120	95	80 - 120	<0.50	mg/L	0.31	20
9698754	Bicarbonate (HCO3)	2019/12/05					<0.50	mg/L	0.31	20
9698754	Carbonate (CO3)	2019/12/05					<0.50	mg/L	NC	20
9698754	Hydroxide (OH)	2019/12/05					<0.50	mg/L	NC	20
9698802	Dissolved Chloride (Cl)	2019/12/06	68 (1)	80 - 120	105	80 - 120	<0.50	mg/L	10	20
9698802	Dissolved Sulphate (SO4)	2019/12/06	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.96	20
9698857	Total Aluminum (Al)	2019/12/06	94	80 - 120	95	80 - 120	<0.00050	mg/L	0.96	20
9698857	Total Antimony (Sb)	2019/12/06	NC	80 - 120	100	80 - 120	<0.00020	mg/L	0.95	20
9698857	Total Arsenic (As)	2019/12/06	NC	80 - 120	98	80 - 120	<0.00020	mg/L	0.73	20
9698857	Total Barium (Ba)	2019/12/06	NC	80 - 120	104	80 - 120	<0.00020	mg/L	0.52	20
9698857	Total Beryllium (Be)	2019/12/06	88	80 - 120	92	80 - 120	<0.00010	mg/L	NC	20
9698857	Total Bismuth (Bi)	2019/12/06	99	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9698857	Total Boron (B)	2019/12/06	91	80 - 120	93	80 - 120	<0.010	mg/L	1.2	20
9698857	Total Cadmium (Cd)	2019/12/06	102	80 - 120	102	80 - 120	<0.000050	mg/L	0.16	20
9698857	Total Chromium (Cr)	2019/12/06	101	80 - 120	99	80 - 120	<0.00010	mg/L	5.5	20
9698857	Total Cobalt (Co)	2019/12/06	98	80 - 120	98	80 - 120	<0.000050	mg/L	1.5	20
9698857	Total Copper (Cu)	2019/12/06	93	80 - 120	98	80 - 120	<0.000050	mg/L	0.016	20
9698857	Total Iron (Fe)	2019/12/06	104	80 - 120	107	80 - 120	<0.0010	mg/L	1.5	20
9698857	Total Lead (Pb)	2019/12/06	105	80 - 120	103	80 - 120	<0.000050	mg/L	0.60	20
9698857	Total Lithium (Li)	2019/12/06	87	80 - 120	92	80 - 120	<0.00050	mg/L	0.68	20
9698857	Total Manganese (Mn)	2019/12/06	NC	80 - 120	101	80 - 120	<0.000050	mg/L	0.10	20
9698857	Total Molybdenum (Mo)	2019/12/06	110	80 - 120	101	80 - 120	<0.000050	mg/L	0.82	20
9698857	Total Nickel (Ni)	2019/12/06	96	80 - 120	98	80 - 120	<0.000020	mg/L	2.9	20
9698857	Total Selenium (Se)	2019/12/06	101	80 - 120	100	80 - 120	<0.000040	mg/L	1.9	20
9698857	Total Silicon (Si)	2019/12/06	98	80 - 120	96	80 - 120	<0.050	mg/L	1.8	20
9698857	Total Silver (Ag)	2019/12/06	101	80 - 120	97	80 - 120	<0.0000050	mg/L	1.9	20
9698857	Total Strontium (Sr)	2019/12/06	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.15	20
9698857	Total Thallium (Tl)	2019/12/06	104	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9698857	Total Tin (Sn)	2019/12/06	104	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20



BV Labs Job #: B9A4160
Report Date: 2019/12/12

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9699857	Total Titanium (Ti)	2019/12/06	105	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9699857	Total Uranium (U)	2019/12/06	105	80 - 120	102	80 - 120	<0.0000020	mg/L	0.070	20
9699857	Total Vanadium (V)	2019/12/06	102	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9699857	Total Zinc (Zn)	2019/12/06	NC	80 - 120	103	80 - 120	<0.00010	mg/L	0.0096	20
9699857	Total Zirconium (Zr)	2019/12/06	107	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9699297	Dissolved Aluminum (Al)	2019/12/06	97	80 - 120	100	80 - 120	<0.00050	mg/L	1.3	20
9699297	Dissolved Antimony (Sb)	2019/12/06	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.35	20
9699297	Dissolved Arsenic (As)	2019/12/06	NC	80 - 120	101	80 - 120	<0.000020	mg/L	1.0	20
9699297	Dissolved Barium (Ba)	2019/12/06	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.71	20
9699297	Dissolved Beryllium (Be)	2019/12/06	99	80 - 120	107	80 - 120	<0.000010	mg/L	NC	20
9699297	Dissolved Bismuth (Bi)	2019/12/06	95	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9699297	Dissolved Boron (B)	2019/12/06	96	80 - 120	101	80 - 120	<0.010	mg/L	0.68	20
9699297	Dissolved Cadmium (Cd)	2019/12/06	102	80 - 120	106	80 - 120	<0.0000050	mg/L	0.11	20
9699297	Dissolved Chromium (Cr)	2019/12/06	99	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9699297	Dissolved Cobalt (Co)	2019/12/06	101	80 - 120	110	80 - 120	<0.0000050	mg/L	0.38	20
9699297	Dissolved Copper (Cu)	2019/12/06	91	80 - 120	101	80 - 120	<0.000050	mg/L	0.11	20
9699297	Dissolved Iron (Fe)	2019/12/06	107	80 - 120	112	80 - 120	<0.0010	mg/L	NC	20
9699297	Dissolved Lead (Pb)	2019/12/06	100	80 - 120	105	80 - 120	<0.0000050	mg/L	0.64	20
9699297	Dissolved Lithium (Li)	2019/12/06	95	80 - 120	105	80 - 120	<0.00050	mg/L	0.25	20
9699297	Dissolved Manganese (Mn)	2019/12/06	NC	80 - 120	106	80 - 120	<0.000050	mg/L	0.13	20
9699297	Dissolved Molybdenum (Mo)	2019/12/06	110	80 - 120	105	80 - 120	<0.000050	mg/L	0.16	20
9699297	Dissolved Nickel (Ni)	2019/12/06	95	80 - 120	107	80 - 120	<0.000020	mg/L	1.7	20
9699297	Dissolved Selenium (Se)	2019/12/06	99	80 - 120	98	80 - 120	<0.000040	mg/L	0.61	20
9699297	Dissolved Silicon (Si)	2019/12/06	95	80 - 120	96	80 - 120	<0.050	mg/L	0.94	20
9699297	Dissolved Silver (Ag)	2019/12/06	102	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
9699297	Dissolved Strontium (Sr)	2019/12/06	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.76	20
9699297	Dissolved Thallium (Tl)	2019/12/06	101	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9699297	Dissolved Tin (Sn)	2019/12/06	101	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9699297	Dissolved Titanium (Ti)	2019/12/06	103	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
9699297	Dissolved Uranium (U)	2019/12/06	103	80 - 120	106	80 - 120	<0.0000020	mg/L	0.21	20
9699297	Dissolved Vanadium (V)	2019/12/06	100	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
9699297	Dissolved Zinc (Zn)	2019/12/06	NC	80 - 120	111	80 - 120	<0.00010	mg/L	0.047	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9699297	Dissolved Zirconium (Zr)	2019/12/06	107	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9699663	Total Ammonia (N)	2019/12/08	114	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
9700136	Biochemical Oxygen Demand	2019/12/11			100	85 - 115	<2.0	mg/L	NC	20
9701217	Total Organic Carbon (C)	2019/12/09	91	80 - 120	95	80 - 120	<0.50	mg/L	4.6	20
9701625	Dissolved Organic Carbon (C)	2019/12/09	93	80 - 120	99	80 - 120	<0.50	mg/L	3.1	20
9701652	Total Suspended Solids	2019/12/09	NC	80 - 120	99	80 - 120	<1.0	mg/L	6.1	20
9701667	Total Ammonia (N)	2019/12/09	90	80 - 120	95	80 - 120	<0.0050	mg/L	0.038	20
9701769	Chemical Oxygen Demand	2019/12/09	108	80 - 120	104	80 - 120	<10	mg/L	7.5	20
9702381	Acidity (pH 4.5)	2019/12/09					<1.0	mg/L	NC	20
9702381	Acidity (pH 8.3)	2019/12/09			97	80 - 120	<1.0	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

BV Labs Job #: B9A4160
Report Date: 2019/12/12

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Harry (Peng) Liang, Senior Analyst

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.



08475704

BBY FCD-00077/05

Page 1 of 1

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required	
Company Name:		BMC MINERALS LTD.		Company Name:		ALEXCO ENVIRONMENTAL		Quotation #:		B60751		☒ Regular TAT 5 days (Most analysis)	
Contact Name:		Marty Mieloska; Renate Vanderhorst		Contact Name:		UNIT 3 151 INDUSTRIAL RD		P.O. #/ A/E:				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		530-1130 WEST PENDER ST		Address:		Whitehorse, YK		Project #:		BMC-18-02		Rush TAT (Surcharges will be applied)	
Vancouver, BC		PC: V6E 4A4		Vancouver, BC		PC: V1A 2V3		Site location:		Kutik Zee Kayaah		☐ Same Day	
Phone:				Phone:		(867) 668-6463		Site #:				☐ 1 Day	
Email:				Email:		mmioska@alexcoenvy.com		Sampled by:				☐ 2 Days	
												☐ 3 Days	
Regulatory Criteria				Special Instructions				Analysis Requested				Rush Confirmation #:	
☐ BC CSR Soil		☐ BC CSR Water		☐ Return Cooler								LABORATORY USE ONLY	
☐ CCME (Specify)		☐ Other (Specify)		☐ Ship Sample Bottles (Please Specify)								CUSTODY - SEAL - V	
☐ Drinking Water		☐ BC Water Quality		USE SCENARIO 1 12485								TEMPERATURES	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												COOLING MEDIA PRESENT	
Sample Identification		Lab Identification		Date Sampled (YYYY/MM/DD)		Time Sampled (HH:MM)		Matrix		# OF CONTAINERS SUBMITTED		HOLD - DO NOT ANALYZE	
1 Influent				03-Dec-19		12:00		Water		9		COMMENTS	
2 2A				03-Dec-19		11:00		Water		6		Metals preserved with HNO3, dissolved	
3 2B				03-Dec-19		10:00		Water		6		Metals preserved with HNO3, dissolved	
4 2C				03-Dec-19		9:00		Water		9		Metals preserved with HNO3, dissolved	
5 5A				03-Dec-19		11:05		Water		6		Metals preserved with HNO3, dissolved	
6 5B				03-Dec-19		10:05		Water		6		Metals preserved with HNO3, dissolved	
7 5C				03-Dec-19		9:05		Water		9		Metals preserved with HNO3, dissolved	
8													
9													
10													
REINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)		TIME: (HH:MM)		B9A4160_COC	
Tina Webb		2019/12/03		12:00		By: Leahann Mieloska							
Tina Webb													

AVANTI PATRIZ 2019/12/10 08:12

CHAIN OF CUSTODY RECORD

COC #:

Page ____ of ____

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required																							
Company Name: BMC MINERALS LTD.				Company Name: ALEXCO ENVIRONMENTAL				Quotation #: B60751				☒ Regular TAT 5 days (Most analyses)																							
Contact Name:				Contact Name: Mary Mioska; Renate Vanderhorst				P.O. # / AFE#: _____				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS																							
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02																											
Vancouver, BC PC: V6E 4A4				Whitehorse, YK PC: Y1A 2V3				Site location: Kudz Ze Kayah																											
Phone: _____				Phone: (867) 668-6463 rvanderhorst@alexcoenv.com				Site #: _____				Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days																							
Email: _____				Email: mmioska@alexcoenv.com				Sampled By: _____				Date Required: _____																							
Regulatory Criteria				Special Instructions				Analysis Requested																											
☐ BC CSR Soil ☐ BC CSR Water				☐ Return Cooler				USE SCENARIO # 12485																											
☐ CCME (Specify) ☐ Other (Specify)				☐ Ship Sample Bottles (Please Specify)																															
☐ Drinking Water ☐ BC Water Quality																																			
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM																																			
Sample Identification		Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix																														
1	Influent		03-Dec-19		Water	X	X	X	X	X	X	X	9	# OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE <table><tr><th colspan="2">LABORATORY USE ONLY</th></tr><tr><td>CUSTODY SEAL Y / N</td><td>COOLER TEMPERATURES</td></tr><tr><td>Present</td><td>Intact</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>		LABORATORY USE ONLY		CUSTODY SEAL Y / N	COOLER TEMPERATURES	Present	Intact														
LABORATORY USE ONLY																																			
CUSTODY SEAL Y / N	COOLER TEMPERATURES																																		
Present	Intact																																		
2	2A		03-Dec-19		Water	X	X	X	X	X	X	X	6																						
3	2B		03-Dec-19		Water	X	X	X	X	X	X	X	6																						
4	2C		03-Dec-19		Water	X	X	X	X	X	X	X	9																						
5	5A		03-Dec-19		Water	X	X	X	X	X	X	X	6																						
6	5B		03-Dec-19		Water	X	X	X	X	X	X	X	6																						
7	5C		03-Dec-19		Water	X	X	X	X	X	X	X	9																						
8																																			
9																																			
10																																			
REINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB # 																											



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476408

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/12/27
 Report #: R2829030
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A9229

Received: 2019/12/19, 14:26

Sample Matrix: Water
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level	6	N/A	2019/12/21	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC	6	N/A	2019/12/23	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (2)	6	N/A	2019/12/27	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	5	N/A	2019/12/24	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	1	N/A	2019/12/27	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	5	N/A	2019/12/24	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	1	N/A	2019/12/27	BBY WI-00033	Auto Calc
Ion Balance	5	N/A	2019/12/24	BBY WI-00033	Auto Calc
Ion Balance	1	N/A	2019/12/27	BBY WI-00033	Auto Calc
Sum of cations, anions	5	N/A	2019/12/24	BBY WI-00033	Auto Calc
Sum of cations, anions	1	N/A	2019/12/27	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2019/12/24	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2019/12/27	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	5	N/A	2019/12/23	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Low Level (dissolved)	1	N/A	2019/12/24	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total)	6	2019/12/23	2019/12/24	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	6	N/A	2019/12/27	BBY WI-00033	Auto Calc
Ammonia-N Low Level (Preserved) (1)	6	N/A	2019/12/24	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level)	6	N/A	2019/12/20	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level)	6	N/A	2019/12/20	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc	6	N/A	2019/12/20	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals	6	N/A	2019/12/20	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476408

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/12/27
Report #: R2829030
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A9229

Received: 2019/12/19, 14:26

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Calgary Environmental

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

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**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		XD8567	XD8568		XD8569		XD8570	XD8571		
Sampling Date		2019/12/19 12:10	2019/12/19 12:05		2019/12/19 12:00		2019/12/19 12:25	2019/12/19 12:20		
COC Number		08476408	08476408		08476408		08476408	08476408		
	UNITS	3A	3B	RDL	3C	RDL	6A	6B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	1.9	2.4	N/A	2.3	N/A	3.9	4.6	N/A	9717049
Cation Sum	meq/L	2.0	2.3	N/A	2.0	N/A	4.1	4.7	N/A	9717049
Filter and HNO3 Preservation	N/A	FIELD	FIELD		FIELD		FIELD	FIELD		ONSITE
Ion Balance	N/A	1.1	0.96	0.010	0.91	0.010	1.1	1.0	0.010	9717047
Ion Balance (% Difference)	%	4.0	2.2	N/A	5.0	N/A	2.9	0.27	N/A	9717048
Nitrate (N)	mg/L	0.0883	0.119	0.0020	0.0873	0.0020	0.0813	0.109	0.0020	9716893

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	24.9	35.5	0.50	28.4	0.50	53.2	56.8	0.50	9717394
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9717394
Bicarbonate (HCO3)	mg/L	30.3	43.3	0.50	34.7	0.50	64.9	69.3	0.50	9717394
Carbonate (CO3)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9717394
Hydroxide (OH)	mg/L	<0.50	<0.50	0.50	<0.50	0.50	<0.50	<0.50	0.50	9717394

Anions

Dissolved Chloride (Cl)	mg/L	14	14	0.50	15	0.50	25	25	0.50	9718822
Dissolved Sulphate (SO4)	mg/L	47	60	0.50	61	0.50	100	130	0.50	9718822

Nutrients

Total Ammonia (N)	mg/L	0.58 (1)	0.77 (1)	0.010	0.19	0.0050	1.5 (1)	1.4 (1)	0.025	9719983
Nitrate plus Nitrite (N)	mg/L	0.122	0.126	0.0020	0.0921	0.0020	0.0954	0.119	0.0020	9717250
Nitrite (N)	mg/L	0.0333	0.0066	0.0020	0.0048	0.0020	0.0141	0.0106	0.0020	9717257

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XD8572		
Sampling Date		2019/12/19 12:15		
COC Number		08476408		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	4.1	N/A	9717049
Cation Sum	meq/L	4.6	N/A	9717049
Filter and HNO ₃ Preservation	N/A	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	9717047
Ion Balance (% Difference)	%	5.4	N/A	9717048
Nitrate (N)	mg/L	0.0227	0.0020	9716893
Misc. Inorganics				
Alkalinity (Total as CaCO ₃)	mg/L	48.9	0.50	9717394
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9717394
Bicarbonate (HCO ₃)	mg/L	59.7	0.50	9717394
Carbonate (CO ₃)	mg/L	<0.50	0.50	9717394
Hydroxide (OH)	mg/L	<0.50	0.50	9717394
Anions				
Dissolved Chloride (Cl)	mg/L	26	0.50	9718822
Dissolved Sulphate (SO ₄)	mg/L	110	0.50	9718822
Nutrients				
Total Ammonia (N)	mg/L	0.41	0.0050	9719983
Nitrate plus Nitrite (N)	mg/L	0.0249	0.0020	9717250
Nitrite (N)	mg/L	0.0022	0.0020	9717257
RDL = Reportable Detection Limit N/A = Not Applicable				



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VERITAS

BV Labs Job #: B9A9229
Report Date: 2019/12/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XD8567	XD8568	XD8569	XD8570	XD8571		
Sampling Date		2019/12/19 12:10	2019/12/19 12:05	2019/12/19 12:00	2019/12/19 12:25	2019/12/19 12:20		
COC Number		08476408	08476408	08476408	08476408	08476408		
	UNITS	3A	3B	3C	6A	6B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	73.5	85.2	82.3	139	158	0.50	9716259
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0396	0.0254	0.00378	0.0403	0.0211	0.00050	9718722
Dissolved Antimony (Sb)	mg/L	0.00685	0.00624	0.00483	0.0112	0.0114	0.000020	9718722
Dissolved Arsenic (As)	mg/L	0.134	0.140	0.0425	0.188	0.192	0.000020	9718722
Dissolved Barium (Ba)	mg/L	0.0199	0.0209	0.0167	0.0286	0.0374	0.000020	9718722
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9718722
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9718722
Dissolved Boron (B)	mg/L	0.035	0.034	0.029	0.024	0.027	0.010	9718722
Dissolved Cadmium (Cd)	mg/L	0.00542	0.00381	0.00120	0.00146	0.00209	0.0000050	9718722
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9718722
Dissolved Cobalt (Co)	mg/L	0.0115	0.00119	0.0000837	0.0123	0.00548	0.0000050	9718722
Dissolved Copper (Cu)	mg/L	0.0643	0.0550	0.0111	0.0313	0.0348	0.000050	9718722
Dissolved Iron (Fe)	mg/L	0.0782	0.0242	0.0354	0.360	0.139	0.0010	9718722
Dissolved Lead (Pb)	mg/L	0.00599	0.000422	0.0000335	0.00202	0.000186	0.0000050	9718722
Dissolved Lithium (Li)	mg/L	0.00244	0.00272	0.00255	0.00435	0.00471	0.00050	9718722
Dissolved Manganese (Mn)	mg/L	0.391	0.0908	0.0430	0.566	0.394	0.000050	9718722
Dissolved Molybdenum (Mo)	mg/L	0.00269	0.00643	0.00683	0.00491	0.0132	0.000050	9718722
Dissolved Nickel (Ni)	mg/L	0.0193	0.0212	0.00917	0.0253	0.0334	0.000020	9718722
Dissolved Selenium (Se)	mg/L	0.00258	0.00333	0.00184	0.00486	0.00470	0.000040	9718722
Dissolved Silicon (Si)	mg/L	0.075	0.102	0.099	0.259	0.337	0.050	9718722
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9718722
Dissolved Strontium (Sr)	mg/L	0.118	0.147	0.139	0.225	0.262	0.000050	9718722
Dissolved Thallium (Tl)	mg/L	0.0000137	0.0000106	0.0000134	0.0000057	0.0000127	0.0000020	9718722
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9718722
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9718722
Dissolved Uranium (U)	mg/L	0.0236	0.0329	0.0163	0.0725	0.0495	0.0000020	9718722
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	0.00024	<0.00020	0.00020	9718722
Dissolved Zinc (Zn)	mg/L	0.517	0.361	0.193	0.203	0.309	0.00010	9718722
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9718722
Dissolved Calcium (Ca)	mg/L	20.9	26.1	25.7	40.6	46.9	0.050	9716715
Dissolved Magnesium (Mg)	mg/L	5.21	4.88	4.43	9.06	9.86	0.050	9716715

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XD8567	XD8568	XD8569	XD8570	XD8571		
Sampling Date		2019/12/19 12:10	2019/12/19 12:05	2019/12/19 12:00	2019/12/19 12:25	2019/12/19 12:20		
COC Number		08476408	08476408	08476408	08476408	08476408		
	UNITS	3A	3B	3C	6A	6B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	10.2	10.1	5.30	28.6	36.5	0.050	9716715
Dissolved Sodium (Na)	mg/L	5.18	5.60	5.61	9.86	10.1	0.050	9716715
Dissolved Sulphur (S)	mg/L	17.7	20.1	18.9	36.9	44.4	3.0	9716715

RDL = Reportable Detection Limit



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BV Labs Job #: B9A9229
Report Date: 2019/12/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XD8572		
Sampling Date		2019/12/19 12:15		
COC Number		08476408		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	155	0.50	9716259
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.00916	0.00050	9718722
Dissolved Antimony (Sb)	mg/L	0.00821	0.000020	9718722
Dissolved Arsenic (As)	mg/L	0.0981	0.000020	9718722
Dissolved Barium (Ba)	mg/L	0.0331	0.000020	9718722
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	9718722
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9718722
Dissolved Boron (B)	mg/L	0.023	0.010	9718722
Dissolved Cadmium (Cd)	mg/L	0.000860	0.0000050	9718722
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	9718722
Dissolved Cobalt (Co)	mg/L	0.00143	0.0000050	9718722
Dissolved Copper (Cu)	mg/L	0.00944	0.000050	9718722
Dissolved Iron (Fe)	mg/L	0.381	0.0010	9718722
Dissolved Lead (Pb)	mg/L	0.0000657	0.0000050	9718722
Dissolved Lithium (Li)	mg/L	0.00534	0.00050	9718722
Dissolved Manganese (Mn)	mg/L	0.901	0.000050	9718722
Dissolved Molybdenum (Mo)	mg/L	0.0111	0.000050	9718722
Dissolved Nickel (Ni)	mg/L	0.0284	0.000020	9718722
Dissolved Selenium (Se)	mg/L	0.00279	0.000040	9718722
Dissolved Silicon (Si)	mg/L	0.313	0.050	9718722
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9718722
Dissolved Strontium (Sr)	mg/L	0.250	0.000050	9718722
Dissolved Thallium (Tl)	mg/L	0.0000228	0.0000020	9718722
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9718722
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9718722
Dissolved Uranium (U)	mg/L	0.0315	0.0000020	9718722
Dissolved Vanadium (V)	mg/L	0.00021	0.00020	9718722
Dissolved Zinc (Zn)	mg/L	0.256	0.00010	9718722
Dissolved Zirconium (Zr)	mg/L	0.00011	0.00010	9718722
Dissolved Calcium (Ca)	mg/L	43.5	0.050	9716715
Dissolved Magnesium (Mg)	mg/L	11.1	0.050	9716715
RDL = Reportable Detection Limit				



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VERITAS

BV Labs Job #: B9A9229
Report Date: 2019/12/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XD8572		
Sampling Date		2019/12/19 12:15		
COC Number		08476408		
	UNITS	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	36.6	0.050	9716715
Dissolved Sodium (Na)	mg/L	10.3	0.050	9716715
Dissolved Sulphur (S)	mg/L	45.1	3.0	9716715
RDL = Reportable Detection Limit				

BUREAU
VERITAS

BV Labs Job #: B9A9229

Report Date: 2019/12/27

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XD8567	XD8568	XD8569	XD8570	XD8571		
Sampling Date		2019/12/19 12:10	2019/12/19 12:05	2019/12/19 12:00	2019/12/19 12:25	2019/12/19 12:20		
COC Number		08476408	08476408	08476408	08476408	08476408		
	UNITS	3A	3B	3C	6A	6B	RDL	QC Batch

Calculated Parameters

Total Hardness (CaCO ₃)	mg/L	69.5	78.8	81.5	134	151	0.50	9716270
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Total Metals by ICPMS

Total Aluminum (Al)	mg/L	0.0413	0.0299	0.0085	0.0545	0.0390	0.0030	9719066
Total Antimony (Sb)	mg/L	0.00648	0.00605	0.00575	0.0120	0.0172	0.000020	9719066
Total Arsenic (As)	mg/L	0.133	0.141	0.0461	0.202	0.238	0.000020	9719066
Total Barium (Ba)	mg/L	0.0192	0.0202	0.0173	0.0318	0.0489	0.000050	9719066
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9719066
Total Bismuth (Bi)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9719066
Total Boron (B)	mg/L	0.046	0.035	0.075	0.061	0.219	0.010	9719066
Total Cadmium (Cd)	mg/L	0.00538	0.00382	0.00155	0.00223	0.00319	0.0000050	9719066
Total Chromium (Cr)	mg/L	0.00013	<0.00010	<0.00010	0.00016	0.00014	0.00010	9719066
Total Cobalt (Co)	mg/L	0.0122	0.00159	0.000106	0.0145	0.0132	0.000010	9719066
Total Copper (Cu)	mg/L	0.0677	0.0582	0.0128	0.0415	0.0427	0.00010	9719066
Total Iron (Fe)	mg/L	0.0966	0.0459	0.0733	0.606	0.910	0.0050	9719066
Total Lead (Pb)	mg/L	0.00953	0.00202	0.000233	0.0136	0.0161	0.000020	9719066
Total Lithium (Li)	mg/L	0.00209	0.00232	0.00245	0.00438	0.00464	0.00050	9719066
Total Manganese (Mn)	mg/L	0.406	0.129	0.0520	0.642	0.935	0.00010	9719066
Total Molybdenum (Mo)	mg/L	0.00260	0.00623	0.00715	0.00515	0.0137	0.000050	9719066
Total Nickel (Ni)	mg/L	0.0195	0.0215	0.00969	0.0261	0.0374	0.00010	9719066
Total Phosphorus (P)	mg/L	0.204	0.203	0.0851	0.891	1.70	0.0050	9719066
Total Selenium (Se)	mg/L	0.00250	0.00333	0.00195	0.00524	0.00581	0.000040	9719066
Total Silicon (Si)	mg/L	0.090	0.128	0.127	0.322	0.354	0.050	9719066
Total Silver (Ag)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9719066
Total Strontium (Sr)	mg/L	0.113	0.139	0.141	0.223	0.259	0.000050	9719066
Total Thallium (Tl)	mg/L	0.0000131	0.0000101	0.0000131	0.0000076	0.0000140	0.0000020	9719066
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9719066
Total Titanium (Ti)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	9719066
Total Uranium (U)	mg/L	0.0214	0.0298	0.0165	0.0707	0.0505	0.0000050	9719066
Total Vanadium (V)	mg/L	0.00021	<0.00020	<0.00020	0.00034	0.00036	0.00020	9719066
Total Zinc (Zn)	mg/L	0.509	0.370	0.213	0.231	0.349	0.0010	9719066
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9719066
Total Calcium (Ca)	mg/L	19.9	24.2	25.3	39.4	45.3	0.25	9716719

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XD8567	XD8568	XD8569	XD8570	XD8571		
Sampling Date		2019/12/19 12:10	2019/12/19 12:05	2019/12/19 12:00	2019/12/19 12:25	2019/12/19 12:20		
COC Number		08476408	08476408	08476408	08476408	08476408		
	UNITS	3A	3B	3C	6A	6B	RDL	QC Batch
Total Magnesium (Mg)	mg/L	4.83	4.46	4.42	8.76	9.29	0.25	9716719
Total Potassium (K)	mg/L	9.71	9.60	5.26	27.6	33.7	0.25	9716719
Total Sodium (Na)	mg/L	4.81	5.25	5.50	9.52	9.34	0.25	9716719
Total Sulphur (S)	mg/L	17.0	19.6	19.1	36.7	43.3	0.60	9719066
RDL = Reportable Detection Limit								



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XD8572		
Sampling Date		2019/12/19 12:15		
COC Number		08476408		
	UNITS	6C	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	148	0.50	9716270
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0193	0.0030	9719066
Total Antimony (Sb)	mg/L	0.00876	0.000020	9719066
Total Arsenic (As)	mg/L	0.0978	0.000020	9719066
Total Barium (Ba)	mg/L	0.0354	0.000050	9719066
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9719066
Total Bismuth (Bi)	mg/L	<0.000010	0.000010	9719066
Total Boron (B)	mg/L	0.056	0.010	9719066
Total Cadmium (Cd)	mg/L	0.000956	0.0000050	9719066
Total Chromium (Cr)	mg/L	<0.00010	0.00010	9719066
Total Cobalt (Co)	mg/L	0.00146	0.000010	9719066
Total Copper (Cu)	mg/L	0.0108	0.00010	9719066
Total Iron (Fe)	mg/L	0.478	0.0050	9719066
Total Lead (Pb)	mg/L	0.000487	0.000020	9719066
Total Lithium (Li)	mg/L	0.00484	0.00050	9719066
Total Manganese (Mn)	mg/L	0.931	0.00010	9719066
Total Molybdenum (Mo)	mg/L	0.0106	0.000050	9719066
Total Nickel (Ni)	mg/L	0.0281	0.00010	9719066
Total Phosphorus (P)	mg/L	1.50	0.0050	9719066
Total Selenium (Se)	mg/L	0.00281	0.000040	9719066
Total Silicon (Si)	mg/L	0.336	0.050	9719066
Total Silver (Ag)	mg/L	<0.000010	0.000010	9719066
Total Strontium (Sr)	mg/L	0.233	0.000050	9719066
Total Thallium (Tl)	mg/L	0.0000225	0.0000020	9719066
Total Tin (Sn)	mg/L	<0.00020	0.00020	9719066
Total Titanium (Ti)	mg/L	<0.0020	0.0020	9719066
Total Uranium (U)	mg/L	0.0315	0.0000050	9719066
Total Vanadium (V)	mg/L	0.00024	0.00020	9719066
Total Zinc (Zn)	mg/L	0.256	0.0010	9719066
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	9719066
Total Calcium (Ca)	mg/L	41.6	0.25	9716719
RDL = Reportable Detection Limit				



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XD8572		
Sampling Date		2019/12/19 12:15		
COC Number		08476408		
	UNITS	6C	RDL	QC Batch
Total Magnesium (Mg)	mg/L	10.6	0.25	9716719
Total Potassium (K)	mg/L	35.2	0.25	9716719
Total Sodium (Na)	mg/L	9.95	0.25	9716719
Total Sulphur (S)	mg/L	42.6	0.60	9719066
RDL = Reportable Detection Limit				



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C
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Sample XD8567 [3A] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XD8568 [3B] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XD8569 [3C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XD8570 [6A] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XD8571 [6B] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XD8572 [6C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Results relate only to the items tested.



BV Labs Job #: B9A9229
Report Date: 2019/12/27

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9717250	Nitrate plus Nitrite (N)	2019/12/20			106	80 - 120	<0.0020	mg/L		
9717257	Nitrite (N)	2019/12/20			105	80 - 120	<0.0020	mg/L		
9717394	Alkalinity (PP as CaCO3)	2019/12/21					<0.50	mg/L		
9717394	Alkalinity (Total as CaCO3)	2019/12/21			96	80 - 120	<0.50	mg/L		
9717394	Bicarbonate (HCO3)	2019/12/21					<0.50	mg/L		
9717394	Carbonate (CO3)	2019/12/21					<0.50	mg/L		
9717394	Hydioxide (OH)	2019/12/21					<0.50	mg/L		
9718722	Dissolved Aluminum (Al)	2019/12/23	106	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
9718722	Dissolved Antimony (Sb)	2019/12/23	107	80 - 120	104	80 - 120	<0.000020	mg/L	NC	20
9718722	Dissolved Arsenic (As)	2019/12/23	103	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9718722	Dissolved Barium (Ba)	2019/12/23	107	80 - 120	104	80 - 120	<0.000020	mg/L	0.36	20
9718722	Dissolved Beryllium (Be)	2019/12/23	102	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9718722	Dissolved Bismuth (Bi)	2019/12/23	107	80 - 120	106	80 - 120	<0.0000050	mg/L	NC	20
9718722	Dissolved Boron (B)	2019/12/23	103	80 - 120	101	80 - 120	<0.010	mg/L	NC	20
9718722	Dissolved Cadmium (Cd)	2019/12/23	107	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9718722	Dissolved Chromium (Cr)	2019/12/23	105	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9718722	Dissolved Cobalt (Co)	2019/12/23	106	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9718722	Dissolved Copper (Cu)	2019/12/23	103	80 - 120	100	80 - 120	<0.000050	mg/L	2.3	20
9718722	Dissolved Iron (Fe)	2019/12/23	109	80 - 120	106	80 - 120	<0.0010	mg/L	NC	20
9718722	Dissolved Lead (Pb)	2019/12/23	109	80 - 120	106	80 - 120	<0.0000050	mg/L	0.87	20
9718722	Dissolved Lithium (Li)	2019/12/23	102	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9718722	Dissolved Manganese (Mn)	2019/12/23	106	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9718722	Dissolved Molybdenum (Mo)	2019/12/23	106	80 - 120	105	80 - 120	<0.000050	mg/L	NC	20
9718722	Dissolved Nickel (Ni)	2019/12/23	107	80 - 120	103	80 - 120	<0.000020	mg/L	13	20
9718722	Dissolved Selenium (Se)	2019/12/23	104	80 - 120	102	80 - 120	<0.000040	mg/L	NC	20
9718722	Dissolved Silicon (Si)	2019/12/23	104	80 - 120	102	80 - 120	<0.050	mg/L	NC	20
9718722	Dissolved Silver (Ag)	2019/12/23	103	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9718722	Dissolved Strontium (Sr)	2019/12/23	99	80 - 120	99	80 - 120	<0.000050	mg/L	0.27	20
9718722	Dissolved Thallium (Tl)	2019/12/23	109	80 - 120	107	80 - 120	<0.0000020	mg/L	NC	20
9718722	Dissolved Tin (Sn)	2019/12/23	106	80 - 120	104	80 - 120	<0.00020	mg/L	NC	20
9718722	Dissolved Titanium (Ti)	2019/12/23	105	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9718722	Dissolved Uranium (U)	2019/12/23	112	80 - 120	109	80 - 120	<0.0000020	mg/L	NC	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9718722	Dissolved Vanadium (V)	2019/12/23	104	80 - 120	101	80 - 120	<0.00020	mg/L	NC	20
9718722	Dissolved Zinc (Zn)	2019/12/23	112	80 - 120	107	80 - 120	<0.00010	mg/L	0.74	20
9718722	Dissolved Zirconium (Zr)	2019/12/23	101	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9718822	Dissolved Chloride (Cl)	2019/12/23	95	80 - 120	103	80 - 120	<0.50	mg/L	4.8	20
9718822	Dissolved Sulphate (SO4)	2019/12/23	NC	80 - 120	99	80 - 120	0.70, RDL=0.50	mg/L	3.4	20
9719066	Total Aluminium (Al)	2019/12/24	101	80 - 120	99	80 - 120	<0.0030	mg/L	0.53	20
9719066	Total Antimony (Sb)	2019/12/24	102	80 - 120	100	80 - 120	<0.000020	mg/L	2.2	20
9719066	Total Arsenic (As)	2019/12/24	103	80 - 120	104	80 - 120	<0.000020	mg/L	5.4	20
9719066	Total Barium (Ba)	2019/12/24	NC	80 - 120	102	80 - 120	<0.000050	mg/L	1.6	20
9719066	Total Beryllium (Be)	2019/12/24	98	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9719066	Total Bismuth (Bi)	2019/12/24	97	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9719066	Total Boron (B)	2019/12/24	99	80 - 120	98	80 - 120	<0.010	mg/L	1.7	20
9719066	Total Cadmium (Cd)	2019/12/24	101	80 - 120	99	80 - 120	<0.0000050	mg/L	3.9	20
9719066	Total Chromium (Cr)	2019/12/24	97	80 - 120	99	80 - 120	<0.00010	mg/L	0.48	20
9719066	Total Cobalt (Co)	2019/12/24	95	80 - 120	98	80 - 120	<0.000010	mg/L	1.5	20
9719066	Total Copper (Cu)	2019/12/24	92	80 - 120	99	80 - 120	<0.00010	mg/L	5.5	20
9719066	Total Iron (Fe)	2019/12/24	98	80 - 120	102	80 - 120	<0.0050	mg/L	0.53	20
9719066	Total Lead (Pb)	2019/12/24	100	80 - 120	101	80 - 120	<0.000020	mg/L	0	20
9719066	Total Lithium (Li)	2019/12/24	97	80 - 120	96	80 - 120	<0.00050	mg/L	0.66	20
9719066	Total Manganese (Mn)	2019/12/24	NC	80 - 120	100	80 - 120	<0.00010	mg/L	1.3	20
9719066	Total Molybdenum (Mo)	2019/12/24	113	80 - 120	102	80 - 120	<0.000050	mg/L	0.19	20
9719066	Total Nickel (Ni)	2019/12/24	95	80 - 120	101	80 - 120	<0.00010	mg/L	2.5	20
9719066	Total Phosphorus (P)	2019/12/24	101	80 - 120	99	80 - 120	<0.0050	mg/L	1.2	20
9719066	Total Selenium (Se)	2019/12/24	81	80 - 120	105	80 - 120	<0.000040	mg/L	1.0	20
9719066	Total Silicon (Si)	2019/12/24	NC	80 - 120	101	80 - 120	<0.050	mg/L	0.41	20
9719066	Total Silver (Ag)	2019/12/24	95	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9719066	Total Strontium (Sr)	2019/12/24	NC	80 - 120	101	80 - 120	<0.000050	mg/L	1.5	20
9719066	Total Sulphur (S)	2019/12/24	NC	80 - 120	98	80 - 120	<0.60	mg/L	1.2	20
9719066	Total Thallium (Tl)	2019/12/24	102	80 - 120	100	80 - 120	<0.0000020	mg/L	NC	20
9719066	Total Tin (Sn)	2019/12/24	96	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9719066	Total Titanium (Ti)	2019/12/24	99	80 - 120	104	80 - 120	<0.0020	mg/L	NC	20
9719066	Total Uranium (U)	2019/12/24	106	80 - 120	100	80 - 120	<0.0000050	mg/L	1.1	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9719066	Total Vanadium (V)	2019/12/24	99	80 - 120	100	80 - 120	<0.00020	mg/L	6.2	20
9719066	Total Zinc (Zn)	2019/12/24	92	80 - 120	99	80 - 120	<0.0010	mg/L	13	20
9719066	Total Zirconium (Zr)	2019/12/24	55 (1)	80 - 120	102	80 - 120	<0.00010	mg/L	0.20	20
9719983	Total Ammonia (N)	2019/12/24	92	80 - 120	91	80 - 120	<0.0050	mg/L	3.3	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2x$ RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

BV Labs Job #: B9A9229
Report Date: 2019/12/27

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476268, 08476264

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2019/12/23
 Report #: R2827334
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A7402

Received: 2019/12/13, 14:30

Sample Matrix: Water
 # Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	12	N/A	2019/12/16	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	9	N/A	2019/12/16	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	3	N/A	2019/12/17	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1, 2)	12	N/A	2019/12/17	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	12	N/A	2019/12/17	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	9	N/A	2019/12/17	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	2	N/A	2019/12/18	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	1	N/A	2019/12/19	BBY WI-00033	Auto Calc
Ion Balance (1)	9	N/A	2019/12/17	BBY WI-00033	Auto Calc
Ion Balance (1)	2	N/A	2019/12/18	BBY WI-00033	Auto Calc
Ion Balance (1)	1	N/A	2019/12/19	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	12	N/A	2019/12/17	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	12	N/A	2019/12/17	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	10	N/A	2019/12/16	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Low Level (dissolved) (1)	2	N/A	2019/12/17	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	12	N/A	2019/12/17	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	12	N/A	2019/12/17	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	8	N/A	2019/12/19	AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N Low Level (Preserved)	4	N/A	2019/12/20	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	12	N/A	2019/12/14	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	12	N/A	2019/12/14	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	12	N/A	2019/12/14	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	12	N/A	2019/12/14	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476268, 08476264

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2019/12/23
Report #: R2827334
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9A7402

Received: 2019/12/13, 14:30

data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		XC9248	XC9249	XC9250		XC9251	XC9252		
Sampling Date		2019/12/13 12:00	2019/12/13 12:20	2019/12/13 12:40		2019/12/13 12:05	2019/12/13 12:25		
COC Number		08476268	08476268	08476268		08476268	08476268		
	UNITS	1C	1B	1A	QC Batch	3C	3B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.7	7.7	7.7	9709489	8.3	8.6	N/A	9709489
Cation Sum	meq/L	8.3	8.4	8.1	9709489	8.5	8.4	N/A	9709489
Filter and HNO ₃ Preservation	N/A	FIELD	FIELD	FIELD	ONSITE	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.1	1.1	1.0	9709358	1.0	0.99	0.010	9709358
Ion Balance (% Difference)	%	3.5	4.5	2.4	9709361	1.2	0.77	N/A	9709361
Nitrate (N)	mg/L	0.488	0.468	0.433	9709490	0.293	0.341	0.0020	9709490

Misc. Inorganics

Alkalinity (Total as CaCO ₃)	mg/L	80.8	80.5	80.9	9711937	81.2	80.9	0.50	9711937
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	<0.50	9711937	<0.50	<0.50	0.50	9711937
Bicarbonate (HCO ₃)	mg/L	98.6	98.2	98.6	9711937	99.0	98.7	0.50	9711937
Carbonate (CO ₃)	mg/L	<0.50	<0.50	<0.50	9711937	<0.50	<0.50	0.50	9711937
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	9711937	<0.50	<0.50	0.50	9711937

Anions

Dissolved Chloride (Cl)	mg/L	62	62	62	9712019	63	65	0.50	9712019
Dissolved Sulphate (SO ₄)	mg/L	210 (1)	210 (1)	210 (1)	9712019	230 (1)	240 (1)	5.0	9712019

Nutrients

Total Ammonia (N)	mg/L	0.34	0.44	0.56	9714805	0.24	0.33	0.0050	9715472
Nitrate plus Nitrite (N)	mg/L	0.597	0.597	0.583	9709546	0.403	0.472	0.0020	9709546
Nitrite (N)	mg/L	0.109	0.129	0.150	9709547	0.110	0.131	0.0020	9709547

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BUREAU
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BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XC9253			XC9254		XC9255		XC9256		
Sampling Date		2019/12/13 12:45			2019/12/13 12:10		2019/12/13 12:30		2019/12/13 12:50		
COC Number		08476268			08476268		08476268		08476268		
	UNITS	3A	RDL	QC Batch	4C	QC Batch	4B	QC Batch	4A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	7.4	N/A	9709489	9.1	9709489	8.5	9709489	8.1	N/A	9709489
Cation Sum	meq/L	8.5	N/A	9709489	9.4	9709489	8.8	9709489	8.5	N/A	9709489
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	9709358	1.0	9709358	1.0	9709358	1.0	0.010	9709358
Ion Balance (% Difference)	%	6.6	N/A	9709361	1.7	9709361	1.9	9709361	2.1	N/A	9709361
Nitrate (N)	mg/L	0.337	0.0020	9709490	0.0090	9709490	0.108	9709490	0.307	0.0020	9709490

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	79.7	0.50	9711937	96.2	9711937	88.6	9711937	83.0	0.50	9711937
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9711937	<0.50	9711937	<0.50	9711937	<0.50	0.50	9711937
Bicarbonate (HCO3)	mg/L	97.3	0.50	9711937	117	9711937	108	9711937	101	0.50	9711937
Carbonate (CO3)	mg/L	<0.50	0.50	9711937	<0.50	9711937	<0.50	9711937	<0.50	0.50	9711937
Hydroxide (OH)	mg/L	<0.50	0.50	9711937	<0.50	9711937	<0.50	9711937	<0.50	0.50	9711937

Anions

Dissolved Chloride (Cl)	mg/L	63	0.50	9712019	68	9712019	64	9712019	65	0.50	9712019
Dissolved Sulphate (SO4)	mg/L	190	0.50	9712019	250 (1)	9712019	240 (1)	9712019	220 (1)	5.0	9712019

Nutrients

Total Ammonia (N)	mg/L	0.53	0.0050	9714805	0.035	9714805	0.064	9715472	0.30	0.0050	9714799
Nitrate plus Nitrite (N)	mg/L	0.506	0.0020	9709546	0.0134	9709552	0.144	9709546	0.415	0.0020	9709552
Nitrite (N)	mg/L	0.169	0.0020	9709547	0.0044	9709553	0.0361	9709547	0.109	0.0020	9709553

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



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BV Labs Job #: B9A7402

Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.

Client Project #: BMC-18-02

Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XC9257		XC9258		XC9259		
Sampling Date		2019/12/13 12:15		2019/12/13 12:35		2019/12/13 12:55		
COC Number		08476268		08476264		08476264		
	UNITS	6C	QC Batch	6B	QC Batch	6A	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	8.3	9709489	8.0	9709489	8.4	N/A	9709489
Cation Sum	meq/L	9.0	9709489	8.5	9709489	8.4	N/A	9709489
Filter and HNO ₃ Preservation	N/A	FIELD	ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.1	9709358	1.1	9709358	0.99	0.010	9709358
Ion Balance (% Difference)	%	3.5	9709361	3.2	9709361	0.18	N/A	9709361
Nitrate (N)	mg/L	0.0379	9709490	0.148	9709490	0.277	0.0020	9709490
Misc. Inorganics								
Alkalinity (Total as CaCO ₃)	mg/L	92.2	9711937	87.4	9711937	82.5	0.50	9711937
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	9711937	<0.50	9711937	<0.50	0.50	9711937
Bicarbonate (HCO ₃)	mg/L	113	9711937	107	9711937	101	0.50	9711937
Carbonate (CO ₃)	mg/L	<0.50	9711937	<0.50	9711937	<0.50	0.50	9711937
Hydroxide (OH)	mg/L	<0.50	9711937	<0.50	9711937	<0.50	0.50	9711937
Anions								
Dissolved Chloride (Cl)	mg/L	64	9712017	62	9712017	63	0.50	9712017
Dissolved Sulphate (SO ₄)	mg/L	230 (1)	9712017	220 (1)	9712017	240 (1)	5.0	9712017
Nutrients								
Total Ammonia (N)	mg/L	0.012	9714805	0.10	9715472	0.40	0.0050	9714799
Nitrate plus Nitrite (N)	mg/L	0.0487	9709546	0.183	9709546	0.362	0.0020	9709546
Nitrite (N)	mg/L	0.0108	9709547	0.0353	9709547	0.0851	0.0020	9709547
RDL = Reportable Detection Limit								
N/A = Not Applicable								
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.								



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BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XC9248	XC9249	XC9250	XC9251	XC9252		
Sampling Date		2019/12/13 12:00	2019/12/13 12:20	2019/12/13 12:40	2019/12/13 12:05	2019/12/13 12:25		
COC Number		08476268	08476268	08476268	08476268	08476268		
	UNITS	1C	1B	1A	3C	3B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	349	356	342	360	357	0.50	9709179
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00678	0.00837	0.00999	0.00783	0.00732	0.00050	9710240
Dissolved Antimony (Sb)	mg/L	0.0197	0.0203	0.0191	0.0202	0.0200	0.000020	9710240
Dissolved Arsenic (As)	mg/L	0.0511	0.0553	0.0561	0.0549	0.0584	0.000020	9710240
Dissolved Barium (Ba)	mg/L	0.0597	0.0613	0.0582	0.0610	0.0613	0.000020	9710240
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9710240
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9710240
Dissolved Boron (B)	mg/L	0.034	0.035	0.034	0.023	0.026	0.010	9710240
Dissolved Cadmium (Cd)	mg/L	0.00117	0.00145	0.00157	0.00109	0.00135	0.0000050	9710240
Dissolved Chromium (Cr)	mg/L	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9710240
Dissolved Cobalt (Co)	mg/L	0.000672	0.000941	0.00146	0.000360	0.000577	0.0000050	9710240
Dissolved Copper (Cu)	mg/L	0.0152	0.0205	0.0303	0.0100	0.0148	0.000050	9710240
Dissolved Iron (Fe)	mg/L	0.0020	0.0013	0.0014	0.0023	<0.0010	0.0010	9710240
Dissolved Lead (Pb)	mg/L	0.00273	0.00360	0.00685	0.00123	0.00168	0.0000050	9710240
Dissolved Lithium (Li)	mg/L	0.0110	0.0112	0.0106	0.0112	0.0113	0.00050	9710240
Dissolved Manganese (Mn)	mg/L	0.0291	0.0228	0.0299	0.0113	0.0143	0.000050	9710240
Dissolved Molybdenum (Mo)	mg/L	0.00178	0.00173	0.00165	0.00181	0.00174	0.000050	9710240
Dissolved Nickel (Ni)	mg/L	0.00675	0.00700	0.00730	0.00622	0.00672	0.000020	9710240
Dissolved Selenium (Se)	mg/L	0.00773	0.00799	0.00749	0.00790	0.00789	0.000040	9710240
Dissolved Silicon (Si)	mg/L	0.336	0.357	0.374	0.311	0.349	0.050	9710240
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9710240
Dissolved Strontium (Sr)	mg/L	0.617	0.623	0.599	0.639	0.634	0.000050	9710240
Dissolved Thallium (Tl)	mg/L	0.0000033	0.0000030	0.0000025	0.0000033	<0.0000020	0.0000020	9710240
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9710240
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9710240
Dissolved Uranium (U)	mg/L	0.0346	0.0346	0.0309	0.0418	0.0392	0.0000020	9710240
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9710240
Dissolved Zinc (Zn)	mg/L	0.118	0.125	0.132	0.107	0.118	0.00010	9710240
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9710240
Dissolved Calcium (Ca)	mg/L	111	113	109	115	114	0.050	9709364
Dissolved Magnesium (Mg)	mg/L	17.6	17.7	16.8	17.7	17.6	0.050	9709364

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XC9248	XC9249	XC9250	XC9251	XC9252		
Sampling Date		2019/12/13 12:00	2019/12/13 12:20	2019/12/13 12:40	2019/12/13 12:05	2019/12/13 12:25		
COC Number		08476268	08476268	08476268	08476268	08476268		
	UNITS	1C	1B	1A	3C	3B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.03	4.03	3.75	4.22	4.11	0.050	9709364
Dissolved Sodium (Na)	mg/L	26.5	26.8	25.2	27.0	26.6	0.050	9709364
Dissolved Sulphur (S)	mg/L	85.3	86.0	81.2	87.0	86.9	3.0	9709364
RDL = Reportable Detection Limit								



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BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XC9253	XC9254	XC9255	XC9256	XC9257		
Sampling Date		2019/12/13 12:45	2019/12/13 12:10	2019/12/13 12:30	2019/12/13 12:50	2019/12/13 12:15		
COC Number		08476268	08476268	08476268	08476268	08476268		
	UNITS	3A	4C	4B	4A	6C	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	359	401	376	361	381	0.50	9709179
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.0115	0.00150	0.00198	0.00586	0.00176	0.00050	9710240
Dissolved Antimony (Sb)	mg/L	0.0203	0.0154	0.0180	0.0199	0.0193	0.000020	9710240
Dissolved Arsenic (As)	mg/L	0.0634	0.0168	0.0402	0.0532	0.0281	0.000020	9710240
Dissolved Barium (Ba)	mg/L	0.0607	0.0615	0.0586	0.0604	0.0598	0.000020	9710240
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9710240
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9710240
Dissolved Boron (B)	mg/L	0.030	0.011	0.017	0.026	0.015	0.010	9710240
Dissolved Cadmium (Cd)	mg/L	0.00176	0.0000885	0.000315	0.000973	0.000109	0.0000050	9710240
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9710240
Dissolved Cobalt (Co)	mg/L	0.00171	0.000133	0.000100	0.000506	0.000204	0.0000050	9710240
Dissolved Copper (Cu)	mg/L	0.0321	0.00184	0.00455	0.0140	0.00346	0.000050	9710240
Dissolved Iron (Fe)	mg/L	0.0026	0.0231	0.0024	0.0019	0.0675	0.0010	9710240
Dissolved Lead (Pb)	mg/L	0.00638	0.000285	0.000512	0.00152	0.000314	0.0000050	9710240
Dissolved Lithium (Li)	mg/L	0.0110	0.0117	0.0112	0.0110	0.0114	0.00050	9710240
Dissolved Manganese (Mn)	mg/L	0.0381	0.0176	0.00284	0.0122	0.0528	0.000050	9710240
Dissolved Molybdenum (Mo)	mg/L	0.00171	0.00138	0.00163	0.00171	0.00180	0.000050	9710240
Dissolved Nickel (Ni)	mg/L	0.00778	0.00606	0.00633	0.00704	0.00590	0.000020	9710240
Dissolved Selenium (Se)	mg/L	0.00803	0.00484	0.00658	0.00763	0.00554	0.000040	9710240
Dissolved Silicon (Si)	mg/L	0.411	0.532	0.475	0.455	0.605	0.050	9710240
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9710240
Dissolved Strontium (Sr)	mg/L	0.638	0.693	0.672	0.647	0.656	0.000050	9710240
Dissolved Thallium (Tl)	mg/L	0.0000024	<0.0000020	<0.0000020	0.0000022	<0.0000020	0.0000020	9710240
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9710240
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9710240
Dissolved Uranium (U)	mg/L	0.0331	0.0363	0.0411	0.0372	0.0436	0.0000020	9710240
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9710240
Dissolved Zinc (Zn)	mg/L	0.142	0.0384	0.0658	0.103	0.0436	0.00010	9710240
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9710240
Dissolved Calcium (Ca)	mg/L	115	128	119	115	121	0.050	9709364
Dissolved Magnesium (Mg)	mg/L	17.6	19.8	18.9	17.7	18.9	0.050	9709364

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XC9253	XC9254	XC9255	XC9256	XC9257		
Sampling Date		2019/12/13 12:45	2019/12/13 12:10	2019/12/13 12:30	2019/12/13 12:50	2019/12/13 12:15		
COC Number		08476268	08476268	08476268	08476268	08476268		
	UNITS	3A	4C	4B	4A	6C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.01	4.34	4.31	4.05	4.73	0.050	9709364
Dissolved Sodium (Na)	mg/L	26.5	29.5	28.0	26.5	28.0	0.050	9709364
Dissolved Sulphur (S)	mg/L	86.9	95.3	91.0	87.0	90.2	3.0	9709364
RDL = Reportable Detection Limit								

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VERITASBV Labs Job #: B9A7402
Report Date: 2019/12/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XC9258	XC9259		
Sampling Date		2019/12/13 12:35	2019/12/13 12:55		
COC Number		08476264	08476264		
	UNITS	6B	6A	RDL	QC Batch

Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	361	355	0.50	9709179
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00632	0.00684	0.00050	9710240
Dissolved Antimony (Sb)	mg/L	0.0205	0.0218	0.000020	9710240
Dissolved Arsenic (As)	mg/L	0.0443	0.0527	0.000020	9710240
Dissolved Barium (Ba)	mg/L	0.0572	0.0605	0.000020	9710240
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9710240
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9710240
Dissolved Boron (B)	mg/L	0.020	0.030	0.010	9710240
Dissolved Cadmium (Cd)	mg/L	0.000270	0.000929	0.0000050	9710240
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9710240
Dissolved Cobalt (Co)	mg/L	0.000265	0.00133	0.0000050	9710240
Dissolved Copper (Cu)	mg/L	0.00764	0.0161	0.000050	9710240
Dissolved Iron (Fe)	mg/L	0.0229	0.0118	0.0010	9710240
Dissolved Lead (Pb)	mg/L	0.00187	0.00205	0.0000050	9710240
Dissolved Lithium (Li)	mg/L	0.0111	0.0109	0.00050	9710240
Dissolved Manganese (Mn)	mg/L	0.0187	0.0426	0.000050	9710240
Dissolved Molybdenum (Mo)	mg/L	0.00181	0.00175	0.000050	9710240
Dissolved Nickel (Ni)	mg/L	0.00565	0.00716	0.000020	9710240
Dissolved Selenium (Se)	mg/L	0.00670	0.00746	0.000040	9710240
Dissolved Silicon (Si)	mg/L	0.550	0.499	0.050	9710240
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9710240
Dissolved Strontium (Sr)	mg/L	0.631	0.621	0.000050	9710240
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9710240
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9710240
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9710240
Dissolved Uranium (U)	mg/L	0.0432	0.0400	0.0000020	9710240
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9710240
Dissolved Zinc (Zn)	mg/L	0.0552	0.105	0.00010	9710240
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9710240
Dissolved Calcium (Ca)	mg/L	115	113	0.050	9709364
Dissolved Magnesium (Mg)	mg/L	18.2	17.6	0.050	9709364
RDL = Reportable Detection Limit					



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BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XC9258	XC9259		
Sampling Date		2019/12/13 12:35	2019/12/13 12:55		
COC Number		08476264	08476264		
	UNITS	6B	6A	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.41	4.12	0.050	9709364
Dissolved Sodium (Na)	mg/L	27.0	26.7	0.050	9709364
Dissolved Sulphur (S)	mg/L	86.2	86.0	3.0	9709364
RDL = Reportable Detection Limit					

BUREAU
VERITASBV Labs Job #: B9A7402
Report Date: 2019/12/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XC9248	XC9249	XC9250	XC9251	XC9252		
Sampling Date		2019/12/13 12:00	2019/12/13 12:20	2019/12/13 12:40	2019/12/13 12:05	2019/12/13 12:25		
COC Number		08476268	08476268	08476268	08476268	08476268		
	UNITS	1C	1B	1A	3C	3B	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	368	370	363	370	374	0.50	9709178
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0133	0.0157	0.0193	0.00933	0.0136	0.00050	9710886
Total Antimony (Sb)	mg/L	0.0215	0.0214	0.0208	0.0208	0.0211	0.000020	9710886
Total Arsenic (As)	mg/L	0.0547	0.0585	0.0589	0.0558	0.0615	0.000020	9710886
Total Barium (Ba)	mg/L	0.0629	0.0624	0.0616	0.0623	0.0634	0.000020	9710886
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9710886
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9710886
Total Boron (B)	mg/L	0.036	0.036	0.037	0.024	0.027	0.010	9710886
Total Cadmium (Cd)	mg/L	0.00130	0.00152	0.00168	0.00111	0.00145	0.0000050	9710886
Total Chromium (Cr)	mg/L	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9710886
Total Cobalt (Co)	mg/L	0.000785	0.00106	0.00162	0.000412	0.000663	0.0000050	9710886
Total Copper (Cu)	mg/L	0.0170	0.0228	0.0339	0.0111	0.0166	0.000050	9710886
Total Iron (Fe)	mg/L	0.0133	0.0078	0.0105	0.0077	0.0070	0.0010	9710886
Total Lead (Pb)	mg/L	0.00685	0.00795	0.0120	0.00289	0.00435	0.0000050	9710886
Total Lithium (Li)	mg/L	0.0125	0.0124	0.0122	0.0124	0.0126	0.00050	9710886
Total Manganese (Mn)	mg/L	0.0343	0.0276	0.0356	0.0137	0.0176	0.000050	9710886
Total Molybdenum (Mo)	mg/L	0.00191	0.00184	0.00179	0.00180	0.00183	0.000050	9710886
Total Nickel (Ni)	mg/L	0.00693	0.00712	0.00754	0.00630	0.00692	0.000020	9710886
Total Selenium (Se)	mg/L	0.00784	0.00803	0.00771	0.00758	0.00791	0.000040	9710886
Total Silicon (Si)	mg/L	0.404	0.422	0.461	0.358	0.399	0.050	9710886
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9710886
Total Strontium (Sr)	mg/L	0.710	0.710	0.685	0.711	0.714	0.000050	9710886
Total Thallium (Tl)	mg/L	0.0000033	0.0000027	0.0000027	0.0000035	<0.0000020	0.0000020	9710886
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9710886
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9710886
Total Uranium (U)	mg/L	0.0362	0.0352	0.0326	0.0415	0.0400	0.0000020	9710886
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9710886
Total Zinc (Zn)	mg/L	0.121	0.130	0.137	0.108	0.123	0.00010	9710886
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9710886
Total Calcium (Ca)	mg/L	118	119	117	119	121	0.050	9709369
Total Magnesium (Mg)	mg/L	17.9	17.8	17.4	17.6	17.8	0.050	9709369

RDL = Reportable Detection Limit



BUREAU
VERITAS

BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XC9248	XC9249	XC9250	XC9251	XC9252		
Sampling Date		2019/12/13 12:00	2019/12/13 12:20	2019/12/13 12:40	2019/12/13 12:05	2019/12/13 12:25		
COC Number		08476268	08476268	08476268	08476268	08476268		
	UNITS	1C	1B	1A	3C	3B	RDL	QC Batch
Total Potassium (K)	mg/L	4.10	4.13	3.91	4.23	4.29	0.050	9709369
Total Sodium (Na)	mg/L	26.8	26.9	26.0	26.5	26.5	0.050	9709369
Total Sulphur (S)	mg/L	90.5	88.9	90.0	87.8	92.4	3.0	9709369
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XC9253	XC9254	XC9255	XC9256	XC9257		
Sampling Date		2019/12/13 12:45	2019/12/13 12:10	2019/12/13 12:30	2019/12/13 12:50	2019/12/13 12:15		
COC Number		08476268	08476268	08476268	08476268	08476268		
	UNITS	3A	4C	4B	4A	6C	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO3)	mg/L	370	423	393	374	409	0.50	9709178
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0170	0.00592	0.00718	0.0121	0.00709	0.00050	9710886
Total Antimony (Sb)	mg/L	0.0210	0.0162	0.0193	0.0209	0.0208	0.000020	9710886
Total Arsenic (As)	mg/L	0.0654	0.0185	0.0435	0.0548	0.0321	0.000020	9710886
Total Barium (Ba)	mg/L	0.0621	0.0633	0.0623	0.0615	0.0641	0.000020	9710886
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9710886
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9710886
Total Boron (B)	mg/L	0.032	0.012	0.019	0.026	0.016	0.010	9710886
Total Cadmium (Cd)	mg/L	0.00183	0.0000886	0.000328	0.00102	0.000148	0.0000050	9710886
Total Chromium (Cr)	mg/L	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9710886
Total Cobalt (Co)	mg/L	0.00174	0.000137	0.000179	0.000571	0.000221	0.0000050	9710886
Total Copper (Cu)	mg/L	0.0339	0.00250	0.00535	0.0156	0.00582	0.000050	9710886
Total Iron (Fe)	mg/L	0.0055	0.0527	0.0080	0.0086	0.108	0.0010	9710886
Total Lead (Pb)	mg/L	0.00990	0.000812	0.00266	0.00439	0.00126	0.0000050	9710886
Total Lithium (Li)	mg/L	0.0124	0.0139	0.0134	0.0125	0.0135	0.00050	9710886
Total Manganese (Mn)	mg/L	0.0418	0.0187	0.00581	0.0153	0.0592	0.000050	9710886
Total Molybdenum (Mo)	mg/L	0.00172	0.00148	0.00176	0.00177	0.00191	0.000050	9710886
Total Nickel (Ni)	mg/L	0.00758	0.00611	0.00636	0.00713	0.00601	0.000020	9710886
Total Selenium (Se)	mg/L	0.00779	0.00473	0.00658	0.00713	0.00571	0.000040	9710886
Total Silicon (Si)	mg/L	0.490	0.638	0.586	0.537	0.737	0.050	9710886
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9710886
Total Strontium (Sr)	mg/L	0.700	0.781	0.772	0.733	0.768	0.000050	9710886
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000020	9710886
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9710886
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9710886
Total Uranium (U)	mg/L	0.0332	0.0371	0.0436	0.0392	0.0453	0.0000020	9710886
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9710886
Total Zinc (Zn)	mg/L	0.142	0.0400	0.0678	0.105	0.0472	0.00010	9710886
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9710886
Total Calcium (Ca)	mg/L	119	136	126	120	131	0.050	9709369
Total Magnesium (Mg)	mg/L	17.5	19.9	19.1	17.7	19.7	0.050	9709369

RDL = Reportable Detection Limit



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BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XC9253	XC9254	XC9255	XC9256	XC9257		
Sampling Date		2019/12/13 12:45	2019/12/13 12:10	2019/12/13 12:30	2019/12/13 12:50	2019/12/13 12:15		
COC Number		08476268	08476268	08476268	08476268	08476268		
	UNITS	3A	4C	4B	4A	6C	RDL	QC Batch
Total Potassium (K)	mg/L	4.01	4.48	4.42	4.17	5.04	0.050	9709369
Total Sodium (Na)	mg/L	25.9	29.2	28.1	26.3	28.8	0.050	9709369
Total Sulphur (S)	mg/L	88.7	101	97.1	89.6	103	3.0	9709369
RDL = Reportable Detection Limit								

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VERITASBV Labs Job #: B9A7402
Report Date: 2019/12/23ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XC9258	XC9259		
Sampling Date		2019/12/13 12:35	2019/12/13 12:55		
COC Number		08476264	08476264		
	UNITS	6B	6A	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	380	374	0.50	9709178
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00657	0.0120	0.00050	9710886
Total Antimony (Sb)	mg/L	0.0216	0.0233	0.000020	9710886
Total Arsenic (As)	mg/L	0.0461	0.0582	0.000020	9710886
Total Barium (Ba)	mg/L	0.0598	0.0643	0.000020	9710886
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9710886
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9710886
Total Boron (B)	mg/L	0.021	0.031	0.010	9710886
Total Cadmium (Cd)	mg/L	0.000281	0.00102	0.0000050	9710886
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9710886
Total Cobalt (Co)	mg/L	0.000254	0.00140	0.0000050	9710886
Total Copper (Cu)	mg/L	0.00765	0.0192	0.000050	9710886
Total Iron (Fe)	mg/L	0.0244	0.0294	0.0010	9710886
Total Lead (Pb)	mg/L	0.00192	0.00564	0.0000050	9710886
Total Lithium (Li)	mg/L	0.0128	0.0127	0.00050	9710886
Total Manganese (Mn)	mg/L	0.0192	0.0463	0.000050	9710886
Total Molybdenum (Mo)	mg/L	0.00180	0.00189	0.000050	9710886
Total Nickel (Ni)	mg/L	0.00569	0.00696	0.000020	9710886
Total Selenium (Se)	mg/L	0.00675	0.00767	0.000040	9710886
Total Silicon (Si)	mg/L	0.660	0.604	0.050	9710886
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9710886
Total Strontium (Sr)	mg/L	0.722	0.724	0.000050	9710886
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9710886
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9710886
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9710886
Total Uranium (U)	mg/L	0.0450	0.0415	0.0000020	9710886
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9710886
Total Zinc (Zn)	mg/L	0.0575	0.109	0.00010	9710886
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9710886
Total Calcium (Ca)	mg/L	122	120	0.050	9709369
Total Magnesium (Mg)	mg/L	18.3	17.8	0.050	9709369
RDL = Reportable Detection Limit					



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VERITAS

BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XC9258	XC9259		
Sampling Date		2019/12/13 12:35	2019/12/13 12:55		
COC Number		08476264	08476264		
	UNITS	6B	6A	RDL	QC Batch
Total Potassium (K)	mg/L	4.59	4.25	0.050	9709369
Total Sodium (Na)	mg/L	26.9	26.3	0.050	9709369
Total Sulphur (S)	mg/L	93.6	91.5	3.0	9709369
RDL = Reportable Detection Limit					



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.0°C
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Results relate only to the items tested.



QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9709546	Nitrate plus Nitrite (N)	2019/12/14	108	80 - 120	104	80 - 120	<0.0020	mg/L	0.42	25
9709547	Nitrite (N)	2019/12/14	102	80 - 120	99	80 - 120	<0.0020	mg/L	5.1	25
9709552	Nitrate plus Nitrite (N)	2019/12/14	101	80 - 120	106	80 - 120	<0.0020	mg/L	1.1	25
9709553	Nitrite (N)	2019/12/14	102	80 - 120	100	80 - 120	<0.0020	mg/L	NC	25
9710240	Dissolved Aluminum (Al)	2019/12/17	101	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9710240	Dissolved Antimony (Sb)	2019/12/17	100	80 - 120	98	80 - 120	<0.000020	mg/L	0.30	20
9710240	Dissolved Arsenic (As)	2019/12/17	103	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9710240	Dissolved Barium (Ba)	2019/12/17	NC	80 - 120	103	80 - 120	<0.000020	mg/L	NC	20
9710240	Dissolved Beryllium (Be)	2019/12/17	103	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9710240	Dissolved Bismuth (Bi)	2019/12/17	101	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9710240	Dissolved Boron (B)	2019/12/17	106	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
9710240	Dissolved Cadmium (Cd)	2019/12/17	101	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9710240	Dissolved Chromium (Cr)	2019/12/17	101	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9710240	Dissolved Cobalt (Co)	2019/12/17	98	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9710240	Dissolved Copper (Cu)	2019/12/17	99	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9710240	Dissolved Iron (Fe)	2019/12/17	104	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
9710240	Dissolved Lead (Pb)	2019/12/17	103	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9710240	Dissolved Lithium (Li)	2019/12/17	94	80 - 120	94	80 - 120	<0.00050	mg/L	NC	20
9710240	Dissolved Manganese (Mn)	2019/12/17	100	80 - 120	101	80 - 120	<0.000050	mg/L	NC	20
9710240	Dissolved Molybdenum (Mo)	2019/12/17	106	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9710240	Dissolved Nickel (Ni)	2019/12/17	100	80 - 120	102	80 - 120	<0.000020	mg/L	NC	20
9710240	Dissolved Selenium (Se)	2019/12/17	105	80 - 120	101	80 - 120	<0.000040	mg/L	NC	20
9710240	Dissolved Silicon (Si)	2019/12/17	NC	80 - 120	101	80 - 120	<0.050	mg/L	NC	20
9710240	Dissolved Silver (Ag)	2019/12/17	100	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9710240	Dissolved Strontium (Sr)	2019/12/17	NC	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
9710240	Dissolved Thallium (Tl)	2019/12/17	104	80 - 120	101	80 - 120	<0.0000020	mg/L	NC	20
9710240	Dissolved Tin (Sn)	2019/12/17	100	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9710240	Dissolved Titanium (Ti)	2019/12/17	103	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9710240	Dissolved Uranium (U)	2019/12/17	NC	80 - 120	103	80 - 120	<0.0000020	mg/L	NC	20
9710240	Dissolved Vanadium (V)	2019/12/17	103	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9710240	Dissolved Zinc (Zn)	2019/12/17	101	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9710240	Dissolved Zirconium (Zr)	2019/12/17	103	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20



BV Labs Job #: B9A7402
Report Date: 2019/12/23

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9710886	Total Aluminum (Al)	2019/12/17	106	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
9710886	Total Antimony (Sb)	2019/12/17	102	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9710886	Total Arsenic (As)	2019/12/17	105	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9710886	Total Barium (Ba)	2019/12/17	NC	80 - 120	101	80 - 120	<0.000020	mg/L	NC	20
9710886	Total Beryllium (Be)	2019/12/17	102	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9710886	Total Bismuth (Bi)	2019/12/17	103	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9710886	Total Boron (B)	2019/12/17	103	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9710886	Total Cadmium (Cd)	2019/12/17	104	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9710886	Total Chromium (Cr)	2019/12/17	103	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9710886	Total Cobalt (Co)	2019/12/17	96	80 - 120	92	80 - 120	<0.0000050	mg/L	NC	20
9710886	Total Copper (Cu)	2019/12/17	98	80 - 120	96	80 - 120	<0.000050	mg/L	NC	20
9710886	Total Iron (Fe)	2019/12/17	108	80 - 120	102	80 - 120	<0.0010	mg/L	3.5	20
9710886	Total Lead (Pb)	2019/12/17	107	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9710886	Total Lithium (Li)	2019/12/17	103	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9710886	Total Manganese (Mn)	2019/12/17	101	80 - 120	99	80 - 120	0.000060, RDL=0.000050 (1)	mg/L	NC	20
9710886	Total Molybdenum (Mo)	2019/12/17	109	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9710886	Total Nickel (Ni)	2019/12/17	99	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
9710886	Total Selenium (Se)	2019/12/17	103	80 - 120	94	80 - 120	<0.000040	mg/L	NC	20
9710886	Total Silicon (Si)	2019/12/17	NC	80 - 120	110	80 - 120	<0.050	mg/L	NC	20
9710886	Total Silver (Ag)	2019/12/17	105	80 - 120	93	80 - 120	<0.0000050	mg/L	NC	20
9710886	Total Strontium (Sr)	2019/12/17	NC	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
9710886	Total Thallium (Tl)	2019/12/17	107	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9710886	Total Tin (Sn)	2019/12/17	103	80 - 120	117	80 - 120	<0.000020	mg/L	NC	20
9710886	Total Titanium (Ti)	2019/12/17	103	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9710886	Total Uranium (U)	2019/12/17	NC	80 - 120	102	80 - 120	0.0000032, RDL=0.0000020 (2)	mg/L	NC	20
9710886	Total Vanadium (V)	2019/12/17	105	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9710886	Total Zinc (Zn)	2019/12/17	103	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9710886	Total Zirconium (Zr)	2019/12/17	109	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9711937	Alkalinity (PP as CaCO3)	2019/12/16					<0.50	mg/L	NC	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9711937	Alkalinity (Total as CaCO ₃)	2019/12/16	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.25	20
9711937	Bicarbonate (HCO ₃)	2019/12/16					<0.50	mg/L	0.25	20
9711937	Carbonate (CO ₃)	2019/12/16					<0.50	mg/L	NC	20
9711937	Hydioxide (OH)	2019/12/16					<0.50	mg/L	NC	20
9712017	Dissolved Chloride (Cl)	2019/12/16	97	80 - 120	104	80 - 120	<0.50	mg/L	0.96	20
9712017	Dissolved Sulphate (SO ₄)	2019/12/16	NC	80 - 120	100	80 - 120	0.73, RDL=0.50	mg/L	0.28	20
9712019	Dissolved Chloride (Cl)	2019/12/16	NC	80 - 120	105	80 - 120	<0.50	mg/L	0.0065	20
9712019	Dissolved Sulphate (SO ₄)	2019/12/16	NC	80 - 120	97	80 - 120	<0.50	mg/L	2.7	20
9714799	Total Ammonia (N)	2019/12/19	110	80 - 120	109	80 - 120	<0.0050	mg/L	NC	20
9714805	Total Ammonia (N)	2019/12/19	NC	80 - 120	106	80 - 120	<0.0050	mg/L	0.13	20
9715472	Total Ammonia (N)	2019/12/20	83	80 - 120	107	80 - 120	<0.0050	mg/L	0.36	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method blank exceeds acceptance limits for Mn- 2X RDL acceptable for low level metals determination.

(2) Method blank exceeds acceptance limits for U- 2X RDL acceptable for low level metals determination.



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BV Labs Job #: B9A7402
Report Date: 2019/12/23

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

COC #1

BBY FCD-00077/05

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B9A7402_COC

June 2019/12/14 11:28



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Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476648

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/01/10
 Report #: R2832422
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C000859

Received: 2020/01/06, 13:13

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	4	N/A	2020/01/07	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	4	N/A	2020/01/07	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1, 2)	4	N/A	2020/01/10	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	4	N/A	2020/01/08	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	4	N/A	2020/01/08	BBY WI-00033	Auto Calc
Ion Balance (1)	4	N/A	2020/01/08	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	4	N/A	2020/01/08	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	4	N/A	2020/01/08	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	4	N/A	2020/01/07	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	4	N/A	2020/01/10	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	4	N/A	2020/01/09	BBY7SOP-00002	EPA 6020b R2 m
Nitrate+Nitrite (N) (low level) (1)	4	N/A	2020/01/07	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	4	N/A	2020/01/07	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	4	N/A	2020/01/07	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	4	N/A	2020/01/07	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476648

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/10
Report #: R2832422
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C000859

Received: 2020/01/06, 13:13

dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF CHEMICAL ANALYSES OF WATER**

BV Labs ID		XE9817	XE9818	XE9819	XE9820		
Sampling Date		2020/01/06 13:00	2020/01/06 11:00	2020/01/06 11:30	2020/01/06 12:00		
COC Number		08476648	08476648	08476648	08476648		
	UNITS	INFLUENT-78	1A	1B	1C	RDL	QC Batch

Calculated Parameters							
Anion Sum	meq/L	8.5	8.6	9.9	9.0	N/A	9727576
Cation Sum	meq/L	8.1	9.2	9.4	9.4	N/A	9727576
Filter and HNO ₃ Preservation	N/A	FIELD	FIELD	FIELD	FIELD		ONSITE
Ion Balance	N/A	0.95	1.1	0.95	1.0	0.010	9727573
Ion Balance (% Difference)	%	2.4	3.3	2.7	2.3	N/A	9727575
Nitrate (N)	mg/L	0.404	0.368	0.132	0.0444	0.0020	9727577
Misc. Inorganics							
Alkalinity (Total as CaCO ₃)	mg/L	81.0	94.5	101	102	0.50	9727466
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9727466
Bicarbonate (HCO ₃)	mg/L	98.8	115	123	125	0.50	9727466
Carbonate (CO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9727466
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	9727466
Anions							
Dissolved Chloride (Cl)	mg/L	62	67	69	70	0.50	9728036
Dissolved Sulphate (SO ₄)	mg/L	250 (1)	230 (1)	280 (1)	240 (1)	5.0	9728036
Nutrients							
Nitrate plus Nitrite (N)	mg/L	0.431	0.377	0.132	0.0444	0.0020	9728023
Nitrite (N)	mg/L	0.0267	0.0089	<0.0020	<0.0020	0.0020	9728024

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



BV Labs Job #: C000859
Report Date: 2020/01/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XE9817	XE9818	XE9819	XE9820		
Sampling Date		2020/01/06 13:00	2020/01/06 11:00	2020/01/06 11:30	2020/01/06 12:00		
COC Number		08476648	08476648	08476648	08476648		
	UNITS	INFLUENT-78	1A	1B	1C	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO ₃)	mg/L	344	390	398	402	0.50	9727376
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.00785	0.00474	0.00215	0.00110	0.00050	9727877
Dissolved Antimony (Sb)	mg/L	0.0194	0.0200	0.0151	0.0120	0.000020	9727877
Dissolved Arsenic (As)	mg/L	0.0593	0.0428	0.0385	0.0193	0.000020	9727877
Dissolved Barium (Ba)	mg/L	0.0600	0.0584	0.0597	0.0558	0.000020	9727877
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9727877
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9727877
Dissolved Boron (B)	mg/L	0.037	0.034	0.031	0.021	0.010	9727877
Dissolved Cadmium (Cd)	mg/L	0.00191	0.00116	0.000887	0.000469	0.0000050	9727877
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00012	<0.00010	<0.00010	0.00010	9727877
Dissolved Cobalt (Co)	mg/L	0.00251	0.00180	0.000479	0.000175	0.0000050	9727877
Dissolved Copper (Cu)	mg/L	0.0402	0.0294	0.0133	0.00588	0.000050	9727877
Dissolved Iron (Fe)	mg/L	<0.0010	0.0014	0.0028	0.0053	0.0010	9727877
Dissolved Lead (Pb)	mg/L	0.0155	0.00732	0.00169	0.000438	0.0000050	9727877
Dissolved Lithium (Li)	mg/L	0.0117	0.0127	0.0131	0.0131	0.00050	9727877
Dissolved Manganese (Mn)	mg/L	0.0498	0.0420	0.0154	0.0251	0.000050	9727877
Dissolved Molybdenum (Mo)	mg/L	0.00167	0.00188	0.00161	0.00139	0.000050	9727877
Dissolved Nickel (Ni)	mg/L	0.00795	0.00691	0.00583	0.00470	0.000020	9727877
Dissolved Selenium (Se)	mg/L	0.00745	0.00599	0.00412	0.00287	0.000040	9727877
Dissolved Silicon (Si)	mg/L	0.418	0.232	0.142	1.34	0.050	9727877
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9727877
Dissolved Strontium (Sr)	mg/L	0.607	0.681	0.655	0.653	0.000050	9727877
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000064	0.0000065	0.0000087	0.0000020	9727877
Dissolved Tin (Sn)	mg/L	<0.00020	0.00038	<0.00020	<0.00020	0.00020	9727877
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9727877
Dissolved Uranium (U)	mg/L	0.0289	0.0469	0.0464	0.0423	0.0000020	9727877
Dissolved Vanadium (V)	mg/L	0.00022	0.00022	0.00044	0.00020	0.00020	9727877
Dissolved Zinc (Zn)	mg/L	0.160	0.132	0.0946	0.0687	0.00010	9727877
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9727877
Dissolved Calcium (Ca)	mg/L	109	122	127	129	0.050	9727377
Dissolved Magnesium (Mg)	mg/L	17.6	20.5	19.8	19.3	0.050	9727377
RDL = Reportable Detection Limit							



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XE9817	XE9818	XE9819	XE9820		
Sampling Date		2020/01/06 13:00	2020/01/06 11:00	2020/01/06 11:30	2020/01/06 12:00		
COC Number		08476648	08476648	08476648	08476648		
	UNITS	INFLUENT-78	1A	1B	1C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	3.84	4.75	4.66	4.89	0.050	9727377
Dissolved Sodium (Na)	mg/L	26.6	30.0	29.6	28.5	0.050	9727377
Dissolved Sulphur (S)	mg/L	85.0	97.3	94.5	93.8	3.0	9727377
RDL = Reportable Detection Limit							

BUREAU
VERITASBV Labs Job #: C000859
Report Date: 2020/01/10ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XE9817	XE9818	XE9819	XE9820		
Sampling Date		2020/01/06 13:00	2020/01/06 11:00	2020/01/06 11:30	2020/01/06 12:00		
COC Number		08476648	08476648	08476648	08476648		
	UNITS	INFLUENT-78	1A	1B	1C	RDL	QC Batch

Calculated Parameters							
Total Hardness (CaCO ₃)	mg/L	351	386	398	410	0.50	9727375
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0157	0.00771	0.00300	0.00139	0.00050	9729833
Total Antimony (Sb)	mg/L	0.0198	0.0200	0.0154	0.0123	0.000020	9729833
Total Arsenic (As)	mg/L	0.0600	0.0411	0.0387	0.0194	0.000020	9729833
Total Barium (Ba)	mg/L	0.0606	0.0592	0.0608	0.0566	0.000020	9729833
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9729833
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9729833
Total Boron (B)	mg/L	0.036	0.034	0.031	0.022	0.010	9729833
Total Cadmium (Cd)	mg/L	0.00197	0.00117	0.000931	0.000496	0.0000050	9729833
Total Chromium (Cr)	mg/L	0.00011	<0.00010	<0.00010	<0.00010	0.00010	9729833
Total Cobalt (Co)	mg/L	0.00251	0.00169	0.000458	0.000163	0.0000050	9729833
Total Copper (Cu)	mg/L	0.0426	0.0300	0.0151	0.00670	0.000050	9729833
Total Iron (Fe)	mg/L	0.0058	0.0043	0.0045	0.0103	0.0010	9729833
Total Lead (Pb)	mg/L	0.0170	0.00788	0.00191	0.000519	0.0000050	9729833
Total Lithium (Li)	mg/L	0.0112	0.0122	0.0126	0.0126	0.00050	9729833
Total Manganese (Mn)	mg/L	0.0514	0.0411	0.0162	0.0264	0.000050	9729833
Total Molybdenum (Mo)	mg/L	0.00174	0.00187	0.00165	0.00140	0.000050	9729833
Total Nickel (Ni)	mg/L	0.00791	0.00647	0.00593	0.00475	0.000020	9729833
Total Selenium (Se)	mg/L	0.00771	0.00606	0.00428	0.00297	0.000040	9729833
Total Silicon (Si)	mg/L	0.440	0.237	0.143	1.31	0.050	9729833
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9729833
Total Strontium (Sr)	mg/L	0.657	0.691	0.704	0.710	0.000050	9729833
Total Thallium (Tl)	mg/L	<0.0000020	0.0000061	0.0000057	0.0000074	0.0000020	9729833
Total Tin (Sn)	mg/L	<0.00020	0.00032	<0.00020	<0.00020	0.00020	9729833
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9729833
Total Uranium (U)	mg/L	0.0287	0.0463	0.0467	0.0438	0.0000020	9729833
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9729833
Total Zinc (Zn)	mg/L	0.162	0.128	0.0965	0.0711	0.00010	9729833
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9729833
Total Calcium (Ca)	mg/L	112	122	126	131	0.050	9727378
Total Magnesium (Mg)	mg/L	17.5	19.5	20.2	20.0	0.050	9727378
RDL = Reportable Detection Limit							



BUREAU
VERITAS

BV Labs Job #: C000859
Report Date: 2020/01/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XE9817	XE9818	XE9819	XE9820		
Sampling Date		2020/01/06 13:00	2020/01/06 11:00	2020/01/06 11:30	2020/01/06 12:00		
COC Number		08476648	08476648	08476648	08476648		
	UNITS	INFLUENT-78	1A	1B	1C	RDL	QC Batch
Total Potassium (K)	mg/L	3.89	4.57	4.70	4.94	0.050	9727378
Total Sodium (Na)	mg/L	26.1	28.9	29.9	29.5	0.050	9727378
Total Sulphur (S)	mg/L	84.3	90.5	95.7	96.1	3.0	9727378
RDL = Reportable Detection Limit							



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BV Labs Job #: C000859
Report Date: 2020/01/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.7°C
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LOW LEVEL DISSOLVED METALS IN WATER (WATER) Comments

Matrix Spike Elements by ICPMS Low Level (dissolved): RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.



BV Labs Job #: C000859
Report Date: 2020/01/10

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9727466	Alkalinity (PP as CaCO ₃)	2020/01/07					<0.50	mg/L	NC	20
9727466	Alkalinity (Total as CaCO ₃)	2020/01/07	95	80 - 120	86	80 - 120	<0.50	mg/L	NC	20
9727466	Bicarbonate (HCO ₃)	2020/01/07					<0.50	mg/L	NC	20
9727466	Carbonate (CO ₃)	2020/01/07					<0.50	mg/L	NC	20
9727466	Hydroxide (OH)	2020/01/07					<0.50	mg/L	NC	20
9727877	Dissolved Aluminum (Al)	2020/01/07	104	80 - 120	107	80 - 120	<0.00050	mg/L	NC	20
9727877	Dissolved Antimony (Sb)	2020/01/07	104	80 - 120	108	80 - 120	<0.000020	mg/L	NC	20
9727877	Dissolved Arsenic (As)	2020/01/07	104	80 - 120	107	80 - 120	<0.000020	mg/L	NC	20
9727877	Dissolved Barium (Ba)	2020/01/07	104	80 - 120	107	80 - 120	<0.000020	mg/L	NC	20
9727877	Dissolved Beryllium (Be)	2020/01/07	98	80 - 120	103	80 - 120	<0.000010	mg/L	NC	20
9727877	Dissolved Bismuth (Bi)	2020/01/07	102	80 - 120	109	80 - 120	<0.0000050	mg/L	NC	20
9727877	Dissolved Boron (B)	2020/01/07	100	80 - 120	105	80 - 120	<0.010	mg/L	NC	20
9727877	Dissolved Cadmium (Cd)	2020/01/07	102	80 - 120	107	80 - 120	<0.0000050	mg/L	NC	20
9727877	Dissolved Chromium (Cr)	2020/01/07	101	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
9727877	Dissolved Cobalt (Co)	2020/01/07	NC	80 - 120	107	80 - 120	<0.0000050	mg/L	NC	20
9727877	Dissolved Copper (Cu)	2020/01/07	98	80 - 120	106	80 - 120	<0.000050	mg/L	NC	20
9727877	Dissolved Iron (Fe)	2020/01/07	NC	80 - 120	111	80 - 120	<0.0010	mg/L	NC	20
9727877	Dissolved Lead (Pb)	2020/01/07	105	80 - 120	109	80 - 120	<0.0000050	mg/L	NC	20
9727877	Dissolved Lithium (Li)	2020/01/07	100	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9727877	Dissolved Manganese (Mn)	2020/01/07	NC	80 - 120	108	80 - 120	<0.000050	mg/L	NC	20
9727877	Dissolved Molybdenum (Mo)	2020/01/07	110	80 - 120	110	80 - 120	<0.000050	mg/L	NC	20
9727877	Dissolved Nickel (Ni)	2020/01/07	NC	80 - 120	106	80 - 120	<0.000020	mg/L	NC	20
9727877	Dissolved Selenium (Se)	2020/01/07	106	80 - 120	106	80 - 120	<0.000040	mg/L	NC	20
9727877	Dissolved Silicon (Si)	2020/01/07	NC	80 - 120	110	80 - 120	<0.050	mg/L	NC	20
9727877	Dissolved Silver (Ag)	2020/01/07	94	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9727877	Dissolved Strontium (Sr)	2020/01/07	NC	80 - 120	106	80 - 120	<0.000050	mg/L	NC	20
9727877	Dissolved Thallium (Tl)	2020/01/07	106	80 - 120	109	80 - 120	<0.0000020	mg/L	NC	20
9727877	Dissolved Tin (Sn)	2020/01/07	104	80 - 120	109	80 - 120	<0.00020	mg/L	NC	20
9727877	Dissolved Titanium (Ti)	2020/01/07	107	80 - 120	111	80 - 120	<0.00050	mg/L	NC	20
9727877	Dissolved Uranium (U)	2020/01/07	107	80 - 120	108	80 - 120	<0.0000020	mg/L	NC	20
9727877	Dissolved Vanadium (V)	2020/01/07	101	80 - 120	107	80 - 120	<0.00020	mg/L	NC	20
9727877	Dissolved Zinc (Zn)	2020/01/07	NC	80 - 120	110	80 - 120	<0.00010	mg/L	NC	20



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9727877	Dissolved Zirconium (Zr)	2020/01/07	108	80 - 120	110	80 - 120	<0.00010	mg/L	NC	20
9728023	Nitrate plus Nitrite (N)	2020/01/07			107	80 - 120	<0.0020	mg/L		
9728024	Nitrite (N)	2020/01/07			97	80 - 120	<0.0020	mg/L		
9728036	Dissolved Chloride (Cl)	2020/01/07	88	80 - 120	102	80 - 120	<0.50	mg/L	7.3	20
9728036	Dissolved Sulphate (SO4)	2020/01/07	NC	80 - 120	99	80 - 120	<0.50	mg/L	1.7	20
9729833	Total Aluminum (Al)	2020/01/09	101	80 - 120	101	80 - 120	<0.00050	mg/L	6.5	20
9729833	Total Antimony (Sb)	2020/01/09	100	80 - 120	101	80 - 120	<0.000020	mg/L	0.64	20
9729833	Total Arsenic (As)	2020/01/09	102	80 - 120	98	80 - 120	<0.000020	mg/L	1.1	20
9729833	Total Barium (Ba)	2020/01/09	NC	80 - 120	99	80 - 120	<0.000020	mg/L	0.78	20
9729833	Total Beryllium (Be)	2020/01/09	99	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9729833	Total Bismuth (Bi)	2020/01/09	100	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9729833	Total Boron (B)	2020/01/09	98	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9729833	Total Cadmium (Cd)	2020/01/09	101	80 - 120	101	80 - 120	<0.0000050	mg/L	6.0	20
9729833	Total Chromium (Cr)	2020/01/09	101	80 - 120	102	80 - 120	<0.00010	mg/L	NC	20
9729833	Total Cobalt (Co)	2020/01/09	96	80 - 120	97	80 - 120	<0.0000050	mg/L	2.7	20
9729833	Total Copper (Cu)	2020/01/09	97	80 - 120	99	80 - 120	<0.000050	mg/L	7.9	20
9729833	Total Iron (Fe)	2020/01/09	96	80 - 120	100	80 - 120	<0.0010	mg/L	2.4	20
9729833	Total Lead (Pb)	2020/01/09	102	80 - 120	101	80 - 120	<0.0000050	mg/L	0.45	20
9729833	Total Lithium (Li)	2020/01/09	94	80 - 120	96	80 - 120	<0.00050	mg/L	0.16	20
9729833	Total Manganese (Mn)	2020/01/09	NC	80 - 120	100	80 - 120	<0.000050	mg/L	2.2	20
9729833	Total Molybdenum (Mo)	2020/01/09	106	80 - 120	104	80 - 120	<0.000050	mg/L	3.1	20
9729833	Total Nickel (Ni)	2020/01/09	99	80 - 120	102	80 - 120	<0.000020	mg/L	2.8	20
9729833	Total Selenium (Se)	2020/01/09	105	80 - 120	99	80 - 120	<0.000040	mg/L	6.9	20
9729833	Total Silicon (Si)	2020/01/09	NC	80 - 120	95	80 - 120	<0.050	mg/L	0.80	20
9729833	Total Silver (Ag)	2020/01/09	101	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9729833	Total Strontium (Sr)	2020/01/09	NC	80 - 120	100	80 - 120	<0.000050	mg/L	0.64	20
9729833	Total Thallium (Tl)	2020/01/09	103	80 - 120	99	80 - 120	<0.0000020	mg/L	4.2	20
9729833	Total Tin (Sn)	2020/01/09	101	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9729833	Total Titanium (Ti)	2020/01/09	102	80 - 120	100	80 - 120	<0.00050	mg/L	15	20
9729833	Total Uranium (U)	2020/01/09	102	80 - 120	100	80 - 120	<0.0000020	mg/L	0.35	20
9729833	Total Vanadium (V)	2020/01/09	102	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9729833	Total Zinc (Zn)	2020/01/09	99	80 - 120	103	80 - 120	<0.00010	mg/L	2.0	20



BV Labs Job #: C000859
Report Date: 2020/01/10

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9729833	Total Zirconium (Zr)	2020/01/09	104	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.										
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.										
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.										
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.										
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)										
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).										



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BV Labs Job #: C000859
Report Date: 2020/01/10

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

CHAIN OF CUSTODY R1

i(ObPr)

08476648

BBY FCD-00077/05

Page 1 of 1

Invoice Information Company Name: BMC MINERALS LTD. Contact Name: _____ Address: 530-1130 WEST PENDER ST Vancouver, BC PC: V6E 4A4 Phone: _____ Email: _____				Report Information (if differs from invoice) Company Name: ALESCO ENVIRONMENTAL Contact Name: Mary Mofka, Renate Vanderhorst Address: UNIT 3 151 INDUSTRIAL RD Whitehorse, YK PC: V1A 2V3 Phone: (867) 668-6463 manderhorst@alexcoenvy.com Email: mmoska@alexcoenvy.com				Project Information (where applicable) Quotation #: 960751 P.O. #/AFER: _____ Project #: BMC-18-02 Site Location: Kudzh Zeyah Site #: _____ Sampled By: _____				Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analyses) Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3 Days			
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485				Analysis Requested Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity							
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM				# OF CONTAINERS SUBMITTED				HOLD - DO NOT ANALYZE							
Sample Identification		Lab Identification		Date Sampled (YYYY/MM/DD)		Time Sampled (HH:MM)		Matrix		COMMENTS					
1 Influent - 78				06-Dec-19		13:00		Water		Metals preserved with HNO3, dissolved					
2 1A				06-Dec-19		11:00		Water		Metals preserved with HNO3, dissolved					
3 1B				06-Dec-19		11:30		Water		Metals preserved with HNO3, dissolved					
4 1C				06-Dec-19		12:00		Water		Metals preserved with HNO3, dissolved					
5										Metals preserved with HNO3, dissolved					
6										Metals preserved with HNO3, dissolved					
7										Metals preserved with HNO3, dissolved					
8										Metals preserved with HNO3, dissolved					
9										Metals preserved with HNO3, dissolved					
10										Metals preserved with HNO3, dissolved					

Received in Saskatoon
 By: *[Signature]*
 JAN 06 2020 14:13
 Temp: 5 / 14 / 15

RENOUNCISHED BY: (Signature/Print) *[Signature]* DATE: (YYYY/MM/DD) **2020/01/06** TIME: (HH:MM) **14:15**
 RECEIVED BY: (Signature/Print) *[Signature]* DATE: (YYYY/MM/DD) **2020/01/07** TIME: (HH:MM) **08:00**

LABORATORY USE ONLY
 CUSTODY SEAL / N
 COOLER TEMPERATURES
 Temp. Index
 YES NO C/T/T
 COMMENTS
 COOLING MEDIA PRESENT
 C/T/T



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476654

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/01/14
 Report #: R2833292
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C001231

Received: 2020/01/07, 10:41

Sample Matrix: Water
 # Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	3	N/A	2020/01/09	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	3	N/A	2020/01/08	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO ₃) (1, 2)	3	N/A	2020/01/13	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃) (1)	3	N/A	2020/01/09	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	3	N/A	2020/01/10	BBY WI-00033	Auto Calc
Ion Balance (1)	3	N/A	2020/01/10	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	3	N/A	2020/01/10	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	3	N/A	2020/01/09	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	3	N/A	2020/01/08	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	2	2020/01/11	2020/01/11	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	1	2020/01/11	2020/01/13	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	3	N/A	2020/01/13	BBY WI-00033	Auto Calc
Nitrate+Nitrite (N) (low level) (1)	3	N/A	2020/01/08	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level) (1)	3	N/A	2020/01/08	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	3	N/A	2020/01/08	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals (1)	3	N/A	2020/01/08	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476654

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/14
Report #: R2833292
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C001231

Received: 2020/01/07, 10:41

BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

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BV Labs Job #: C001231
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: KV

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XF1070	XF1071	XF1072		
Sampling Date		2020/01/06 04:30	2020/01/07 08:30	2020/01/07 08:35		
COC Number		08476654	08476654	08476654		
	UNITS	4A	4B	4C	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	13	8.5	10	N/A	9728721
Cation Sum	meq/L	12	9.2	11	N/A	9728721
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD		ONSITE
Ion Balance	N/A	0.89	1.1	1.1	0.010	9728719
Ion Balance (% Difference)	%	5.6	4.0	3.3	N/A	9728720
Nitrate (N)	mg/L	0.380	0.333	0.260	0.0020	9728724
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	115	91.3	105	0.50	9728922
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	0.50	9728922
Bicarbonate (HCO3)	mg/L	141	111	128	0.50	9728922
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	0.50	9728922
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	0.50	9728922
Anions						
Dissolved Chloride (Cl)	mg/L	92	59	73	0.50	9729113
Dissolved Sulphate (SO4)	mg/L	410 (1)	240 (1)	280 (1)	5.0	9729113
Nutrients						
Nitrate plus Nitrite (N)	mg/L	0.416	0.374	0.301	0.0020	9729059
Nitrite (N)	mg/L	0.0353	0.0415	0.0409	0.0020	9729061
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to dilution to bring analyte within the calibrated range.						



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BV Labs Job #: C001231
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: KV

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		XF1072		
Sampling Date		2020/01/07 08:35		
COC Number		08476654		
	UNITS	4C	RDL	QC Batch
Total Metals by ICPMS				
Total Aluminum (Al)	mg/L	0.0083	0.0030	9731497
Total Antimony (Sb)	mg/L	0.0227	0.000020	9731497
Total Arsenic (As)	mg/L	0.0664	0.000020	9731497
Total Barium (Ba)	mg/L	0.0656	0.000050	9731497
Total Beryllium (Be)	mg/L	<0.000010	0.000010	9731497
Total Bismuth (Bi)	mg/L	<0.000010	0.000010	9731497
Total Boron (B)	mg/L	0.013	0.010	9731497
Total Cadmium (Cd)	mg/L	0.000914	0.0000050	9731497
Total Chromium (Cr)	mg/L	<0.00010	0.00010	9731497
Total Cobalt (Co)	mg/L	0.00106	0.000010	9731497
Total Copper (Cu)	mg/L	0.0184	0.00010	9731497
Total Iron (Fe)	mg/L	0.0274	0.0050	9731497
Total Lead (Pb)	mg/L	0.00184	0.000020	9731497
Total Lithium (Li)	mg/L	0.0152	0.00050	9731497
Total Manganese (Mn)	mg/L	0.109	0.00010	9731497
Total Molybdenum (Mo)	mg/L	0.00268	0.000050	9731497
Total Nickel (Ni)	mg/L	0.0102	0.00010	9731497
Total Phosphorus (P)	mg/L	0.135	0.0050	9731497
Total Selenium (Se)	mg/L	0.00868	0.000040	9731497
Total Silicon (Si)	mg/L	0.827	0.050	9731497
Total Silver (Ag)	mg/L	<0.000010	0.000010	9731497
Total Strontium (Sr)	mg/L	0.873	0.000050	9731497
Total Thallium (Tl)	mg/L	0.0000098	0.0000020	9731497
Total Tin (Sn)	mg/L	<0.00020	0.00020	9731497
Total Titanium (Ti)	mg/L	<0.0020	0.0020	9731497
Total Uranium (U)	mg/L	0.0514	0.0000050	9731497
Total Vanadium (V)	mg/L	0.00027	0.00020	9731497
Total Zinc (Zn)	mg/L	0.0973	0.0010	9731497
Total Zirconium (Zr)	mg/L	<0.00010	0.00010	9731497
Total Sulphur (S)	mg/L	122	0.60	9731497
RDL = Reportable Detection Limit				



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BV Labs Job #: C001231
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: KV

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF1070	XF1071	XF1072		
Sampling Date		2020/01/06 04:30	2020/01/07 08:30	2020/01/07 08:35		
COC Number		08476654	08476654	08476654		
	UNITS	4A	4B	4C	RDL	QC Batch
Calculated Parameters						
Dissolved Hardness (CaCO ₃)	mg/L	486	387	452	0.50	9728343
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	mg/L	0.00804	0.00410	0.00330	0.00050	9728976
Dissolved Antimony (Sb)	mg/L	0.0329	0.0201	0.0194	0.000020	9728976
Dissolved Arsenic (As)	mg/L	0.124	0.0628	0.0620	0.000020	9728976
Dissolved Barium (Ba)	mg/L	0.0632	0.0624	0.0610	0.000020	9728976
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	0.000010	9728976
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9728976
Dissolved Boron (B)	mg/L	0.019	0.021	0.010	0.010	9728976
Dissolved Cadmium (Cd)	mg/L	0.00149	0.00143	0.000792	0.0000050	9728976
Dissolved Chromium (Cr)	mg/L	0.00013	<0.00010	<0.00010	0.00010	9728976
Dissolved Cobalt (Co)	mg/L	0.00303	0.00133	0.000941	0.0000050	9728976
Dissolved Copper (Cu)	mg/L	0.0333	0.0213	0.0156	0.000050	9728976
Dissolved Iron (Fe)	mg/L	0.0148	0.0047	0.0171	0.0010	9728976
Dissolved Lead (Pb)	mg/L	0.00205	0.00268	0.00117	0.0000050	9728976
Dissolved Lithium (Li)	mg/L	0.0181	0.0130	0.0148	0.00050	9728976
Dissolved Manganese (Mn)	mg/L	0.162	0.0701	0.0977	0.000050	9728976
Dissolved Molybdenum (Mo)	mg/L	0.00386	0.00213	0.00241	0.000050	9728976
Dissolved Nickel (Ni)	mg/L	0.0178	0.00745	0.00898	0.000020	9728976
Dissolved Selenium (Se)	mg/L	0.00893	0.00745	0.00730	0.000040	9728976
Dissolved Silicon (Si)	mg/L	0.665	0.532	0.802	0.050	9728976
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	9728976
Dissolved Strontium (Sr)	mg/L	0.919	0.707	0.822	0.000050	9728976
Dissolved Thallium (Tl)	mg/L	0.0000112	0.0000035	0.0000089	0.0000020	9728976
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	9728976
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	9728976
Dissolved Uranium (U)	mg/L	0.118	0.0395	0.0480	0.0000020	9728976
Dissolved Vanadium (V)	mg/L	0.00032	<0.00020	0.00024	0.00020	9728976
Dissolved Zinc (Zn)	mg/L	0.155	0.126	0.0833	0.00010	9728976
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	9728976
Dissolved Calcium (Ca)	mg/L	144	123	143	0.050	9728722
RDL = Reportable Detection Limit						



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BV Labs Job #: C001231
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: KV

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF1070	XF1071	XF1072		
Sampling Date		2020/01/06 04:30	2020/01/07 08:30	2020/01/07 08:35		
COC Number		08476654	08476654	08476654		
	UNITS	4A	4B	4C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	31.0	19.5	23.0	0.050	9728722
Dissolved Potassium (K)	mg/L	19.5	5.87	11.0	0.050	9728722
Dissolved Sodium (Na)	mg/L	42.1	29.0	32.6	0.050	9728722
Dissolved Sulphur (S)	mg/L	138	95.0	113	3.0	9728722
RDL = Reportable Detection Limit						



BUREAU
VERITAS

BV Labs Job #: C001231
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: KV

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XF1070	XF1071			XF1072		
Sampling Date		2020/01/06 04:30	2020/01/07 08:30			2020/01/07 08:35		
COC Number		08476654	08476654			08476654		
	UNITS	4A	4B	RDL	QC Batch	4C	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	529	389	0.50	9728342	507	0.50	9728342
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0128	0.0093	0.0030	9731497			
Total Antimony (Sb)	mg/L	0.0354	0.0211	0.000020	9731497			
Total Arsenic (As)	mg/L	0.131	0.0635	0.000020	9731497			
Total Barium (Ba)	mg/L	0.0696	0.0666	0.000050	9731497			
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9731497			
Total Bismuth (Bi)	mg/L	<0.000010	<0.000010	0.000010	9731497			
Total Boron (B)	mg/L	0.023	0.019	0.010	9731497			
Total Cadmium (Cd)	mg/L	0.00167	0.00149	0.0000050	9731497			
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9731497			
Total Cobalt (Co)	mg/L	0.00321	0.00134	0.000010	9731497			
Total Copper (Cu)	mg/L	0.0334	0.0254	0.00010	9731497			
Total Iron (Fe)	mg/L	0.0403	0.0086	0.0050	9731497			
Total Lead (Pb)	mg/L	0.00338	0.00364	0.000020	9731497			
Total Lithium (Li)	mg/L	0.0169	0.0113	0.00050	9731497			
Total Manganese (Mn)	mg/L	0.186	0.0730	0.00010	9731497			
Total Molybdenum (Mo)	mg/L	0.00407	0.00221	0.000050	9731497			
Total Nickel (Ni)	mg/L	0.0175	0.00730	0.00010	9731497			
Total Phosphorus (P)	mg/L	0.233	0.0359	0.0050	9731497			
Total Selenium (Se)	mg/L	0.00991	0.00764	0.000040	9731497			
Total Silicon (Si)	mg/L	0.732	0.527	0.050	9731497			
Total Silver (Ag)	mg/L	<0.000010	<0.000010	0.000010	9731497			
Total Strontium (Sr)	mg/L	0.994	0.762	0.000050	9731497			
Total Thallium (Tl)	mg/L	0.0000118	0.0000037	0.0000020	9731497			
Total Tin (Sn)	mg/L	<0.00020	0.00050	0.00020	9731497			
Total Titanium (Ti)	mg/L	<0.0020	<0.0020	0.0020	9731497			
Total Uranium (U)	mg/L	0.123	0.0407	0.0000050	9731497			
Total Vanadium (V)	mg/L	0.00024	<0.00020	0.00020	9731497			
Total Zinc (Zn)	mg/L	0.158	0.128	0.0010	9731497			
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9731497			
RDL = Reportable Detection Limit								



BUREAU
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BV Labs Job #: C001231
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: KV

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XF1070	XF1071			XF1072		
Sampling Date		2020/01/06 04:30	2020/01/07 08:30			2020/01/07 08:35		
COC Number		08476654	08476654			08476654		
	UNITS	4A	4B	RDL	QC Batch	4C	RDL	QC Batch
Total Calcium (Ca)	mg/L	164	125	0.25	9728723	160	0.25	9728723
Total Magnesium (Mg)	mg/L	28.8	18.7	0.25	9728723	25.8	0.25	9728723
Total Potassium (K)	mg/L	20.1	6.00	0.25	9728723	12.1	0.25	9728723
Total Sodium (Na)	mg/L	40.7	28.2	0.25	9728723	37.4	0.25	9728723
Total Sulphur (S)	mg/L	136	91.9	0.60	9731497	122	3.0	9728723
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: C001231
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: KV

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	10.7°C
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Sample XF1070 [4A] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XF1071 [4B] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XF1072 [4C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Results relate only to the items tested.



BV Labs Job #: C001231
Report Date: 2020/01/14

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: KV

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9728922	Alkalinity (PP as CaCO ₃)	2020/01/09					<0.50	mg/L		
9728922	Alkalinity (Total as CaCO ₃)	2020/01/09			93	80 - 120	<0.50	mg/L		
9728922	Bicarbonate (HCO ₃)	2020/01/09					<0.50	mg/L		
9728922	Carbonate (CO ₃)	2020/01/09					<0.50	mg/L		
9728922	Hydioxide (OH)	2020/01/09					<0.50	mg/L		
9728976	Dissolved Aluminum (Al)	2020/01/08	101	80 - 120	101	80 - 120	<0.00050	mg/L	0.67	20
9728976	Dissolved Antimony (Sb)	2020/01/08	NC	80 - 120	101	80 - 120	<0.000020	mg/L	1.1	20
9728976	Dissolved Arsenic (As)	2020/01/08	NC	80 - 120	102	80 - 120	<0.000020	mg/L	0.55	20
9728976	Dissolved Barium (Ba)	2020/01/08	NC	80 - 120	100	80 - 120	<0.000020	mg/L	1.6	20
9728976	Dissolved Beryllium (Be)	2020/01/08	96	80 - 120	99	80 - 120	<0.000010	mg/L	NC	20
9728976	Dissolved Bismuth (Bi)	2020/01/08	97	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9728976	Dissolved Boron (B)	2020/01/08	99	80 - 120	101	80 - 120	<0.010	mg/L	1.8	20
9728976	Dissolved Cadmium (Cd)	2020/01/08	98	80 - 120	100	80 - 120	<0.0000050	mg/L	1.7	20
9728976	Dissolved Chromium (Cr)	2020/01/08	98	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9728976	Dissolved Cobalt (Co)	2020/01/08	95	80 - 120	99	80 - 120	<0.0000050	mg/L	1.4	20
9728976	Dissolved Copper (Cu)	2020/01/08	92	80 - 120	99	80 - 120	<0.000050	mg/L	2.2	20
9728976	Dissolved Iron (Fe)	2020/01/08	97	80 - 120	104	80 - 120	<0.0010	mg/L	2.0	20
9728976	Dissolved Lead (Pb)	2020/01/08	99	80 - 120	104	80 - 120	<0.0000050	mg/L	1.1	20
9728976	Dissolved Lithium (Li)	2020/01/08	94	80 - 120	100	80 - 120	<0.00050	mg/L	1.0	20
9728976	Dissolved Manganese (Mn)	2020/01/08	NC	80 - 120	99	80 - 120	<0.000050	mg/L	0.87	20
9728976	Dissolved Molybdenum (Mo)	2020/01/08	110	80 - 120	102	80 - 120	<0.000050	mg/L	0.61	20
9728976	Dissolved Nickel (Ni)	2020/01/08	94	80 - 120	99	80 - 120	0.000033, RDL=0.000020 (1)	mg/L	1.4	20
9728976	Dissolved Selenium (Se)	2020/01/08	101	80 - 120	101	80 - 120	<0.000040	mg/L	0.10	20
9728976	Dissolved Silicon (Si)	2020/01/08	94	80 - 120	100	80 - 120	<0.050	mg/L	2.0	20
9728976	Dissolved Silver (Ag)	2020/01/08	97	80 - 120	98	80 - 120	<0.0000050	mg/L	NC	20
9728976	Dissolved Strontium (Sr)	2020/01/08	NC	80 - 120	102	80 - 120	<0.000050	mg/L	0.60	20
9728976	Dissolved Thallium (Tl)	2020/01/08	100	80 - 120	102	80 - 120	<0.0000020	mg/L	2.2	20
9728976	Dissolved Tin (Sn)	2020/01/08	101	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9728976	Dissolved Titanium (Ti)	2020/01/08	103	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9728976	Dissolved Uranium (U)	2020/01/08	101	80 - 120	103	80 - 120	<0.0000020	mg/L	0.30	20



BV Labs Job #: C001231
Report Date: 2020/01/14

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: KV

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9728976	Dissolved Vanadium (V)	2020/01/08	100	80 - 120	101	80 - 120	0.00022, RDL=0.00020 (2)	mg/L	8.7	20
9728976	Dissolved Zinc (Zn)	2020/01/08	NC	80 - 120	103	80 - 120	<0.00010	mg/L	1.5	20
9728976	Dissolved Zirconium (Zr)	2020/01/08	111	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9729059	Nitrate plus Nitrite (N)	2020/01/08	104	80 - 120	105	80 - 120	<0.0020	mg/L	0.36	25
9729061	Nitrite (N)	2020/01/08	101	80 - 120	103	80 - 120	<0.0020	mg/L	NC	25
9729113	Dissolved Chloride (Cl)	2020/01/08	NC	80 - 120	100	80 - 120	<0.50	mg/L	0.15	20
9729113	Dissolved Sulphate (SO4)	2020/01/08	NC	80 - 120	96	80 - 120	0.76, RDL=0.50	mg/L	10	20
9731497	Total Aluminum (Al)	2020/01/11	99	80 - 120	98	80 - 120	<0.0030	mg/L	12	20
9731497	Total Antimony (Sb)	2020/01/11	NC	80 - 120	108	80 - 120	<0.000020	mg/L	0.60	20
9731497	Total Arsenic (As)	2020/01/11	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.12	20
9731497	Total Barium (Ba)	2020/01/11	NC	80 - 120	108	80 - 120	<0.000050	mg/L	0.78	20
9731497	Total Beryllium (Be)	2020/01/11	92	80 - 120	92	80 - 120	<0.000010	mg/L	NC	20
9731497	Total Bismuth (Bi)	2020/01/11	102	80 - 120	107	80 - 120	<0.000010	mg/L	NC	20
9731497	Total Boron (B)	2020/01/11	95	80 - 120	96	80 - 120	<0.010	mg/L	1.3	20
9731497	Total Cadmium (Cd)	2020/01/11	103	80 - 120	105	80 - 120	<0.0000050	mg/L	0.32	20
9731497	Total Chromium (Cr)	2020/01/11	98	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9731497	Total Cobalt (Co)	2020/01/11	94	80 - 120	98	80 - 120	<0.000010	mg/L	1.4	20
9731497	Total Copper (Cu)	2020/01/11	92	80 - 120	99	80 - 120	0.000010, RDL=0.00010 (3)	mg/L	0.59	20
9731497	Total Iron (Fe)	2020/01/11	104	80 - 120	108	80 - 120	<0.0050	mg/L	1.6	20
9731497	Total Lead (Pb)	2020/01/11	107	80 - 120	110	80 - 120	<0.000020	mg/L	1.8	20
9731497	Total Lithium (Li)	2020/01/11	96	80 - 120	95	80 - 120	<0.00050	mg/L	2.3	20
9731497	Total Manganese (Mn)	2020/01/11	NC	80 - 120	102	80 - 120	<0.00010	mg/L	0.69	20
9731497	Total Molybdenum (Mo)	2020/01/11	114	80 - 120	104	80 - 120	<0.000050	mg/L	1.3	20
9731497	Total Nickel (Ni)	2020/01/11	94	80 - 120	99	80 - 120	0.000018, RDL=0.00010 (4)	mg/L	1.6	20
9731497	Total Phosphorus (P)	2020/01/11	99	80 - 120	96	80 - 120	<0.0050	mg/L	0.086	20
9731497	Total Selenium (Se)	2020/01/11	101	80 - 120	102	80 - 120	<0.000040	mg/L	0.17	20
9731497	Total Silicon (Si)	2020/01/11	97	80 - 120	99	80 - 120	<0.050	mg/L	0.24	20



BV Labs Job #: C001231
Report Date: 2020/01/14

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH
Sampler Initials: KV

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9731497	Total Silver (Ag)	2020/01/11	100	80 - 120	102	80 - 120	<0.000010	mg/L	NC	20
9731497	Total Strontium (Sr)	2020/01/11	NC	80 - 120	103	80 - 120	<0.000050	mg/L	1.4	20
9731497	Total Sulphur (S)	2020/01/11	NC	80 - 120	98	80 - 120	<0.60	mg/L	0.27	20
9731497	Total Thallium (Tl)	2020/01/11	106	80 - 120	107	80 - 120	<0.0000020	mg/L	0	20
9731497	Total Tin (Sn)	2020/01/11	107	80 - 120	106	80 - 120	<0.00020	mg/L	1.8	20
9731497	Total Titanium (Ti)	2020/01/11	99	80 - 120	101	80 - 120	<0.0020	mg/L	NC	20
9731497	Total Uranium (U)	2020/01/11	113	80 - 120	109	80 - 120	<0.0000050	mg/L	2.1	20
9731497	Total Vanadium (V)	2020/01/11	101	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9731497	Total Zinc (Zn)	2020/01/11	NC	80 - 120	104	80 - 120	<0.0010	mg/L	0.87	20
9731497	Total Zirconium (Zr)	2020/01/11	110	80 - 120	106	80 - 120	<0.00010	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Method Blank exceeds acceptance limits for Ni - 2X RDL acceptable for low level metals determination.

(2) Method Blank exceeds acceptance limits for V - 2X RDL acceptable for low level metals determination.

(3) Method Blank exceeds acceptance limits for (Copper) - 2X RDL acceptable for low level metals determination.

(4) Method Blank exceeds acceptance limits for (Nickel) - 2X RDL acceptable for low level metals determination.



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BV Labs Job #: C001231
Report Date: 2020/01/14

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Sampler Initials: KV

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1J5, Toll Free (800) 665-8566

CHAIN OF CUSTODY REC

COC #:

BBV FCD-00077/05
08476654

Page 1 of 1

Invoice Information Company Name: <u>BMC MINERALS LTD.</u> Contact Name: <u>530-1130 WEST PENDER ST</u> Address: <u>Vancouver, BC PC V6E 4A4</u> Phone: <u>(867) 668-6463</u> Email: <u>maxxam@alexcogroup.com</u>		Report Information (if differs from invoice) Company Name: <u>ALEXCO ENVIRONMENTAL</u> Contact Name: <u>Walter J. Rennie, Renate Vandenhofst</u> Address: <u>UNIT 3 151 INDUSTRIAL RD</u> Whitehorse, YK PC V1A 2V3 Phone: <u>(867) 668-6463</u> Email: <u>maxxam@alexcogroup.com</u>		Project Information (where applicable) Quotation #: <u>B60751</u> P.O. #/ AFB#: <u>BMC-18-02</u> Project #: <u>Kudze Kayah</u> Site location: <u>Kudze Kayah</u> Site #: <u></u> Sampled By: <u></u>		Turnaround Time (TAT) Required ☒ Regular TAT 5 days (Most analyses) Rush TAT (Surcharges will be applied) ☐ Same Day ☐ 2 Days ☐ 3 Days	
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality		Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12345		Analysis Requested Low Level Dissolved Metals Low Level Total Metals Anions (SO4, NO2, NO3, Cl) Alkalinity		Rush Confirmation #: Laboratory Use Only CUSTODY SEAL: <u>Y</u> COOLING TEMPERATURES Present: <u>Induct</u>	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM				# OF CONTAINERS SUBMITTED HOLD - DO NOT ANALYZE		COMMENTS Metalls preserved with HNO3, dissolved Metalls field filtered, ammonia preserved Metalls preserved with HNO3, dissolved Metalls field filtered, ammonia preserved Metalls preserved with HNO3, dissolved Metalls field filtered, ammonia preserved Metalls preserved with HNO3, dissolved Metalls field filtered, ammonia preserved	
Sample Identification 1 2 4A 3 4B 4 4C 5 6 7 8 9 10		Lab Identification Data Sampled (YYYY/MM/DD) Time Sampled (HH:MM) Matrix		06-Jan-19 4:30 Water X X X X 07-Jan-19 8:30 Water X X X X 07-Jan-19 8:35 Water X X X X		Received in Saskatoon By: <u>Patrick H. H. H.</u> JAN 17 2020 10:41 Temp: 17 / 9 / 11	
RECEIVED BY: (Signature/Print) <u>Maxxam</u>		DATE: (YYYY/MM/DD) <u>2020/01/16</u>		TIME: (HH:MM) <u>08:00</u>		RECEIVED BY: (Signature/Print) <u>Maxxam</u>	
DATE: (YYYY/MM/DD) <u>2020/01/16</u>		TIME: (HH:MM) <u>08:00</u>		DATE: (YYYY/MM/DD) <u>2020/01/16</u>		TIME: (HH:MM) <u>08:00</u>	

C001231_COC



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476712

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/01/16
 Report #: R2834170
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C001859

Received: 2020/01/09, 10:38

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	7	N/A	2020/01/10	BBY6SOP-00026	SM 23 2320 B m
Low level chloride/sulphate by AC (1)	7	N/A	2020/01/10	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO3) (1, 2)	7	N/A	2020/01/14	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3) (1)	7	N/A	2020/01/13	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	7	N/A	2020/01/13	BBY WI-00033	Auto Calc
Ion Balance (1)	7	N/A	2020/01/13	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	7	N/A	2020/01/13	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	7	N/A	2020/01/13	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	7	N/A	2020/01/10	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	7	N/A	2020/01/14	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	7	N/A	2020/01/14	BBY7SOP-00002	EPA 6020b R2 m
Nitrate+Nitrite (N) (low level) (1)	7	N/A	2020/01/10	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	7	N/A	2020/01/10	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	7	N/A	2020/01/10	BBY WI-00033	Auto Calc
Filter and HNO3 Preserve for Metals (1)	7	N/A	2020/01/10	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476712

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/16
Report #: R2834170
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C001859

Received: 2020/01/09, 10:38

dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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VERITAS

BV Labs Job #: C001859
Report Date: 2020/01/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XF3313	XF3314	XF3315	XF3316	XF3317	XF3318	XF3319		
Sampling Date		2020/01/09 10:00	2020/01/09 09:20	2020/01/09 09:10	2020/01/09 09:00	2020/01/09 09:25	2020/01/09 09:15	2020/01/09 09:05		
COC Number		08476712	08476712	08476712	08476712	08476712	08476712	08476712		
	UNITS	INFLUENT-79	1A	1B	1C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.0	8.0	7.6	7.7	7.6	8.7	8.8	N/A	9730778
Cation Sum	meq/L	8.1	8.0	8.1	8.4	8.1	8.5	8.9	N/A	9730778
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	1.0	1.1	1.1	1.1	0.98	1.0	0.010	9730776
Ion Balance (% Difference)	%	0.67	0.038	3.7	4.3	3.2	1.1	0.86	N/A	9730777
Nitrate (N)	mg/L	0.379	0.574	0.626	0.637	0.382	0.347	0.206	0.0020	9730793

Misc. Inorganics

Alkalinity (Total as CaCO3)	mg/L	79.3	79.9	79.2	80.7	82.7	86.4	93.1	0.50	9731180
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9731180
Bicarbonate (HCO3)	mg/L	96.8	97.5	96.6	98.5	101	105	114	0.50	9731180
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9731180
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9731180

Anions

Dissolved Chloride (Cl)	mg/L	66	62	63	63	63	64	69	0.50	9731380
Dissolved Sulphate (SO4)	mg/L	220 (1)	220 (1)	200 (1)	200 (1)	200 (1)	250 (1)	240 (1)	5.0	9731380

Nutrients

Nitrate plus Nitrite (N)	mg/L	0.384	0.586	0.635	0.643	0.408	0.368	0.219	0.0020	9731405
Nitrite (N)	mg/L	0.0048	0.0120	0.0087	0.0067	0.0261	0.0210	0.0131	0.0020	9731408

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



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BV Labs Job #: C001859
Report Date: 2020/01/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF3313	XF3314	XF3315	XF3316	XF3317		
Sampling Date		2020/01/09 10:00	2020/01/09 09:20	2020/01/09 09:10	2020/01/09 09:00	2020/01/09 09:25		
COC Number		08476712	08476712	08476712	08476712	08476712		
	UNITS	INFLUENT-79	1A	1B	1C	4A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	341	340	345	354	346	0.50	9730707
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00771	0.00390	0.00236	0.00087	0.00632 (1)	0.00050	9731173
Dissolved Antimony (Sb)	mg/L	0.0191	0.0187	0.0187	0.0193	0.0183	0.000020	9731173
Dissolved Arsenic (As)	mg/L	0.0620	0.0570	0.0558	0.0512	0.0531	0.000020	9731173
Dissolved Barium (Ba)	mg/L	0.0600	0.0605	0.0615	0.0610	0.0605	0.000020	9731173
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9731173
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9731173
Dissolved Boron (B)	mg/L	0.035	0.035	0.034	0.034	0.030	0.010	9731173
Dissolved Cadmium (Cd)	mg/L	0.00202	0.00156	0.00128	0.000710	0.00138	0.0000050	9731173
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	0.00010	9731173
Dissolved Cobalt (Co)	mg/L	0.00247	0.000882	0.000377	0.0000724	0.000912	0.0000050	9731173
Dissolved Copper (Cu)	mg/L	0.0627	0.0298	0.0175	0.00651	0.0257 (1)	0.000050	9731173
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	<0.0010	0.0017	0.0130	0.0010	9731173
Dissolved Lead (Pb)	mg/L	0.0154	0.00453	0.00152	0.000144	0.00353	0.0000050	9731173
Dissolved Lithium (Li)	mg/L	0.0115	0.0110	0.0110	0.0115	0.0111	0.00050	9731173
Dissolved Manganese (Mn)	mg/L	0.0499	0.0190	0.00949	0.00362	0.0266	0.000050	9731173
Dissolved Molybdenum (Mo)	mg/L	0.00176	0.00167	0.00165	0.00169	0.00166	0.000050	9731173
Dissolved Nickel (Ni)	mg/L	0.00790	0.00736	0.00687	0.00557	0.00742	0.000020	9731173
Dissolved Selenium (Se)	mg/L	0.00786	0.00769	0.00780	0.00771	0.00795	0.000040	9731173
Dissolved Silicon (Si)	mg/L	0.402	0.318	0.290	0.311	0.420	0.050	9731173
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9731173
Dissolved Strontium (Sr)	mg/L	0.649	0.635	0.647	0.688	0.650	0.000050	9731173
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000022	<0.0000020	0.0000029	<0.0000020	0.0000020	9731173
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9731173
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9731173
Dissolved Uranium (U)	mg/L	0.0281	0.0280	0.0289	0.0295	0.0302	0.0000020	9731173
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9731173
Dissolved Zinc (Zn)	mg/L	0.159	0.148	0.138	0.105	0.131	0.00010	9731173
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9731173
Dissolved Calcium (Ca)	mg/L	109	109	110	112	111	0.050	9730781

RDL = Reportable Detection Limit

(1) Dissolved greater than total. Reanalysis yields similar results.



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF3313	XF3314	XF3315	XF3316	XF3317		
Sampling Date		2020/01/09 10:00	2020/01/09 09:20	2020/01/09 09:10	2020/01/09 09:00	2020/01/09 09:25		
COC Number		08476712	08476712	08476712	08476712	08476712		
	UNITS	INFLUENT-79	1A	1B	1C	4A	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	16.8	16.5	16.8	17.7	16.8	0.050	9730781
Dissolved Potassium (K)	mg/L	3.93	3.87	3.93	4.13	4.03	0.050	9730781
Dissolved Sodium (Na)	mg/L	26.1	25.5	26.2	27.4	25.9	0.050	9730781
Dissolved Sulphur (S)	mg/L	83.3	80.3	82.3	85.9	83.8	3.0	9730781
RDL = Reportable Detection Limit								



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BV Labs Job #: C001859
Report Date: 2020/01/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF3318	XF3319		
Sampling Date		2020/01/09 09:15	2020/01/09 09:05		
COC Number		08476712	08476712		
	UNITS	4B	4C	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	362	380	0.50	9730707
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00194	0.00098	0.00050	9731173
Dissolved Antimony (Sb)	mg/L	0.0185	0.0165	0.000020	9731173
Dissolved Arsenic (As)	mg/L	0.0482	0.0389	0.000020	9731173
Dissolved Barium (Ba)	mg/L	0.0629	0.0627	0.000020	9731173
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9731173
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9731173
Dissolved Boron (B)	mg/L	0.025	0.015	0.010	9731173
Dissolved Cadmium (Cd)	mg/L	0.000957	0.000555	0.0000050	9731173
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9731173
Dissolved Cobalt (Co)	mg/L	0.000635	0.000284	0.0000050	9731173
Dissolved Copper (Cu)	mg/L	0.0154	0.00879	0.000050	9731173
Dissolved Iron (Fe)	mg/L	0.0064	0.0110	0.0010	9731173
Dissolved Lead (Pb)	mg/L	0.000967	0.000291	0.0000050	9731173
Dissolved Lithium (Li)	mg/L	0.0111	0.0122	0.00050	9731173
Dissolved Manganese (Mn)	mg/L	0.0546	0.0370	0.000050	9731173
Dissolved Molybdenum (Mo)	mg/L	0.00176	0.00157	0.000050	9731173
Dissolved Nickel (Ni)	mg/L	0.00736	0.00677	0.000020	9731173
Dissolved Selenium (Se)	mg/L	0.00782	0.00725	0.000040	9731173
Dissolved Silicon (Si)	mg/L	0.467	0.580	0.050	9731173
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9731173
Dissolved Strontium (Sr)	mg/L	0.670	0.708	0.000050	9731173
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	9731173
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9731173
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9731173
Dissolved Uranium (U)	mg/L	0.0310	0.0319	0.0000020	9731173
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9731173
Dissolved Zinc (Zn)	mg/L	0.112	0.0844	0.00010	9731173
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9731173
Dissolved Calcium (Ca)	mg/L	116	123	0.050	9730781
Dissolved Magnesium (Mg)	mg/L	17.4	17.6	0.050	9730781
RDL = Reportable Detection Limit					



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BV Labs Job #: C001859
Report Date: 2020/01/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF3318	XF3319		
Sampling Date		2020/01/09 09:15	2020/01/09 09:05		
COC Number		08476712	08476712		
	UNITS	4B	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.48	5.16	0.050	9730781
Dissolved Sodium (Na)	mg/L	26.9	27.1	0.050	9730781
Dissolved Sulphur (S)	mg/L	86.1	87.9	3.0	9730781
RDL = Reportable Detection Limit					

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VERITASBV Labs Job #: C001859
Report Date: 2020/01/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XF3313	XF3314	XF3315	XF3316	XF3317		
Sampling Date		2020/01/09 10:00	2020/01/09 09:20	2020/01/09 09:10	2020/01/09 09:00	2020/01/09 09:25		
COC Number		08476712	08476712	08476712	08476712	08476712		
	UNITS	INFLUENT-79	1A	1B	1C	4A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	364	364	369	372	364	0.50	9730706
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0154	0.00772	0.00558	0.00245	0.00373	0.00050	9732713
Total Antimony (Sb)	mg/L	0.0204	0.0201	0.0205	0.0200	0.0195	0.000020	9732713
Total Arsenic (As)	mg/L	0.0618	0.0583	0.0580	0.0502	0.0521	0.000020	9732713
Total Barium (Ba)	mg/L	0.0616	0.0620	0.0633	0.0618	0.0624	0.000020	9732713
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9732713
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9732713
Total Boron (B)	mg/L	0.036	0.036	0.036	0.034	0.030	0.010	9732713
Total Cadmium (Cd)	mg/L	0.00212	0.00164	0.00138	0.000752	0.00141	0.0000050	9732713
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9732713
Total Cobalt (Co)	mg/L	0.00250	0.000942	0.000398	0.0000711	0.000926	0.0000050	9732713
Total Copper (Cu)	mg/L	0.0638	0.0312	0.0182	0.00666	0.0240	0.000050	9732713
Total Iron (Fe)	mg/L	0.0060	0.0030	0.0302	0.0036	0.0051	0.0010	9732713
Total Lead (Pb)	mg/L	0.0171	0.00547	0.00201	0.000238	0.00274	0.0000050	9732713
Total Lithium (Li)	mg/L	0.0118	0.0119	0.0121	0.0121	0.0119	0.00050	9732713
Total Manganese (Mn)	mg/L	0.0513	0.0201	0.0102	0.00380	0.0268	0.000050	9732713
Total Molybdenum (Mo)	mg/L	0.00172	0.00167	0.00173	0.00167	0.00168	0.000050	9732713
Total Nickel (Ni)	mg/L	0.00804	0.00754	0.00698	0.00546	0.00759	0.000020	9732713
Total Selenium (Se)	mg/L	0.00792	0.00786	0.00779	0.00724	0.00746	0.000040	9732713
Total Silicon (Si)	mg/L	0.455	0.343	0.320	0.315	0.434	0.050	9732713
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9732713
Total Strontium (Sr)	mg/L	0.657	0.655	0.669	0.669	0.652	0.000050	9732713
Total Thallium (Tl)	mg/L	0.0000029	0.0000031	0.0000031	0.0000043	<0.0000020	0.0000020	9732713
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9732713
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9732713
Total Uranium (U)	mg/L	0.0287	0.0286	0.0301	0.0297	0.0304	0.0000020	9732713
Total Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9732713
Total Zinc (Zn)	mg/L	0.168	0.160	0.149	0.108	0.138	0.00010	9732713
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9732713
Total Calcium (Ca)	mg/L	118	118	119	120	118	0.050	9730789
Total Magnesium (Mg)	mg/L	17.2	17.3	17.3	17.7	17.1	0.050	9730789

RDL = Reportable Detection Limit



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BV Labs Job #: C001859
Report Date: 2020/01/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XF3313	XF3314	XF3315	XF3316	XF3317		
Sampling Date		2020/01/09 10:00	2020/01/09 09:20	2020/01/09 09:10	2020/01/09 09:00	2020/01/09 09:25		
COC Number		08476712	08476712	08476712	08476712	08476712		
	UNITS	INFLUENT-79	1A	1B	1C	4A	RDL	QC Batch
Total Potassium (K)	mg/L	3.91	3.94	4.01	4.14	4.07	0.050	9730789
Total Sodium (Na)	mg/L	25.9	26.0	26.2	26.6	25.6	0.050	9730789
Total Sulphur (S)	mg/L	86.8	86.4	85.9	87.4	85.8	3.0	9730789
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: C001859
Report Date: 2020/01/16ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XF3318	XF3319		
Sampling Date		2020/01/09 09:15	2020/01/09 09:05		
COC Number		08476712	08476712		
	UNITS	4B	4C	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	380	411	0.50	9730706
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00565	0.00380	0.00050	9732713
Total Antimony (Sb)	mg/L	0.0196	0.0184	0.000020	9732713
Total Arsenic (As)	mg/L	0.0485	0.0400	0.000020	9732713
Total Barium (Ba)	mg/L	0.0656	0.0677	0.000020	9732713
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9732713
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9732713
Total Boron (B)	mg/L	0.026	0.016	0.010	9732713
Total Cadmium (Cd)	mg/L	0.000991	0.000588	0.0000050	9732713
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9732713
Total Cobalt (Co)	mg/L	0.000659	0.000322	0.0000050	9732713
Total Copper (Cu)	mg/L	0.0174	0.0116	0.000050	9732713
Total Iron (Fe)	mg/L	0.0168	0.0236	0.0010	9732713
Total Lead (Pb)	mg/L	0.00171	0.000626	0.0000050	9732713
Total Lithium (Li)	mg/L	0.0124	0.0130	0.00050	9732713
Total Manganese (Mn)	mg/L	0.0538	0.0409	0.000050	9732713
Total Molybdenum (Mo)	mg/L	0.00173	0.00164	0.000050	9732713
Total Nickel (Ni)	mg/L	0.00766	0.00758	0.000020	9732713
Total Selenium (Se)	mg/L	0.00751	0.00682	0.000040	9732713
Total Silicon (Si)	mg/L	0.498	0.632	0.050	9732713
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9732713
Total Strontium (Sr)	mg/L	0.691	0.744	0.000050	9732713
Total Thallium (Tl)	mg/L	0.0000021	0.0000023	0.0000020	9732713
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9732713
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9732713
Total Uranium (U)	mg/L	0.0310	0.0325	0.0000020	9732713
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9732713
Total Zinc (Zn)	mg/L	0.118	0.0931	0.00010	9732713
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9732713
Total Calcium (Ca)	mg/L	123	133	0.050	9730789
Total Magnesium (Mg)	mg/L	17.7	19.0	0.050	9730789
RDL = Reportable Detection Limit					



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BV Labs Job #: C001859
Report Date: 2020/01/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XF3318	XF3319		
Sampling Date		2020/01/09 09:15	2020/01/09 09:05		
COC Number		08476712	08476712		
	UNITS	4B	4C	RDL	QC Batch
Total Potassium (K)	mg/L	4.54	5.31	0.050	9730789
Total Sodium (Na)	mg/L	26.6	28.3	0.050	9730789
Total Sulphur (S)	mg/L	89.1	95.1	3.0	9730789
RDL = Reportable Detection Limit					



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.0°C
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Results relate only to the items tested.



BV Labs Job #: C001859
Report Date: 2020/01/16

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9731173	Dissolved Aluminum (Al)	2020/01/10	98	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9731173	Dissolved Antimony (Sb)	2020/01/10	NC	80 - 120	103	80 - 120	<0.000020	mg/L	4.6	20
9731173	Dissolved Arsenic (As)	2020/01/10	103	80 - 120	100	80 - 120	<0.000020	mg/L	0.94	20
9731173	Dissolved Barium (Ba)	2020/01/10	NC	80 - 120	102	80 - 120	<0.000020	mg/L	8.0	20
9731173	Dissolved Beryllium (Be)	2020/01/10	96	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
9731173	Dissolved Bismuth (Bi)	2020/01/10	95	80 - 120	105	80 - 120	<0.0000050	mg/L	NC	20
9731173	Dissolved Boron (B)	2020/01/10	93	80 - 120	96	80 - 120	<0.010	mg/L	0.25	20
9731173	Dissolved Cadmium (Cd)	2020/01/10	99	80 - 120	102	80 - 120	<0.0000050	mg/L	4.8	20
9731173	Dissolved Chromium (Cr)	2020/01/10	99	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9731173	Dissolved Cobalt (Co)	2020/01/10	92	80 - 120	99	80 - 120	<0.0000050	mg/L	6.5	20
9731173	Dissolved Copper (Cu)	2020/01/10	90	80 - 120	103	80 - 120	<0.000050	mg/L	7.6	20
9731173	Dissolved Iron (Fe)	2020/01/10	99	80 - 120	105	80 - 120	<0.0010	mg/L	0.22	20
9731173	Dissolved Lead (Pb)	2020/01/10	99	80 - 120	105	80 - 120	<0.0000050	mg/L	5.8	20
9731173	Dissolved Lithium (Li)	2020/01/10	98	80 - 120	100	80 - 120	<0.00050	mg/L	1.7	20
9731173	Dissolved Manganese (Mn)	2020/01/10	100	80 - 120	103	80 - 120	<0.000050	mg/L	7.7	20
9731173	Dissolved Molybdenum (Mo)	2020/01/10	114	80 - 120	105	80 - 120	<0.000050	mg/L	4.6	20
9731173	Dissolved Nickel (Ni)	2020/01/10	93	80 - 120	104	80 - 120	<0.000020	mg/L	9.6	20
9731173	Dissolved Selenium (Se)	2020/01/10	107	80 - 120	103	80 - 120	<0.000040	mg/L	0.39	20
9731173	Dissolved Silicon (Si)	2020/01/10	99	80 - 120	99	80 - 120	<0.050	mg/L	0.15	20
9731173	Dissolved Silver (Ag)	2020/01/10	97	80 - 120	103	80 - 120	<0.0000050	mg/L	NC	20
9731173	Dissolved Strontium (Sr)	2020/01/10	NC	80 - 120	103	80 - 120	<0.000050	mg/L	2.0	20
9731173	Dissolved Thallium (Tl)	2020/01/10	102	80 - 120	105	80 - 120	<0.0000020	mg/L	NC	20
9731173	Dissolved Tin (Sn)	2020/01/10	104	80 - 120	106	80 - 120	<0.00020	mg/L	NC	20
9731173	Dissolved Titanium (Ti)	2020/01/10	101	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20
9731173	Dissolved Uranium (U)	2020/01/10	104	80 - 120	104	80 - 120	<0.0000020	mg/L	1.8	20
9731173	Dissolved Vanadium (V)	2020/01/10	100	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9731173	Dissolved Zinc (Zn)	2020/01/10	NC	80 - 120	105	80 - 120	<0.00010	mg/L	2.1	20
9731173	Dissolved Zirconium (Zr)	2020/01/10	110	80 - 120	103	80 - 120	<0.00010	mg/L	NC	20
9731180	Alkalinity (PP as CaCO3)	2020/01/10					<0.50	mg/L		
9731180	Alkalinity (Total as CaCO3)	2020/01/10	NC	80 - 120	94	80 - 120	<0.50	mg/L		
9731180	Bicarbonate (HCO3)	2020/01/10					<0.50	mg/L		
9731180	Carbonate (CO3)	2020/01/10					<0.50	mg/L		



BV Labs Job #: C001859
Report Date: 2020/01/16

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9731180	Hydroxide (OH)	2020/01/10					<0.50	mg/L		
9731380	Dissolved Chloride (Cl)	2020/01/10	NC	80 - 120	103	80 - 120	<0.50	mg/L	2.0	20
9731380	Dissolved Sulphate (SO4)	2020/01/10	NC	80 - 120	103	80 - 120	0.89, RDI=0.50	mg/L	4.1	20
9731405	Nitrate plus Nitrite (N)	2020/01/10			104	80 - 120	<0.0020	mg/L		
9731408	Nitrite (N)	2020/01/10			103	80 - 120	<0.0020	mg/L		
9732713	Total Aluminium (Al)	2020/01/14	101	80 - 120	100	80 - 120	<0.00050	mg/L	5.3	20
9732713	Total Antimony (Sb)	2020/01/14	NC	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9732713	Total Arsenic (As)	2020/01/14	NC	80 - 120	99	80 - 120	<0.000020	mg/L	NC	20
9732713	Total Barium (Ba)	2020/01/14	NC	80 - 120	100	80 - 120	<0.000020	mg/L	14	20
9732713	Total Beryllium (Be)	2020/01/14	100	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9732713	Total Bismuth (Bi)	2020/01/14	101	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9732713	Total Boron (B)	2020/01/14	102	80 - 120	102	80 - 120	<0.010	mg/L	NC	20
9732713	Total Cadmium (Cd)	2020/01/14	101	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9732713	Total Chromium (Cr)	2020/01/14	99	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9732713	Total Cobalt (Co)	2020/01/14	94	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9732713	Total Copper (Cu)	2020/01/14	NC	80 - 120	95	80 - 120	<0.000050	mg/L	13	20
9732713	Total Iron (Fe)	2020/01/14	102	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
9732713	Total Lead (Pb)	2020/01/14	101	80 - 120	102	80 - 120	<0.0000050	mg/L	5.3	20
9732713	Total Lithium (Li)	2020/01/14	107	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9732713	Total Manganese (Mn)	2020/01/14	NC	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9732713	Total Molybdenum (Mo)	2020/01/14	111	80 - 120	103	80 - 120	<0.000050	mg/L	NC	20
9732713	Total Nickel (Ni)	2020/01/14	95	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9732713	Total Selenium (Se)	2020/01/14	106	80 - 120	102	80 - 120	<0.000040	mg/L	NC	20
9732713	Total Silicon (Si)	2020/01/14	103	80 - 120	103	80 - 120	<0.050	mg/L	NC	20
9732713	Total Silver (Ag)	2020/01/14	100	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9732713	Total Strontium (Sr)	2020/01/14	NC	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9732713	Total Thallium (Tl)	2020/01/14	104	80 - 120	101	80 - 120	<0.0000020	mg/L	18	20
9732713	Total Tin (Sn)	2020/01/14	104	80 - 120	102	80 - 120	<0.00020	mg/L	NC	20
9732713	Total Titanium (Ti)	2020/01/14	101	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
9732713	Total Uranium (U)	2020/01/14	102	80 - 120	102	80 - 120	<0.0000020	mg/L	18	20
9732713	Total Vanadium (V)	2020/01/14	102	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9732713	Total Zinc (Zn)	2020/01/14	NC	80 - 120	100	80 - 120	<0.00010	mg/L	2.2	20



BV Labs Job #: C001859
Report Date: 2020/01/16

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9732713	Total Zirconium (Zr)	2020/01/14	109	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.										
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.										
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.										
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.										
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)										
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).										



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BV Labs Job #: C001859
Report Date: 2020/01/16

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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C001859 COC



Your Project #: BMC-18-02
Your C.O.C. #: 08476857

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/21
Report #: R2835650
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C002510

Received: 2020/01/13, 14:16

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (as CaCO ₃)	3	N/A	2020/01/14	BBY6SOP-00037	SM 23 2310 B m
Alkalinity - Low Level	4	N/A	2020/01/14	BBY6SOP-00026	SM 23 2320 B m
Alkalinity - Low Level	3	N/A	2020/01/15	BBY6SOP-00026	SM 23 2320 B m
Biochemical Oxygen Demand	3	2020/01/15	2020/01/20	BBY6SOP-00045	SM 23 5210 B m
Low level chloride/sulphate by AC	7	N/A	2020/01/14	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO ₄ -E m
COD by Colorimeter	3	N/A	2020/01/14	BBY6SOP-00024	SM 23 5220 D m
Carbon (DOC) (1, 2)	3	N/A	2020/01/15	AB SOP-00087	MMCW 119 1996 m
Hardness Total (calculated as CaCO ₃) (3)	7	N/A	2020/01/16	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO ₃)	7	N/A	2020/01/16	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio)	7	N/A	2020/01/16	BBY WI-00033	Auto Calc
Ion Balance	7	N/A	2020/01/16	BBY WI-00033	Auto Calc
Sum of cations, anions	7	N/A	2020/01/16	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	7	N/A	2020/01/16	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved)	7	N/A	2020/01/15	BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	7	N/A	2020/01/16	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	7	N/A	2020/01/15	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved) (1)	7	N/A	2020/01/15	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate+Nitrite (N) (low level)	7	N/A	2020/01/14	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrite (N) (low level)	7	N/A	2020/01/14	BBY6SOP-00010	SM 23 4500-NO ₃ - I m
Nitrogen - Nitrate (as N) Low Level Calc	7	N/A	2020/01/14	BBY WI-00033	Auto Calc
Filter and HNO ₃ Preserve for Metals	7	N/A	2020/01/14	BBY7 WI-00004	SM 23 3030B m
Carbon (Total Organic) (1, 4)	3	N/A	2020/01/15	AB SOP-00087	MMCW 119 1996 m
Total Suspended Solids (NFR)	3	2020/01/16	2020/01/17	BBY6SOP-00034	SM 23 2540 D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless



Your Project #: BMC-18-02
Your C.O.C. #: 08476857

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/21
Report #: R2835650
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C002510

Received: 2020/01/13, 14:16

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Calgary Environmental

(2) DOC present in the sample should be considered as non-purgeable DOC. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XF6302			XF6303		XF6304		
Sampling Date		2020/01/13 10:00			2020/01/13 09:20		2020/01/13 09:10		
COC Number		08476857			08476857		08476857		
	UNITS	INFLUENT	RDL	QC Batch	1A	QC Batch	1B	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	7.9	N/A	9733822	8.5	9733822	8.7	N/A	9733822
Cation Sum	meq/L	8.4	N/A	9733822	8.2	9733822	8.0	N/A	9733822
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	9733819	0.96	9733819	0.92	0.010	9733819
Ion Balance (% Difference)	%	3.2	N/A	9733821	1.9	9733821	4.2	N/A	9733821
Nitrate (N)	mg/L	0.322	0.0020	9733828	0.527	9733828	0.563	0.0020	9733828
Demand Parameters									
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9735005					
Chemical Oxygen Demand	mg/L	12	10	9734028					
Misc. Inorganics									
Dissolved Organic Carbon (C)	mg/L	3.2	0.50	9734868					
Acidity (pH 4.5)	mg/L	<1.0	1.0	9733910					
Alkalinity (Total as CaCO ₃)	mg/L	87.3	0.50	9734181	86.2	9734181	84.6	0.50	9734181
Total Organic Carbon (C)	mg/L	2.8	0.50	9734864					
Acidity (pH 8.3)	mg/L	4.0	1.0	9733910					
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	0.50	9734181	<0.50	9734181	<0.50	0.50	9734181
Bicarbonate (HCO ₃)	mg/L	106	0.50	9734181	105	9734181	103	0.50	9734181
Carbonate (CO ₃)	mg/L	<0.50	0.50	9734181	<0.50	9734181	<0.50	0.50	9734181
Hydroxide (OH)	mg/L	<0.50	0.50	9734181	<0.50	9734181	<0.50	0.50	9734181
Total Suspended Solids	mg/L	<1.0	1.0	9735737					
Anions									
Dissolved Chloride (Cl)	mg/L	57	0.50	9734265	57	9734265	63	0.50	9734265
Dissolved Sulphate (SO ₄)	mg/L	210 (1)	5.0	9734265	250 (1)	9734265	250 (1)	5.0	9734265
Nutrients									
Total Ammonia (N)	mg/L	0.91	0.0050	9734382	0.65	9734382	0.52	0.0050	9734382
Nitrate plus Nitrite (N)	mg/L	0.326	0.0020	9734149	0.561	9734159	0.590	0.0020	9734149
Nitrite (N)	mg/L	0.0036	0.0020	9734151	0.0336	9734161	0.0264	0.0020	9734151
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.									

BUREAU
VERITASBV Labs Job #: C002510
Report Date: 2020/01/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XF6305			XF6306	XF6307			XF6308		
Sampling Date		2020/01/13 09:00			2020/01/13 09:25	2020/01/13 09:15			2020/01/13 09:05		
COC Number		08476857			08476857	08476857			08476857		
	UNITS	1C	RDL	QC Batch	4A	4B	RDL	QC Batch	4C	RDL	QC Batch
Calculated Parameters											
Anion Sum	meq/L	7.8	N/A	9733822	7.8	7.8	N/A	9733822	8.6	N/A	9733822
Cation Sum	meq/L	8.3	N/A	9733822	8.3	8.6	N/A	9733822	8.8	N/A	9733822
Filter and HNO3 Preservation	N/A	FIELD		ONSITE	FIELD	FIELD		ONSITE	FIELD		ONSITE
Ion Balance	N/A	1.1	0.010	9733819	1.1	1.1	0.010	9733819	1.0	0.010	9733819
Ion Balance (% Difference)	%	2.8	N/A	9733821	3.0	4.8	N/A	9733821	0.86	N/A	9733821
Nitrate (N)	mg/L	0.779	0.0020	9733828	0.347	0.173	0.0020	9733828	0.0617	0.0020	9733828
Demand Parameters											
Biochemical Oxygen Demand	mg/L	<2.0	2.0	9735005					<2.0	2.0	9735005
Chemical Oxygen Demand	mg/L	10	10	9734028					11	10	9734028
Misc. Inorganics											
Dissolved Organic Carbon (C)	mg/L	3.1	0.50	9734868					3.3	0.50	9734868
Acidity (pH 4.5)	mg/L	<1.0	1.0	9733910					<1.0	1.0	9733910
Alkalinity (Total as CaCO3)	mg/L	82.9	0.50	9734181	87.5	88.0	0.50	9734181	94.7	0.50	9734181
Total Organic Carbon (C)	mg/L	2.7	0.50	9734864					3.0	0.50	9734864
Acidity (pH 8.3)	mg/L	3.5	1.0	9733910					5.0	1.0	9733910
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	9734181	<0.50	<0.50	0.50	9734181	<0.50	0.50	9734181
Bicarbonate (HCO3)	mg/L	101	0.50	9734181	107	107	0.50	9734181	116	0.50	9734181
Carbonate (CO3)	mg/L	<0.50	0.50	9734181	<0.50	<0.50	0.50	9734181	<0.50	0.50	9734181
Hydroxide (OH)	mg/L	<0.50	0.50	9734181	<0.50	<0.50	0.50	9734181	<0.50	0.50	9734181
Total Suspended Solids	mg/L	<1.0	1.0	9735737					<1.0	1.0	9735737
Anions											
Dissolved Chloride (Cl)	mg/L	66	0.50	9734265	58	58	0.50	9734265	59	0.50	9734265
Dissolved Sulphate (SO4)	mg/L	200 (1)	5.0	9734265	210 (1)	210 (1)	5.0	9734265	240 (1)	5.0	9734265
Nutrients											
Total Ammonia (N)	mg/L	0.29	0.0050	9734382	0.47	0.13	0.0050	9734382	0.039	0.0050	9734382
Nitrate plus Nitrite (N)	mg/L	0.792	0.0020	9734159	0.406	0.198	0.0020	9734149	0.0687	0.0020	9734149
Nitrite (N)	mg/L	0.0126	0.0020	9734161	0.0596	0.0249	0.0020	9734151	0.0070	0.0020	9734151
RDL = Reportable Detection Limit											
N/A = Not Applicable											
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.											

**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XF6302	XF6303	XF6304	XF6305	XF6306		
Sampling Date		2020/01/13 10:00	2020/01/13 09:20	2020/01/13 09:10	2020/01/13 09:00	2020/01/13 09:25		
COC Number		08476857	08476857	08476857	08476857	08476857		
	UNITS	INFLUENT	1A	1B	1C	4A	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	355	349	341	353	352	0.50	9733187
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00744	0.00586	0.00380	0.00245	0.00303	0.00050	9734019
Dissolved Antimony (Sb)	mg/L	0.0195	0.0191	0.0187	0.0188	0.0212	0.000020	9734019
Dissolved Arsenic (As)	mg/L	0.0590	0.0563	0.0545	0.0524	0.0490	0.000020	9734019
Dissolved Barium (Ba)	mg/L	0.0586	0.0580	0.0566	0.0578	0.0597	0.000020	9734019
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9734019
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9734019
Dissolved Boron (B)	mg/L	0.037	0.036	0.036	0.035	0.033	0.010	9734019
Dissolved Cadmium (Cd)	mg/L	0.00166	0.00155	0.00145	0.00116	0.00136	0.0000050	9734019
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9734019
Dissolved Cobalt (Co)	mg/L	0.00267	0.00135	0.000724	0.000268	0.000620	0.0000050	9734019
Dissolved Copper (Cu)	mg/L	0.0577	0.0376	0.0258	0.0134	0.0207	0.000050	9734019
Dissolved Iron (Fe)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	0.0027	0.0010	9734019
Dissolved Lead (Pb)	mg/L	0.0153	0.00703	0.00334	0.00107	0.00239	0.0000050	9734019
Dissolved Lithium (Li)	mg/L	0.0108	0.0110	0.0108	0.0108	0.0109	0.00050	9734019
Dissolved Manganese (Mn)	mg/L	0.0439	0.0234	0.0136	0.00897	0.0113	0.000050	9734019
Dissolved Molybdenum (Mo)	mg/L	0.00163	0.00154	0.00153	0.00152	0.00163	0.000050	9734019
Dissolved Nickel (Ni)	mg/L	0.00733	0.00714	0.00707	0.00657	0.00771	0.000020	9734019
Dissolved Selenium (Se)	mg/L	0.00758	0.00762	0.00740	0.00748	0.00772	0.000040	9734019
Dissolved Silicon (Si)	mg/L	0.391	0.329	0.289	0.302	0.386	0.050	9734019
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9734019
Dissolved Strontium (Sr)	mg/L	0.644	0.638	0.629	0.647	0.642	0.000050	9734019
Dissolved Thallium (Tl)	mg/L	<0.0000020	<0.0000020	0.0000020	0.0000031	0.0000028	0.0000020	9734019
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9734019
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9734019
Dissolved Uranium (U)	mg/L	0.0278	0.0279	0.0280	0.0269	0.0289	0.0000020	9734019
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9734019
Dissolved Zinc (Zn)	mg/L	0.154	0.153	0.148	0.148	0.155	0.00010	9734019
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9734019
Dissolved Calcium (Ca)	mg/L	114	113	109	113	113	0.050	9733824
Dissolved Magnesium (Mg)	mg/L	16.9	16.5	16.6	16.9	17.0	0.050	9733824
Dissolved Potassium (K)	mg/L	3.87	3.83	3.79	3.87	3.90	0.050	9733824

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF6302	XF6303	XF6304	XF6305	XF6306		
Sampling Date		2020/01/13 10:00	2020/01/13 09:20	2020/01/13 09:10	2020/01/13 09:00	2020/01/13 09:25		
COC Number		08476857	08476857	08476857	08476857	08476857		
	UNITS	INFLUENT	1A	1B	1C	4A	RDL	QC Batch
Dissolved Sodium (Na)	mg/L	25.7	25.3	24.9	25.3	25.6	0.050	9733824
Dissolved Sulphur (S)	mg/L	85.0	85.4	80.1	83.0	84.4	3.0	9733824
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: C002510
Report Date: 2020/01/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02**LOW LEVEL DISSOLVED METALS IN WATER (WATER)**

BV Labs ID		XF6307	XF6308		
Sampling Date		2020/01/13 09:15	2020/01/13 09:05		
COC Number		08476857	08476857		
	UNITS	4B	4C	RDL	QC Batch
Calculated Parameters					
Dissolved Hardness (CaCO ₃)	mg/L	365	376	0.50	9733187
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	mg/L	0.00452	0.00078	0.00050	9734019
Dissolved Antimony (Sb)	mg/L	0.0201	0.0175	0.000020	9734019
Dissolved Arsenic (As)	mg/L	0.0326	0.0233	0.000020	9734019
Dissolved Barium (Ba)	mg/L	0.0600	0.0619	0.000020	9734019
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9734019
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9734019
Dissolved Boron (B)	mg/L	0.026	0.021	0.010	9734019
Dissolved Cadmium (Cd)	mg/L	0.000489	0.000281	0.0000050	9734019
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9734019
Dissolved Cobalt (Co)	mg/L	0.000438	0.000206	0.0000050	9734019
Dissolved Copper (Cu)	mg/L	0.00860	0.00526	0.000050	9734019
Dissolved Iron (Fe)	mg/L	0.0107	0.0125	0.0010	9734019
Dissolved Lead (Pb)	mg/L	0.000687	0.000148	0.0000050	9734019
Dissolved Lithium (Li)	mg/L	0.0111	0.0120	0.00050	9734019
Dissolved Manganese (Mn)	mg/L	0.0467	0.0359	0.000050	9734019
Dissolved Molybdenum (Mo)	mg/L	0.00145	0.00128	0.000050	9734019
Dissolved Nickel (Ni)	mg/L	0.00793	0.00715	0.000020	9734019
Dissolved Selenium (Se)	mg/L	0.00691	0.00611	0.000040	9734019
Dissolved Silicon (Si)	mg/L	0.455	0.527	0.050	9734019
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	0.0000050	9734019
Dissolved Strontium (Sr)	mg/L	0.659	0.696	0.000050	9734019
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000022	0.0000020	9734019
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9734019
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9734019
Dissolved Uranium (U)	mg/L	0.0244	0.0208	0.0000020	9734019
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9734019
Dissolved Zinc (Zn)	mg/L	0.101	0.0769	0.00010	9734019
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9734019
Dissolved Calcium (Ca)	mg/L	117	121	0.050	9733824
Dissolved Magnesium (Mg)	mg/L	17.7	18.1	0.050	9733824
Dissolved Potassium (K)	mg/L	4.17	4.48	0.050	9733824
RDL = Reportable Detection Limit					



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XF6307	XF6308		
Sampling Date		2020/01/13 09:15	2020/01/13 09:05		
COC Number		08476857	08476857		
	UNITS	4B	4C	RDL	QC Batch
Dissolved Sodium (Na)	mg/L	26.3	26.4	0.050	9733824
Dissolved Sulphur (S)	mg/L	88.0	89.8	3.0	9733824
RDL = Reportable Detection Limit					

BUREAU
VERITASBV Labs Job #: C002510
Report Date: 2020/01/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XF6302	XF6303	XF6304	XF6305	XF6306		
Sampling Date		2020/01/13 10:00	2020/01/13 09:20	2020/01/13 09:10	2020/01/13 09:00	2020/01/13 09:25		
COC Number		08476857	08476857	08476857	08476857	08476857		
	UNITS	INFLUENT	1A	1B	1C	4A	RDL	QC Batch

Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	351	351	343	344	352	0.50	9733185
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0150	0.00914	0.00696	0.00563	0.00585	0.00050	9734030
Total Antimony (Sb)	mg/L	0.0195	0.0187	0.0183	0.0187	0.0206	0.000020	9734030
Total Arsenic (As)	mg/L	0.0587	0.0555	0.0545	0.0516	0.0482	0.000020	9734030
Total Barium (Ba)	mg/L	0.0586	0.0564	0.0569	0.0573	0.0576	0.000020	9734030
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9734030
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9734030
Total Boron (B)	mg/L	0.036	0.036	0.036	0.036	0.034	0.010	9734030
Total Cadmium (Cd)	mg/L	0.00161	0.00149	0.00143	0.00112	0.00135	0.0000050	9734030
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	0.00010	9734030
Total Cobalt (Co)	mg/L	0.00267	0.00136	0.000745	0.000259	0.000598	0.0000050	9734030
Total Copper (Cu)	mg/L	0.0572	0.0387	0.0264	0.0137	0.0213	0.000050	9734030
Total Iron (Fe)	mg/L	0.0059	0.0034	0.0042	0.0056	0.0060	0.0010	9734030
Total Lead (Pb)	mg/L	0.0198	0.00930	0.00479	0.00156	0.00367	0.0000050	9734030
Total Lithium (Li)	mg/L	0.0110	0.0108	0.0109	0.0111	0.0113	0.00050	9734030
Total Manganese (Mn)	mg/L	0.0467	0.0255	0.0150	0.00950	0.0123	0.000050	9734030
Total Molybdenum (Mo)	mg/L	0.00155	0.00159	0.00158	0.00157	0.00157	0.000050	9734030
Total Nickel (Ni)	mg/L	0.00711	0.00725	0.00688	0.00656	0.00763	0.000020	9734030
Total Selenium (Se)	mg/L	0.00767	0.00747	0.00718	0.00739	0.00761	0.000040	9734030
Total Silicon (Si)	mg/L	0.410	0.312	0.293	0.292	0.381	0.050	9734030
Total Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9734030
Total Strontium (Sr)	mg/L	0.653	0.638	0.634	0.651	0.657	0.000050	9734030
Total Thallium (Tl)	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000028	0.0000024	0.0000020	9734030
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9734030
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9734030
Total Uranium (U)	mg/L	0.0285	0.0282	0.0289	0.0271	0.0289	0.0000020	9734030
Total Vanadium (V)	mg/L	<0.00020	0.00021	0.00022	<0.00020	0.00022	0.00020	9734030
Total Zinc (Zn)	mg/L	0.151	0.153	0.148	0.146	0.152	0.00010	9734030
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9734030
Total Calcium (Ca)	mg/L	113	113	110	110	114	0.050	9733826
Total Magnesium (Mg)	mg/L	16.5	16.9	16.5	16.7	16.7	0.050	9733826
Total Potassium (K)	mg/L	3.80	3.98	3.88	3.88	3.95	0.050	9733826

RDL = Reportable Detection Limit



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XF6302	XF6303	XF6304	XF6305	XF6306		
Sampling Date		2020/01/13 10:00	2020/01/13 09:20	2020/01/13 09:10	2020/01/13 09:00	2020/01/13 09:25		
COC Number		08476857	08476857	08476857	08476857	08476857		
	UNITS	INFLUENT	1A	1B	1C	4A	RDL	QC Batch
Total Sodium (Na)	mg/L	24.7	25.7	25.0	25.2	25.5	0.050	9733826
Total Sulphur (S)	mg/L	81.7	79.3	79.0	79.5	78.9	3.0	9733826
RDL = Reportable Detection Limit								

BUREAU
VERITASBV Labs Job #: C002510
Report Date: 2020/01/21ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XF6307	XF6308		
Sampling Date		2020/01/13 09:15	2020/01/13 09:05		
COC Number		08476857	08476857		
	UNITS	4B	4C	RDL	QC Batch
Calculated Parameters					
Total Hardness (CaCO ₃)	mg/L	356	379	0.50	9733185
Total Metals by ICPMS					
Total Aluminum (Al)	mg/L	0.00343	0.00409	0.00050	9734030
Total Antimony (Sb)	mg/L	0.0194	0.0171	0.000020	9734030
Total Arsenic (As)	mg/L	0.0325	0.0238	0.000020	9734030
Total Barium (Ba)	mg/L	0.0597	0.0627	0.000020	9734030
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9734030
Total Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	0.0000050	9734030
Total Boron (B)	mg/L	0.029	0.021	0.010	9734030
Total Cadmium (Cd)	mg/L	0.000512	0.000303	0.0000050	9734030
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9734030
Total Cobalt (Co)	mg/L	0.000449	0.000212	0.0000050	9734030
Total Copper (Cu)	mg/L	0.00931	0.00637	0.000050	9734030
Total Iron (Fe)	mg/L	0.0189	0.0223	0.0010	9734030
Total Lead (Pb)	mg/L	0.00112	0.000309	0.0000050	9734030
Total Lithium (Li)	mg/L	0.0113	0.0120	0.00050	9734030
Total Manganese (Mn)	mg/L	0.0470	0.0365	0.000050	9734030
Total Molybdenum (Mo)	mg/L	0.00140	0.00122	0.000050	9734030
Total Nickel (Ni)	mg/L	0.00754	0.00737	0.000020	9734030
Total Selenium (Se)	mg/L	0.00684	0.00606	0.000040	9734030
Total Silicon (Si)	mg/L	0.422	0.516	0.050	9734030
Total Silver (Ag)	mg/L	0.0000060	<0.0000050	0.0000050	9734030
Total Strontium (Sr)	mg/L	0.664	0.703	0.000050	9734030
Total Thallium (Tl)	mg/L	0.0000023	0.0000021	0.0000020	9734030
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9734030
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9734030
Total Uranium (U)	mg/L	0.0239	0.0207	0.0000020	9734030
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9734030
Total Zinc (Zn)	mg/L	0.0985	0.0800	0.00010	9734030
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9734030
Total Calcium (Ca)	mg/L	114	122	0.050	9733826
Total Magnesium (Mg)	mg/L	17.0	18.1	0.050	9733826
Total Potassium (K)	mg/L	4.20	4.65	0.050	9733826
RDL = Reportable Detection Limit					



LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XF6307	XF6308		
Sampling Date		2020/01/13 09:15	2020/01/13 09:05		
COC Number		08476857	08476857		
	UNITS	4B	4C	RDL	QC Batch
Total Sodium (Na)	mg/L	25.6	26.9	0.050	9733826
Total Sulphur (S)	mg/L	81.4	86.4	3.0	9733826
RDL = Reportable Detection Limit					



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	19.3°C
Package 2	12.7°C
Package 3	18.3°C
Package 4	11.0°C

Results relate only to the items tested.



QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9733910	Acidity (pH 4.5)	2020/01/14					<1.0	mg/L	NC	20
9733910	Acidity (pH 8.3)	2020/01/14			97	80 - 120	<1.0	mg/L	2.9	20
9734019	Dissolved Aluminum (Al)	2020/01/15	105	80 - 120	96	80 - 120	<0.00050	mg/L	8.6	20
9734019	Dissolved Antimony (Sb)	2020/01/15	NC	80 - 120	97	80 - 120	<0.000020	mg/L	0.48	20
9734019	Dissolved Arsenic (As)	2020/01/15	115	80 - 120	97	80 - 120	<0.000020	mg/L	0.25	20
9734019	Dissolved Barium (Ba)	2020/01/15	NC	80 - 120	98	80 - 120	<0.000020	mg/L	1.5	20
9734019	Dissolved Beryllium (Be)	2020/01/15	100	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
9734019	Dissolved Bismuth (Bi)	2020/01/15	91	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9734019	Dissolved Boron (B)	2020/01/15	101	80 - 120	100	80 - 120	<0.010	mg/L	0.75	20
9734019	Dissolved Cadmium (Cd)	2020/01/15	104	80 - 120	97	80 - 120	<0.0000050	mg/L	3.4	20
9734019	Dissolved Chromium (Cr)	2020/01/15	103	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20
9734019	Dissolved Cobalt (Co)	2020/01/15	100	80 - 120	97	80 - 120	<0.0000050	mg/L	2.8	20
9734019	Dissolved Copper (Cu)	2020/01/15	95	80 - 120	96	80 - 120	<0.000050	mg/L	1.5	20
9734019	Dissolved Iron (Fe)	2020/01/15	105	80 - 120	99	80 - 120	<0.0010	mg/L	0.84	20
9734019	Dissolved Lead (Pb)	2020/01/15	106	80 - 120	98	80 - 120	<0.0000050	mg/L	5.1	20
9734019	Dissolved Lithium (Li)	2020/01/15	99	80 - 120	91	80 - 120	<0.00050	mg/L	1.4	20
9734019	Dissolved Manganese (Mn)	2020/01/15	103	80 - 120	98	80 - 120	<0.000050	mg/L	0.40	20
9734019	Dissolved Molybdenum (Mo)	2020/01/15	114	80 - 120	98	80 - 120	<0.000050	mg/L	0.64	20
9734019	Dissolved Nickel (Ni)	2020/01/15	97	80 - 120	97	80 - 120	<0.000020	mg/L	2.6	20
9734019	Dissolved Selenium (Se)	2020/01/15	109	80 - 120	99	80 - 120	<0.000040	mg/L	1.3	20
9734019	Dissolved Silicon (Si)	2020/01/15	108	80 - 120	99	80 - 120	<0.050	mg/L	1.0	20
9734019	Dissolved Silver (Ag)	2020/01/15	93	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9734019	Dissolved Strontium (Sr)	2020/01/15	NC	80 - 120	98	80 - 120	<0.000050	mg/L	0.64	20
9734019	Dissolved Thallium (Tl)	2020/01/15	109	80 - 120	99	80 - 120	<0.0000020	mg/L	9.5	20
9734019	Dissolved Tin (Sn)	2020/01/15	109	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9734019	Dissolved Titanium (Ti)	2020/01/15	109	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9734019	Dissolved Uranium (U)	2020/01/15	111	80 - 120	100	80 - 120	<0.0000020	mg/L	0.73	20
9734019	Dissolved Vanadium (V)	2020/01/15	105	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9734019	Dissolved Zinc (Zn)	2020/01/15	NC	80 - 120	100	80 - 120	<0.00010	mg/L	2.2	20
9734019	Dissolved Zirconium (Zr)	2020/01/15	115	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9734028	Chemical Oxygen Demand	2020/01/14	106	80 - 120	101	80 - 120	<10	mg/L	NC	20
9734030	Total Aluminum (Al)	2020/01/15	107	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9734030	Total Antimony (Sb)	2020/01/15	105	80 - 120	96	80 - 120	<0.000020	mg/L	NC	20



QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9734030	Total Arsenic (As)	2020/01/15	110	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
9734030	Total Barium (Ba)	2020/01/15	106	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
9734030	Total Beryllium (Be)	2020/01/15	106	80 - 120	95	80 - 120	<0.000010	mg/L	NC	20
9734030	Total Bismuth (Bi)	2020/01/15	22 (1)	80 - 120	100	80 - 120	<0.0000050	mg/L	NC	20
9734030	Total Boron (B)	2020/01/15	101	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9734030	Total Cadmium (Cd)	2020/01/15	108	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9734030	Total Chromium (Cr)	2020/01/15	104	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
9734030	Total Cobalt (Co)	2020/01/15	104	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9734030	Total Copper (Cu)	2020/01/15	103	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
9734030	Total Iron (Fe)	2020/01/15	107	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
9734030	Total Lead (Pb)	2020/01/15	107	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9734030	Total Lithium (Li)	2020/01/15	104	80 - 120	94	80 - 120	<0.00050	mg/L	NC	20
9734030	Total Manganese (Mn)	2020/01/15	105	80 - 120	98	80 - 120	<0.000050	mg/L	NC	20
9734030	Total Molybdenum (Mo)	2020/01/15	70 (1)	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9734030	Total Nickel (Ni)	2020/01/15	104	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20
9734030	Total Selenium (Se)	2020/01/15	118	80 - 120	99	80 - 120	<0.000040	mg/L	NC	20
9734030	Total Silicon (Si)	2020/01/15	110	80 - 120	103	80 - 120	<0.050	mg/L	NC	20
9734030	Total Silver (Ag)	2020/01/15	94	80 - 120	96	80 - 120	<0.0000050	mg/L	NC	20
9734030	Total Strontium (Sr)	2020/01/15	108	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9734030	Total Thallium (Tl)	2020/01/15	96	80 - 120	98	80 - 120	<0.0000020	mg/L	NC	20
9734030	Total Tin (Sn)	2020/01/15	104	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9734030	Total Titanium (Ti)	2020/01/15	107	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9734030	Total Uranium (U)	2020/01/15	108	80 - 120	100	80 - 120	0.0000021, RDL=0.00000020 (2)	mg/L	NC	20
9734030	Total Vanadium (V)	2020/01/15	102	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9734030	Total Zinc (Zn)	2020/01/15	119	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
9734030	Total Zirconium (Zr)	2020/01/15	106	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9734149	Nitrate plus Nitrite (N)	2020/01/14			109	80 - 120	<0.0020	mg/L		
9734151	Nitrite (N)	2020/01/14			105	80 - 120	<0.0020	mg/L		
9734159	Nitrate plus Nitrite (N)	2020/01/14	NC	80 - 120	111	80 - 120	<0.0020	mg/L	2.9	25
9734161	Nitrite (N)	2020/01/14	102	80 - 120	105	80 - 120	<0.0020	mg/L	1.2	25
9734181	Alkalinity (PP as CaCO3)	2020/01/14					<0.50	mg/L		



BV Labs Job #: C002510
Report Date: 2020/01/21

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9734181	Alkalinity (Total as CaCO ₃)	2020/01/14			93	80 - 120	<0.50	mg/L		
9734181	Bicarbonate (HCO ₃)	2020/01/14					<0.50	mg/L		
9734181	Carbonate (CO ₃)	2020/01/14					<0.50	mg/L		
9734181	Hydioxide (OH)	2020/01/14					<0.50	mg/L		
9734265	Dissolved Chloride (Cl)	2020/01/14	NC	80 - 120	101	80 - 120	<0.50	mg/L	4.0	20
9734265	Dissolved Sulphate (SO ₄)	2020/01/14	NC	80 - 120	101	80 - 120	0.80, RDL=0.50	mg/L	2.2	20
9734382	Total Ammonia (N)	2020/01/15	116	80 - 120	109	80 - 120	<0.0050	mg/L	6.6	20
9734864	Total Organic Carbon (C)	2020/01/15	99	80 - 120	106	80 - 120	<0.50	mg/L	NC	20
9734868	Dissolved Organic Carbon (C)	2020/01/15	106	80 - 120	102	80 - 120	<0.50	mg/L	13	20
9735005	Biochemical Oxygen Demand	2020/01/20			98	85 - 115	<2.0	mg/L	NC	20
9735737	Total Suspended Solids	2020/01/17	101	80 - 120	99	80 - 120	<1.0	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Method blank exceeds acceptance limits for U - 2X RDL acceptable for low level metals determination.



VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Turnaround Time (TAT) Required _____

[illegible]

C002510 C0C



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476506

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/01/03
 Report #: R2830579
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9B0180

Received: 2019/12/27, 12:32

Sample Matrix: Water
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Low Level (1)	6	N/A	2019/12/30	BBY6SOP-00026	SM 22 2320 B m
Low level chloride/sulphate by AC (1)	5	N/A	2019/12/30	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC (1)	1	N/A	2019/12/31	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Hardness Total (calculated as CaCO3) (1, 2)	2	N/A	2019/12/31	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO3) (1, 2)	4	N/A	2020/01/03	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3) (1)	6	N/A	2019/12/31	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	5	N/A	2019/12/31	BBY WI-00033	Auto Calc
Ion Balance (as Cations/Anions Ratio) (1)	1	N/A	2020/01/02	BBY WI-00033	Auto Calc
Ion Balance (1)	5	N/A	2019/12/31	BBY WI-00033	Auto Calc
Ion Balance (1)	1	N/A	2020/01/02	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	6	N/A	2019/12/31	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.) (1)	6	N/A	2019/12/31	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	6	N/A	2019/12/30	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	3	2019/12/31	2019/12/31	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total) (1)	1	2019/12/31	2020/01/02	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	2	N/A	2019/12/31	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	4	N/A	2020/01/03	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total) (1)	2	N/A	2019/12/30	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N Low Level (Preserved)	6	N/A	2019/12/31	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level) (1)	6	N/A	2019/12/28	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level) (1)	6	N/A	2019/12/28	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc (1)	6	N/A	2019/12/28	BBY WI-00033	Auto Calc
Filter and HNO3 Preserve for Metals (1)	6	N/A	2019/12/28	BBY7 WI-00004	SM 23 3030B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476506

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/03
Report #: R2830579
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9B0180

Received: 2019/12/27, 12:32

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlab.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		XE4035	XE4036	XE4037	XE4038	XE4039	XE4040		
Sampling Date		2019/12/27 09:10	2019/12/27 09:05	2019/12/27 09:00	2019/12/27 09:25	2019/12/27 09:20	2019/12/27 09:15		
COC Number		08476506	08476506	08476506	08476506	08476506	08476506		
	UNITS	1A	1B	1C	4A	4B	4C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.4	9.3	8.7	15	11	13	N/A	9722184
Cation Sum	meq/L	8.7	8.6	8.7	14	11	13	N/A	9722184
Filter and HNO ₃ Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD		ONSITE
Ion Balance	N/A	1.0	0.92	1.0	0.96	1.0	0.99	0.010	9722182
Ion Balance (% Difference)	%	1.6	4.0	0.40	2.1	1.3	0.30	N/A	9722183
Nitrate (N)	mg/L	0.573	0.0168	0.0090	0.0145	<0.0020	<0.0020	0.0020	9722187

Misc. Inorganics

Alkalinity (Total as CaCO ₃)	mg/L	92.2	93.4	93.0	183	131	165	0.50	9723039
Alkalinity (PP as CaCO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9723039
Bicarbonate (HCO ₃)	mg/L	113	114	113	223	160	202	0.50	9723039
Carbonate (CO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9723039
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9723039

Anions

Dissolved Chloride (Cl)	mg/L	65	70	65	91	84	90	0.50	9723253
Dissolved Sulphate (SO ₄)	mg/L	230 (1)	260 (1)	240 (1)	410 (1)	290 (1)	350 (1)	5.0	9723253

Nutrients

Total Ammonia (N)	mg/L	0.0064	0.028	0.017	0.079	0.012	0.0091	0.0050	9723658
Nitrate plus Nitrite (N)	mg/L	0.573	0.0168	0.0090	0.0145	<0.0020	<0.0020	0.0020	9722204
Nitrite (N)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	9722205

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.



ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		XE4037	XE4038	XE4039	XE4040		
Sampling Date		2019/12/27 09:00	2019/12/27 09:25	2019/12/27 09:20	2019/12/27 09:15		
COC Number		08476506	08476506	08476506	08476506		
	UNITS	1C	4A	4B	4C	RDL	QC Batch
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	<0.0030	0.508	0.0131	0.0041	0.0030	9723308
Total Antimony (Sb)	mg/L	0.0154	0.0468	0.00617	0.00338 (1)	0.000020	9723308
Total Arsenic (As)	mg/L	0.0139	0.463	0.0443	0.00860	0.000020	9723308
Total Barium (Ba)	mg/L	0.0567	0.127	0.0662	0.0668	0.000050	9723308
Total Beryllium (Be)	mg/L	<0.000010	0.000028	<0.000010	<0.000010	0.000010	9723308
Total Bismuth (Bi)	mg/L	<0.000010	0.000023	<0.000010	<0.000010	0.000010	9723308
Total Boron (B)	mg/L	0.041	0.402	0.120	0.037	0.010	9723308
Total Cadmium (Cd)	mg/L	0.000728	0.00845	0.00101	0.0000817	0.0000050	9723308
Total Chromium (Cr)	mg/L	<0.00010	0.00182	<0.00010	<0.00010	0.00010	9723308
Total Cobalt (Co)	mg/L	0.000046	0.0430	0.00155	0.000140	0.000010	9723308
Total Copper (Cu)	mg/L	0.00309	0.153	0.00609	0.00064	0.00010	9723308
Total Iron (Fe)	mg/L	0.0134	7.57	0.311	0.157	0.0050	9723308
Total Lead (Pb)	mg/L	0.000052	0.175	0.00388	0.000090	0.000020	9723308
Total Lithium (Li)	mg/L	0.0112	0.0188	0.0152	0.0174	0.00050	9723308
Total Manganese (Mn)	mg/L	0.0211	1.78	0.261	0.0724	0.00010	9723308
Total Molybdenum (Mo)	mg/L	0.00208	0.00466	0.000965	0.000200	0.000050	9723308
Total Nickel (Ni)	mg/L	0.00491	0.0323	0.00874	0.00449	0.00010	9723308
Total Phosphorus (P)	mg/L	0.0157	0.821	0.264	0.102	0.0050	9723308
Total Selenium (Se)	mg/L	0.00394	0.0132	0.00112	0.000484	0.000040	9723308
Total Silicon (Si)	mg/L	1.00	1.98	0.850	1.75	0.050	9723308
Total Silver (Ag)	mg/L	<0.000010	0.000042	<0.000010	<0.000010	0.000010	9723308
Total Strontium (Sr)	mg/L	0.635	1.05	0.820	0.937	0.000050	9723308
Total Thallium (Tl)	mg/L	0.0000077	0.0000493	0.0000067	0.0000054	0.0000020	9723308
Total Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9723308
Total Titanium (Ti)	mg/L	<0.0020	0.0168	<0.0020	<0.0020	0.0020	9723308
Total Uranium (U)	mg/L	0.0376	0.280	0.0558	0.0456	0.0000050	9723308
Total Vanadium (V)	mg/L	<0.00020	0.00268	<0.00020	<0.00020	0.00020	9723308
Total Zinc (Zn)	mg/L	0.0704	0.466	0.0632	0.0150	0.0010	9723308
Total Zirconium (Zr)	mg/L	<0.00010	0.00030	<0.00010	<0.00010	0.00010	9723308
Total Sulphur (S)	mg/L	89.2	146	114	133	0.60	9723308
RDL = Reportable Detection Limit							
(1) Matrix Spike outside acceptance criteria due to sample matrix interference.							



BUREAU
VERITAS

BV Labs Job #: B9B0180
Report Date: 2020/01/03

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XE4035	XE4036	XE4037	XE4038	XE4039		
Sampling Date		2019/12/27 09:10	2019/12/27 09:05	2019/12/27 09:00	2019/12/27 09:25	2019/12/27 09:20		
COC Number		08476506	08476506	08476506	08476506	08476506		
	UNITS	1A	1B	1C	4A	4B	RDL	QC Batch

Calculated Parameters

Dissolved Hardness (CaCO ₃)	mg/L	371	365	375	617	490	0.50	9722113
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Dissolved Metals by ICPMS

Dissolved Aluminum (Al)	mg/L	0.00171	0.00097	0.00052	0.00119	0.00078	0.00050	9722718
Dissolved Antimony (Sb)	mg/L	0.0201	0.0150	0.0143	0.00979	0.00373	0.000020	9722718
Dissolved Arsenic (As)	mg/L	0.0274	0.0383	0.0126	0.0163	0.0180	0.000020	9722718
Dissolved Barium (Ba)	mg/L	0.0572	0.0601	0.0552	0.0661	0.0621	0.000020	9722718
Dissolved Beryllium (Be)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	9722718
Dissolved Bismuth (Bi)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9722718
Dissolved Boron (B)	mg/L	0.032	0.031	0.025	0.011	0.011	0.010	9722718
Dissolved Cadmium (Cd)	mg/L	0.000776	0.000793	0.000269	0.000169	0.0000714	0.0000050	9722718
Dissolved Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9722718
Dissolved Cobalt (Co)	mg/L	0.0000783	0.0000453	0.0000243	0.000145	0.0000220	0.0000050	9722718
Dissolved Copper (Cu)	mg/L	0.00759	0.00655	0.00247	0.00239	0.00129	0.000050	9722718
Dissolved Iron (Fe)	mg/L	0.0018	0.0028	0.0047	0.0059	0.0024	0.0010	9722718
Dissolved Lead (Pb)	mg/L	0.000105	0.0000317	<0.0000050	0.000163	0.0000188	0.0000050	9722718
Dissolved Lithium (Li)	mg/L	0.0124	0.0123	0.0125	0.0171	0.0159	0.00050	9722718
Dissolved Manganese (Mn)	mg/L	0.00161	0.00125	0.00350	0.00767	0.00121	0.000050	9722718
Dissolved Molybdenum (Mo)	mg/L	0.00437	0.00146	0.00198	0.000717	0.000458	0.000050	9722718
Dissolved Nickel (Ni)	mg/L	0.00543	0.00583	0.00436	0.00642	0.00444	0.000020	9722718
Dissolved Selenium (Se)	mg/L	0.00591	0.00454	0.00366	0.00116	0.000565	0.000040	9722718
Dissolved Silicon (Si)	mg/L	0.230	0.101	1.05	0.922	0.883	0.050	9722718
Dissolved Silver (Ag)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	9722718
Dissolved Strontium (Sr)	mg/L	0.672	0.654	0.676	1.02	0.852	0.000050	9722718
Dissolved Thallium (Tl)	mg/L	0.0000079	0.0000045	0.0000063	<0.0000020	<0.0000020	0.0000020	9722718
Dissolved Tin (Sn)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9722718
Dissolved Titanium (Ti)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	9722718
Dissolved Uranium (U)	mg/L	0.0460	0.0362	0.0362	0.239	0.0545	0.0000020	9722718
Dissolved Vanadium (V)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	9722718
Dissolved Zinc (Zn)	mg/L	0.111	0.105	0.0594	0.0262	0.0149	0.00010	9722718
Dissolved Zirconium (Zr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	9722718
Dissolved Calcium (Ca)	mg/L	119	117	121	203	158	0.050	9722185
Dissolved Magnesium (Mg)	mg/L	18.0	17.9	17.9	27.0	23.2	0.050	9722185

RDL = Reportable Detection Limit



LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XE4035	XE4036	XE4037	XE4038	XE4039		
Sampling Date		2019/12/27 09:10	2019/12/27 09:05	2019/12/27 09:00	2019/12/27 09:25	2019/12/27 09:20		
COC Number		08476506	08476506	08476506	08476506	08476506		
	UNITS	1A	1B	1C	4A	4B	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.16	4.07	4.38	4.11	3.93	0.050	9722185
Dissolved Sodium (Na)	mg/L	26.6	26.6	26.2	37.6	33.9	0.050	9722185
Dissolved Sulphur (S)	mg/L	86.3	85.7	87.6	137	115	3.0	9722185
RDL = Reportable Detection Limit								



BUREAU
VERITAS

BV Labs Job #: B9B0180
Report Date: 2020/01/03

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XE4040		
Sampling Date		2019/12/27 09:15		
COC Number		08476506		
	UNITS	4C	RDL	QC Batch
Calculated Parameters				
Dissolved Hardness (CaCO ₃)	mg/L	569	0.50	9722113
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	mg/L	0.00050	0.00050	9722718
Dissolved Antimony (Sb)	mg/L	0.00278	0.000020	9722718
Dissolved Arsenic (As)	mg/L	0.00500	0.000020	9722718
Dissolved Barium (Ba)	mg/L	0.0639	0.000020	9722718
Dissolved Beryllium (Be)	mg/L	<0.000010	0.000010	9722718
Dissolved Bismuth (Bi)	mg/L	<0.0000050	0.0000050	9722718
Dissolved Boron (B)	mg/L	<0.010	0.010	9722718
Dissolved Cadmium (Cd)	mg/L	0.0000068	0.0000050	9722718
Dissolved Chromium (Cr)	mg/L	<0.00010	0.00010	9722718
Dissolved Cobalt (Co)	mg/L	0.0000310	0.0000050	9722718
Dissolved Copper (Cu)	mg/L	0.000174	0.000050	9722718
Dissolved Iron (Fe)	mg/L	0.0186	0.0010	9722718
Dissolved Lead (Pb)	mg/L	0.0000085	0.0000050	9722718
Dissolved Lithium (Li)	mg/L	0.0173	0.00050	9722718
Dissolved Manganese (Mn)	mg/L	0.00901	0.000050	9722718
Dissolved Molybdenum (Mo)	mg/L	0.000109	0.000050	9722718
Dissolved Nickel (Ni)	mg/L	0.00370	0.000020	9722718
Dissolved Selenium (Se)	mg/L	0.000338	0.000040	9722718
Dissolved Silicon (Si)	mg/L	1.77	0.050	9722718
Dissolved Silver (Ag)	mg/L	<0.0000050	0.0000050	9722718
Dissolved Strontium (Sr)	mg/L	0.927	0.000050	9722718
Dissolved Thallium (Tl)	mg/L	<0.0000020	0.0000020	9722718
Dissolved Tin (Sn)	mg/L	<0.00020	0.00020	9722718
Dissolved Titanium (Ti)	mg/L	<0.00050	0.00050	9722718
Dissolved Uranium (U)	mg/L	0.0444	0.0000020	9722718
Dissolved Vanadium (V)	mg/L	<0.00020	0.00020	9722718
Dissolved Zinc (Zn)	mg/L	0.00352	0.00010	9722718
Dissolved Zirconium (Zr)	mg/L	<0.00010	0.00010	9722718
Dissolved Calcium (Ca)	mg/L	184	0.050	9722185
Dissolved Magnesium (Mg)	mg/L	26.4	0.050	9722185
RDL = Reportable Detection Limit				



BUREAU
VERITAS

BV Labs Job #: B9B0180
Report Date: 2020/01/03

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL DISSOLVED METALS IN WATER (WATER)

BV Labs ID		XE4040		
Sampling Date		2019/12/27 09:15		
COC Number		08476506		
	UNITS	4C	RDL	QC Batch
Dissolved Potassium (K)	mg/L	4.30	0.050	9722185
Dissolved Sodium (Na)	mg/L	36.6	0.050	9722185
Dissolved Sulphur (S)	mg/L	127	3.0	9722185
RDL = Reportable Detection Limit				



BUREAU
VERITAS

BV Labs Job #: B9B0180
Report Date: 2020/01/03

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

LOW LEVEL TOTAL METALS IN WATER (WATER)

BV Labs ID		XE4035	XE4036			XE4037	XE4038	XE4039		
Sampling Date		2019/12/27 09:10	2019/12/27 09:05			2019/12/27 09:00	2019/12/27 09:25	2019/12/27 09:20		
COC Number		08476506	08476506			08476506	08476506	08476506		
	UNITS	1A	1B	RDL	QC Batch	1C	4A	4B	RDL	QC Batch

Calculated Parameters										
Total Hardness (CaCO3)	mg/L	354	380	0.50	9722112	372	653	473	0.50	9722112
Total Metals by ICPMS										
Total Aluminum (Al)	mg/L	0.00470	0.00164	0.00050	9722764					
Total Antimony (Sb)	mg/L	0.0199	0.0155	0.000020	9722764					
Total Arsenic (As)	mg/L	0.0283	0.0394	0.000020	9722764					
Total Barium (Ba)	mg/L	0.0546	0.0582	0.000020	9722764					
Total Beryllium (Be)	mg/L	<0.000010	<0.000010	0.000010	9722764					
Total Bismuth (Bi)	mg/L	0.0000085	<0.0000050	0.0000050	9722764					
Total Boron (B)	mg/L	0.040	0.034	0.010	9722764					
Total Cadmium (Cd)	mg/L	0.000901	0.000841	0.0000050	9722764					
Total Chromium (Cr)	mg/L	<0.00010	<0.00010	0.00010	9722764					
Total Cobalt (Co)	mg/L	0.000151	0.0000543	0.0000050	9722764					
Total Copper (Cu)	mg/L	0.00867	0.00709	0.000050	9722764					
Total Iron (Fe)	mg/L	0.0484	0.0047	0.0010	9722764					
Total Lead (Pb)	mg/L	0.000260	0.0000747	0.0000050	9722764					
Total Lithium (Li)	mg/L	0.0121	0.0122	0.00050	9722764					
Total Manganese (Mn)	mg/L	0.0116	0.00190	0.000050	9722764					
Total Molybdenum (Mo)	mg/L	0.00443	0.00145	0.000050	9722764					
Total Nickel (Ni)	mg/L	0.00591	0.00614	0.000020	9722764					
Total Selenium (Se)	mg/L	0.00619	0.00492	0.000040	9722764					
Total Silicon (Si)	mg/L	0.259	0.103	0.050	9722764					
Total Silver (Ag)	mg/L	0.0000090	<0.0000050	0.0000050	9722764					
Total Strontium (Sr)	mg/L	0.632	0.635	0.000050	9722764					
Total Thallium (Tl)	mg/L	0.0000182	0.0000043	0.0000020	9722764					
Total Tin (Sn)	mg/L	<0.00020	<0.00020	0.00020	9722764					
Total Titanium (Ti)	mg/L	<0.00050	<0.00050	0.00050	9722764					
Total Uranium (U)	mg/L	0.0454	0.0370	0.0000020	9722764					
Total Vanadium (V)	mg/L	<0.00020	<0.00020	0.00020	9722764					
Total Zinc (Zn)	mg/L	0.117	0.110	0.00010	9722764					
Total Zirconium (Zr)	mg/L	<0.00010	<0.00010	0.00010	9722764					
Total Calcium (Ca)	mg/L	112	122	0.050	9722186	119	209	151	0.25	9722186
Total Magnesium (Mg)	mg/L	18.1	18.3	0.050	9722186	18.3	31.9	23.5	0.25	9722186

RDL = Reportable Detection Limit

**LOW LEVEL TOTAL METALS IN WATER (WATER)**

BV Labs ID		XE4035	XE4036			XE4037	XE4038	XE4039		
Sampling Date		2019/12/27 09:10	2019/12/27 09:05			2019/12/27 09:00	2019/12/27 09:25	2019/12/27 09:20		
COC Number		08476506	08476506			08476506	08476506	08476506		
	UNITS	1A	1B	RDL	QC Batch	1C	4A	4B	RDL	QC Batch
Total Potassium (K)	mg/L	4.16	4.15	0.050	9722186	4.52	10.8	6.31	0.25	9722186
Total Sodium (Na)	mg/L	26.7	27.1	0.050	9722186	27.2	39.9	34.0	0.25	9722186
Total Sulphur (S)	mg/L	85.5	87.6	3.0	9722186	89.2	146	114	3.0	9722186
RDL = Reportable Detection Limit										

BV Labs ID		XE4040		
Sampling Date		2019/12/27 09:15		
COC Number		08476506		
	UNITS	4C	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	573	0.50	9722112
Total Metals by ICPMS				
Total Calcium (Ca)	mg/L	185	0.25	9722186
Total Magnesium (Mg)	mg/L	27.2	0.25	9722186
Total Potassium (K)	mg/L	5.98	0.25	9722186
Total Sodium (Na)	mg/L	38.3	0.25	9722186
Total Sulphur (S)	mg/L	133	3.0	9722186
RDL = Reportable Detection Limit				



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	13.0°C
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Sample XE4037 [1C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XE4038 [4A] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XE4039 [4B] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Sample XE4040 [4C] : Sample analyzed for digested low level metals due to sediment in sample. This results in an increased reportable detection limit for Al B Ba Bi Cr Co Cu Fe Mn Ni P Pb Sb Si Ti U V and Zn.

Results relate only to the items tested.



BV Labs Job #: B9B0180
Report Date: 2020/01/03

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9722204	Nitrate plus Nitrite (N)	2019/12/28	95	80 - 120	102	80 - 120	<0.0020	mg/L	6.5	25
9722205	Nitrite (N)	2019/12/28	95	80 - 120	101	80 - 120	<0.0020	mg/L	NC	25
9722718	Dissolved Aluminum (Al)	2019/12/30	102	80 - 120	101	80 - 120	<0.00050	mg/L	3.8	20
9722718	Dissolved Antimony (Sb)	2019/12/30	NC	80 - 120	98	80 - 120	<0.000020	mg/L	0.93	20
9722718	Dissolved Arsenic (As)	2019/12/30	99	80 - 120	96	80 - 120	<0.000020	mg/L	1.7	20
9722718	Dissolved Barium (Ba)	2019/12/30	NC	80 - 120	101	80 - 120	<0.000020	mg/L	0.21	20
9722718	Dissolved Beryllium (Be)	2019/12/30	98	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9722718	Dissolved Bismuth (Bi)	2019/12/30	98	80 - 120	101	80 - 120	<0.0000050	mg/L	NC	20
9722718	Dissolved Boron (B)	2019/12/30	98	80 - 120	99	80 - 120	<0.010	mg/L	2.8	20
9722718	Dissolved Cadmium (Cd)	2019/12/30	99	80 - 120	98	80 - 120	<0.0000050	mg/L	0.97	20
9722718	Dissolved Chromium (Cr)	2019/12/30	96	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9722718	Dissolved Cobalt (Co)	2019/12/30	95	80 - 120	96	80 - 120	<0.0000050	mg/L	1.4	20
9722718	Dissolved Copper (Cu)	2019/12/30	89	80 - 120	94	80 - 120	<0.000050	mg/L	1.9	20
9722718	Dissolved Iron (Fe)	2019/12/30	100	80 - 120	102	80 - 120	<0.0010	mg/L	3.7	20
9722718	Dissolved Lead (Pb)	2019/12/30	101	80 - 120	102	80 - 120	<0.0000050	mg/L	2.6	20
9722718	Dissolved Lithium (Li)	2019/12/30	99	80 - 120	106	80 - 120	<0.00050	mg/L	3.6	20
9722718	Dissolved Manganese (Mn)	2019/12/30	98	80 - 120	99	80 - 120	<0.000050	mg/L	2.8	20
9722718	Dissolved Molybdenum (Mo)	2019/12/30	109	80 - 120	100	80 - 120	<0.000050	mg/L	0.38	20
9722718	Dissolved Nickel (Ni)	2019/12/30	93	80 - 120	96	80 - 120	<0.000020	mg/L	2.5	20
9722718	Dissolved Selenium (Se)	2019/12/30	101	80 - 120	97	80 - 120	<0.000040	mg/L	1.6	20
9722718	Dissolved Silicon (Si)	2019/12/30	101	80 - 120	104	80 - 120	<0.050	mg/L	0.84	20
9722718	Dissolved Silver (Ag)	2019/12/30	98	80 - 120	95	80 - 120	<0.0000050	mg/L	NC	20
9722718	Dissolved Strontium (Sr)	2019/12/30	NC	80 - 120	100	80 - 120	<0.000050	mg/L	2.9	20
9722718	Dissolved Thallium (Tl)	2019/12/30	103	80 - 120	102	80 - 120	<0.0000020	mg/L	2.5	20
9722718	Dissolved Tin (Sn)	2019/12/30	102	80 - 120	99	80 - 120	<0.00020	mg/L	NC	20
9722718	Dissolved Titanium (Ti)	2019/12/30	101	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
9722718	Dissolved Uranium (U)	2019/12/30	103	80 - 120	101	80 - 120	<0.0000020	mg/L	0.51	20
9722718	Dissolved Vanadium (V)	2019/12/30	98	80 - 120	95	80 - 120	<0.00020	mg/L	NC	20
9722718	Dissolved Zinc (Zn)	2019/12/30	NC	80 - 120	100	80 - 120	<0.00010	mg/L	0.56	20
9722718	Dissolved Zirconium (Zr)	2019/12/30	108	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
9722764	Total Aluminum (Al)	2019/12/30	104	80 - 120	97	80 - 120	<0.00050	mg/L	2.7	20
9722764	Total Antimony (Sb)	2019/12/30	105	80 - 120	98	80 - 120	<0.000020	mg/L	NC	20



BV Labs Job #: B9B0180
Report Date: 2020/01/03

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9722764	Total Arsenic (As)	2019/12/30	104	80 - 120	97	80 - 120	<0.000020	mg/L	NC	20
9722764	Total Barium (Ba)	2019/12/30	102	80 - 120	96	80 - 120	<0.000020	mg/L	NC	20
9722764	Total Beryllium (Be)	2019/12/30	103	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9722764	Total Bismuth (Bi)	2019/12/30	107	80 - 120	102	80 - 120	<0.0000050	mg/L	NC	20
9722764	Total Boron (B)	2019/12/30	102	80 - 120	99	80 - 120	<0.010	mg/L	NC	20
9722764	Total Cadmium (Cd)	2019/12/30	107	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9722764	Total Chromium (Cr)	2019/12/30	104	80 - 120	98	80 - 120	<0.00010	mg/L	1.9	20
9722764	Total Cobalt (Co)	2019/12/30	104	80 - 120	97	80 - 120	<0.0000050	mg/L	NC	20
9722764	Total Copper (Cu)	2019/12/30	103	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
9722764	Total Iron (Fe)	2019/12/30	108	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20
9722764	Total Lead (Pb)	2019/12/30	107	80 - 120	104	80 - 120	<0.0000050	mg/L	NC	20
9722764	Total Lithium (Li)	2019/12/30	103	80 - 120	101	80 - 120	<0.00050	mg/L	NC	20
9722764	Total Manganese (Mn)	2019/12/30	107	80 - 120	100	80 - 120	<0.000050	mg/L	NC	20
9722764	Total Molybdenum (Mo)	2019/12/30	106	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
9722764	Total Nickel (Ni)	2019/12/30	108	80 - 120	100	80 - 120	<0.000020	mg/L	NC	20
9722764	Total Selenium (Se)	2019/12/30	108	80 - 120	100	80 - 120	<0.000040	mg/L	NC	20
9722764	Total Silicon (Si)	2019/12/30	100	80 - 120	95	80 - 120	<0.050	mg/L	NC	20
9722764	Total Silver (Ag)	2019/12/30	104	80 - 120	99	80 - 120	<0.0000050	mg/L	NC	20
9722764	Total Strontium (Sr)	2019/12/30	101	80 - 120	95	80 - 120	<0.000050	mg/L	4.5	20
9722764	Total Thallium (Tl)	2019/12/30	106	80 - 120	102	80 - 120	<0.0000020	mg/L	NC	20
9722764	Total Tin (Sn)	2019/12/30	105	80 - 120	100	80 - 120	<0.00020	mg/L	NC	20
9722764	Total Titanium (Ti)	2019/12/30	108	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9722764	Total Uranium (U)	2019/12/30	105	80 - 120	99	80 - 120	<0.0000020	mg/L	NC	20
9722764	Total Vanadium (V)	2019/12/30	102	80 - 120	95	80 - 120	<0.00020	mg/L	NC	20
9722764	Total Zinc (Zn)	2019/12/30	113	80 - 120	104	80 - 120	<0.00010	mg/L	NC	20
9722764	Total Zirconium (Zr)	2019/12/30	106	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
9723039	Alkalinity (PP as CaCO3)	2019/12/30					<0.50	mg/L	NC	20
9723039	Alkalinity (Total as CaCO3)	2019/12/30	NC	80 - 120	93	80 - 120	<0.50	mg/L	1.3	20
9723039	Bicarbonate (HCO3)	2019/12/30					<0.50	mg/L	1.3	20
9723039	Carbonate (CO3)	2019/12/30					<0.50	mg/L	NC	20
9723039	Hydroxide (OH)	2019/12/30					<0.50	mg/L	NC	20
9723253	Dissolved Chloride (Cl)	2019/12/30	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.15	20



BV Labs Job #: B9B0180
Report Date: 2020/01/03

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9723253	Dissolved Sulphate (SO4)	2019/12/30	NC	80 - 120	103	80 - 120	<0.50	mg/L	10	20
9723308	Total Aluminum (Al)	2020/01/02	98	80 - 120	98	80 - 120	<0.0030	mg/L	NC	20
9723308	Total Antimony (Sb)	2020/01/02	133 (1)	80 - 120	98	80 - 120	<0.000020	mg/L	0.86	20
9723308	Total Arsenic (As)	2020/01/02	104	80 - 120	95	80 - 120	<0.000020	mg/L	0.17	20
9723308	Total Barium (Ba)	2020/01/02	NC	80 - 120	99	80 - 120	<0.000050	mg/L	1.5	20
9723308	Total Beryllium (Be)	2020/01/02	96	80 - 120	97	80 - 120	<0.000010	mg/L	NC	20
9723308	Total Bismuth (Bi)	2020/01/02	95	80 - 120	98	80 - 120	<0.000010	mg/L	NC	20
9723308	Total Boron (B)	2020/01/02	104	80 - 120	99	80 - 120	<0.010	mg/L	0.66	20
9723308	Total Cadmium (Cd)	2020/01/02	99	80 - 120	99	80 - 120	<0.0000050	mg/L	3.4	20
9723308	Total Chromium (Cr)	2020/01/02	95	80 - 120	96	80 - 120	<0.00010	mg/L	NC	20
9723308	Total Cobalt (Co)	2020/01/02	95	80 - 120	97	80 - 120	<0.000010	mg/L	6.9	20
9723308	Total Copper (Cu)	2020/01/02	91	80 - 120	95	80 - 120	<0.00010	mg/L	1.9	20
9723308	Total Iron (Fe)	2020/01/02	105	80 - 120	98	80 - 120	<0.0050	mg/L	2.4	20
9723308	Total Lead (Pb)	2020/01/02	96	80 - 120	98	80 - 120	<0.000020	mg/L	5.1	20
9723308	Total Lithium (Li)	2020/01/02	95	80 - 120	103	80 - 120	<0.00050	mg/L	0.17	20
9723308	Total Manganese (Mn)	2020/01/02	NC	80 - 120	97	80 - 120	<0.00010	mg/L	0.17	20
9723308	Total Molybdenum (Mo)	2020/01/02	110	80 - 120	99	80 - 120	<0.000050	mg/L	0.12	20
9723308	Total Nickel (Ni)	2020/01/02	93	80 - 120	97	80 - 120	<0.00010	mg/L	1.0	20
9723308	Total Phosphorus (P)	2020/01/02	104	80 - 120	97	80 - 120	<0.0050	mg/L	4.1	20
9723308	Total Selenium (Se)	2020/01/02	100	80 - 120	97	80 - 120	<0.000040	mg/L	1.5	20
9723308	Total Silicon (Si)	2020/01/02	95	80 - 120	98	80 - 120	<0.050	mg/L	1.2	20
9723308	Total Silver (Ag)	2020/01/02	94	80 - 120	94	80 - 120	<0.000010	mg/L	NC	20
9723308	Total Strontium (Sr)	2020/01/02	NC	80 - 120	97	80 - 120	<0.000050	mg/L	0.077	20
9723308	Total Sulphur (S)	2020/01/02	NC	80 - 120	99	80 - 120	<0.60	mg/L	1.2	20
9723308	Total Thallium (Tl)	2020/01/02	93	80 - 120	101	80 - 120	<0.0000020	mg/L	3.8	20
9723308	Total Tin (Sn)	2020/01/02	99	80 - 120	98	80 - 120	<0.00020	mg/L	NC	20
9723308	Total Titanium (Ti)	2020/01/02	100	80 - 120	97	80 - 120	<0.0020	mg/L	NC	20
9723308	Total Uranium (U)	2020/01/02	101	80 - 120	101	80 - 120	<0.0000050	mg/L	0.31	20
9723308	Total Vanadium (V)	2020/01/02	99	80 - 120	96	80 - 120	<0.00020	mg/L	NC	20
9723308	Total Zinc (Zn)	2020/01/02	100	80 - 120	98	80 - 120	<0.0010	mg/L	0.56	20
9723308	Total Zirconium (Zr)	2020/01/02	87	80 - 120	97	80 - 120	<0.00010	mg/L	NC	20



BV Labs Job #: B9B0180
Report Date: 2020/01/03

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits

9723658	Total Ammonia (N)	2019/12/31	97	80 - 120	94	80 - 120	<0.0050	mg/L	9.6	20
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Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

BV Labs Job #: B9B0180
Report Date: 2020/01/03

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Rob Reinert, B.Sc., Scientific Spécialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required	
Company Name: BMC MINERALS LTD.				Company Name: ALEXCO ENVIRONMENTAL				Quotation #: B60751				☒ Regular TAT 5 days (Most analyses)	
Contact Name:				Contact Name: Mary Miodka, Renate Vanderhorst				P.O. #/ Affili:				Rush TAT (Surcharges will be applied)	
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #:				☐ Same Day ☐ 2 Days	
Vancouver, BC PC: V6E 4A4				Whitton, BC PC: V1A 2V3				Site Location: Kudr Ze Kayah				☐ 1 Day ☐ 3 Days	
Phone:				Phone: (867) 668-6463				Email: randemhorst@alexcoenv.com				Date Required:	
Email:				Email: mmiodka@alexcoenv.com				Sampled By:				Rush Confirmation #:	
Regulatory Criteria				Special Instructions				Analysis Requested				Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485								☐ Vapour/Leak - USE ONLY ☐ LUSTOBY SEAL (Y/N) ☐ COOLER - TEMPERATURES ☐ Present ☐ Absent ☐ 1 ☐ 2 ☐ 3	
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												HOLD - DO NOT ANALYZE	
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Low Level Dissolved Metals	Low Level Total Metals	Anions (SO4, NO2, NO3, Cl)	Alkalinity	Ammonia	# OF CONTAINERS SUBMITTED	COMMENTS		
1 1A		27-Dec-19	9:10	Water	X	X	X	X	X	6	Metals preserved with HNO3, dissolved		
2 1B		27-Dec-19	9:05	Water	X	X	X	X	X	6	Metals preserved with HNO3, dissolved		
3 1C		27-Dec-19	9:00	Water	X	X	X	X	X	6	Metals preserved with HNO3, dissolved		
4 4A		27-Dec-19	9:25	Water	X	X	X	X	X	6	Metals preserved with HNO3, dissolved		
5 4B		27-Dec-19	9:20	Water	X	X	X	X	X	6	Metals preserved with HNO3, dissolved		
6 4C		27-Dec-19	9:15	Water	X	X	X	X	X	6	Metals preserved with HNO3, dissolved		
7													
8													
9													
10													
REINQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)				RECEIVED BY: (Signature/Print)	
<i>Buckle Bruden</i>				2019/12/27				12:00				<i>[Signature]</i>	
												DATE: (YYYY/MM/DD)	
												TIME: (HH:MM)	
												DATE: (YYYY/MM/DD)	
												TIME: (HH:MM)	

Received in Saskatoon
By: *[Signature]*
DEC 27 2019 12:32
Temp: 15 / 11 / 10



B9B0180_COC

0367



Table 1: Tessier So

Maxxam
Fraction 1: Water S
XE8534
XF9802
XF9803
XF9804
XF9805
XF9806
XF9807
Fraction 2: Exchar
XE8541
XF9809
XF9810
XF9811
XF9812
XF9813
XF9814
Fraction 3: Metals
XE8548
XF9816
XF9817
XF9818
XF9819
XF9820
XF9821
Fraction 4: Metals
XE8555
XF9823
XF9824
XF9825
XF9826
XF9827
XF9828
Fraction 5: Metals
XE8562
XF9830

XF9831
XF9832
XF9833
XF9834
XF9835
Detection Limits
BV Labs SOP #

Notes:

RDL raised due to cc

Client:

Sequential Extraction (Fractions 1-5) for project KUDZ ZE KAYAH

Sample ID
Units
Soluble Metals
BLANK - FRACTION 1
1A SOIL - FRACTION 1
1B SOIL - FRACTION 1
1C SOIL - FRACTION 1
4A SOIL - FRACTION 1
4B SOIL - FRACTION 1
4C SOIL - FRACTION 1
Exchangeable Metals and Calcite (1M MgCl)
BLANK - FRACTION 2
1A SOIL - FRACTION 2
1B SOIL - FRACTION 2
1C SOIL - FRACTION 2
4A SOIL - FRACTION 2
4B SOIL - FRACTION 2
4C SOIL - FRACTION 2
Bound to Carbonates (1M NaOAc)
BLANK - FRACTION 3
1A SOIL - FRACTION 3
1B SOIL - FRACTION 3
1C SOIL - FRACTION 3
4A SOIL - FRACTION 3
4B SOIL - FRACTION 3
4C SOIL - FRACTION 3
Bound to Fe and Mn Oxides (0.04M NH₂OH HCl)
BLANK - FRACTION 4
1A SOIL - FRACTION 4
1B SOIL - FRACTION 4
1C SOIL - FRACTION 4
4A SOIL - FRACTION 4
4B SOIL - FRACTION 4
4C SOIL - FRACTION 4
Bound to Organics and Sulfides (0.02M HNO₃ and 1.2M HN₄OAc)
BLANK - FRACTION 5
1A SOIL - FRACTION 5

1B SOIL - FRACTION 5
1C SOIL - FRACTION 5
4A SOIL - FRACTION 5
4B SOIL- FRACTION 5
4C SOIL - FRACTION 5

Concentration over linear range, sample dilution required.

BMC MINERAL (NO. 1) LTD.

Page 1 of 5

Sample Weight	Final Volume	Dissolved Aluminum (Al)	Dissolved Antimony (Sb)	Dissolved Arsenic (As)	Dissolved Barium (Ba)
g	ml	mg/L	mg/L	mg/L	mg/L
0.00	25.00	0.00835	<0.000020	0.000064	<0.000020
1.00	25.00	0.0509	0.000544	0.00202	0.00219
1.00	25.00	0.0681	0.000204	0.000703	0.00369
1.00	25.00	0.0399	0.000366	0.000505	0.00669
1.00	25.00	0.0744	0.000782	0.000595	0.0102
1.00	25.00	0.0401	0.000305	0.000343	0.00678
1.00	25.00	0.0302	0.000278	0.000387	0.00597
0.00	25.00	0.082	<0.0020	<0.0020	<0.0020
1.00	25.00	0.079	<0.0020	<0.0020	0.0402
1.00	25.00	0.091	<0.0020	<0.0020	0.0321
1.00	25.00	0.155	<0.0020	<0.0020	0.0390
1.00	25.00	0.108	<0.0020	<0.0020	0.0873
1.00	25.00	0.242	<0.0020	<0.0020	0.0719
1.00	25.00	0.092	<0.0020	<0.0020	0.0574
0.00	30.00	0.059	<0.0020	<0.0020	0.0134
1.00	30.00	0.119	<0.0020	0.0048	0.0541
1.00	30.00	0.394	<0.0020	0.0024	0.0512
1.00	30.00	0.237	<0.0020	0.0032	0.0441
1.00	30.00	0.187	<0.0020	0.0034	0.0766
1.00	30.00	0.157	<0.0020	<0.0020	0.0561
1.00	30.00	0.170	<0.0020	0.0024	0.0635
0.00	30.00	0.00352	<0.000020	0.000052	0.000068
1.00	30.00	0.938	0.0017	0.0117	0.0945
1.00	30.00	1.13	<0.0010	0.0056	0.120
1.00	30.00	1.20	0.0016	0.0097	0.115
1.00	30.00	0.366	<0.0010	0.0014	0.0249
1.00	30.00	1.43	0.0011	0.0050	0.0713
1.00	30.00	1.29	0.0013	0.0044	0.0650
0.00	30.00	0.00183	<0.000020	0.000026	0.000057
1.00	30.00	1.48	0.00109	0.00705	0.0205

1.00	30.00	2.66	0.000855	0.00891	0.305
1.00	30.00	2.25	0.000231	0.00551	0.0301
1.00	30.00	3.27	0.00176	0.0181	0.0726
1.00	30.00	3.10	0.000172	0.00389	0.0471
1.00	30.00	2.59	0.000230	0.00408	0.0391
		0.00050	0.000020	0.000020	0.000020
	BBY7SOP-0000BY7SOP-0000BY7SOP-0000BY7SOP-0000				

Dissolved Beryllium (Be)	Dissolved Bismuth (Bi)	Dissolved Boron (B)	Dissolved Cesium (Cs)	Dissolved Cadmium (Cd)	Dissolved Calcium (Ca)
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<0.000010	<0.0000050	<0.050	<0.000050	<0.0000050	<0.050
<0.000010	<0.0000050	<0.050	<0.000050	0.0000140	2.57
<0.000010	<0.0000050	<0.050	<0.000050	0.0000136	3.64
<0.000010	<0.0000050	<0.050	<0.000050	0.0000450	5.52
<0.000010	<0.0000050	<0.050	<0.000050	0.0000494	6.28
<0.000010	<0.0000050	<0.050	<0.000050	0.0000083	5.25
<0.000010	<0.0000050	<0.050	<0.000050	0.0000076	4.87
<0.0010	0.00074	<5.0	<0.0050	<0.00050	<5.0
<0.0010	<0.00050	<5.0	<0.0050	0.00065	21.9
<0.0010	<0.00050	<5.0	<0.0050	<0.00050	21.9
<0.0010	<0.00050	<5.0	<0.0050	0.00127	23.1
<0.0010	<0.00050	<5.0	<0.0050	0.00229	27.9
<0.0010	<0.00050	<5.0	<0.0050	<0.00050	23.8
<0.0010	<0.00050	<5.0	<0.0050	<0.00050	23.0
<0.0010	<0.00050	<5.0	<0.0050	<0.00050	<5.0
<0.0010	<0.00050	<5.0	<0.0050	0.00120	522
<0.0010	<0.00050	<5.0	<0.0050	0.00130	551
<0.0010	<0.00050	<5.0	<0.0050	0.00129	557
<0.0010	<0.00050	<5.0	<0.0050	0.00246	653
<0.0010	<0.00050	<5.0	<0.0050	0.00090	467
<0.0010	<0.00050	<5.0	<0.0050	0.00102	487
<0.000010	0.0000054	<0.050	<0.000050	<0.0000050	<0.050
0.00090	<0.00025	<2.5	<0.0025	0.00132	1930
0.00112	<0.00025	<2.5	<0.0025	0.00111	2040
0.00127	<0.00025	<2.5	<0.0025	0.00108	1580
<0.00050	<0.00025	<2.5	<0.0025	0.00063	297
0.00106	<0.00025	<2.5	<0.0025	0.00064	1050
0.00086	<0.00025	<2.5	<0.0025	0.00053	1070
<0.000010	0.0000223	<0.050	<0.000050	<0.0000050	<0.050
0.000184	0.000065	<0.10	<0.00010	0.000284	58.5

0.00191	0.0000502	<0.050	0.000169	0.000227	47.6
0.000251	0.0000613	<0.050	0.000166	0.000302	11.1
0.000600	0.000106	<0.10	0.00018	0.00130	19.7
0.000407	0.0000529	<0.050	0.000174	0.000145	11.9
0.000869	0.0000529	<0.050	0.000164	0.000432	11.1
0.000010	0.0000050	0.050	0.000050	0.0000050	0.050
BBY7SOP-00002	BY7SOP-00003	BY7SOP-00003	BY7SOP-00003	BBY7SOP-00002	BBY7SOP-00002

Dissolved Chromium (Cr)	Dissolved Cobalt (Co)	Dissolved Copper (Cu)	Dissolved Lanthanum (La)	Dissolved Iron (Fe)	Dissolved Lead (Pb)
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<0.00010	<0.0000050	0.000051	<0.000050	0.0018	0.0000089
<0.00010	0.000173	0.000815	<0.000050	0.0777	0.000505
0.00025	0.0000717	0.000970	<0.000050	0.0879	0.000508
0.00011	0.0000863	0.000565	<0.000050	0.0500	0.000887
0.00011	0.000107	0.00148	<0.000050	0.0898	0.00138
0.00011	0.000122	0.000774	<0.000050	0.0873	0.000127
0.00015	0.000135	0.000986	<0.000050	0.0828	0.000162
<0.010	<0.00050	0.0083	<0.0050	0.32	0.00088
<0.010	0.00290	0.0085	<0.0050	<0.10	0.00565
<0.010	0.00136	0.0082	<0.0050	0.14	0.00394
<0.010	0.00184	0.0092	<0.0050	0.24	0.0122
<0.010	0.00279	0.0150	<0.0050	0.20	0.0264
<0.010	0.00259	0.0123	<0.0050	0.91	0.00318
<0.010	0.00218	0.0081	<0.0050	0.17	0.00138
<0.010	<0.00050	<0.0050	<0.0050	<0.10	<0.00050
<0.010	0.00376	0.0084	0.0083	1.21	0.00831
<0.010	0.00264	0.0104	0.0090	1.97	0.00611
0.043	0.00356	0.0099	0.0102	2.50	0.0103
<0.010	0.00479	0.0177	0.0105	2.53	0.0278
<0.010	0.00278	0.0091	0.0096	3.32	0.00405
<0.010	0.00356	0.0127	0.0092	3.10	0.00553
0.00486	0.0000581	0.00144	<0.000050	0.0249	0.0000610
0.0171	0.0115	0.0102	0.0184	26.7	0.0151
0.0183	0.0117	0.0165	0.0219	49.3	0.0181
0.0168	0.0117	0.0090	0.0233	37.5	0.0233
0.0057	0.00286	<0.0025	0.0051	6.98	0.0135
0.0153	0.00956	0.0216	0.0189	28.3	0.0152
0.0152	0.00788	0.0118	0.0152	31.0	0.0123
0.00121	0.0000783	0.000619	<0.000050	0.0086	0.00166
0.00464	0.00309	0.0252	0.0196	27.5	0.00533

0.00554	0.00388	0.0324	0.0581	9.98	0.0129
0.00546	0.00399	0.0513	0.0177	7.28	0.00609
0.0108	0.00574	0.0915	0.0520	7.67	0.0244
0.00690	0.00424	0.0334	0.0349	5.50	0.00473
0.00666	0.00376	0.207	0.0194	4.77	0.00495
0.00010	0.0000050	0.000050	0.000050	0.0010	0.0000050
BBY7SOP-00002	BBY7SOP-00002	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Lithium (Li)	Dissolved Magnesium (Mg)	Dissolved Manganese (Mn)	Dissolved Phosphorus (P)	Dissolved Molybdenum (Mo)	Dissolved Nickel (Ni)
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<0.00050	<0.050	0.000052	0.0083	<0.000050	0.000034
<0.00050	0.315	0.0205	0.101	0.000378	0.000808
<0.00050	0.416	0.0263	0.0254	0.000347	0.000368
0.00113	1.24	0.0401	0.0132	0.00878	0.000449
0.00054	0.634	0.0400	0.0132	0.000907	0.000647
<0.00050	0.523	0.0267	0.0123	0.000643	0.000527
<0.00050	0.595	0.0234	0.0174	0.000641	0.000579
<0.050	13200	<0.0050	0.40	<0.0050	<0.0020
<0.050	13200	0.565	<0.20	<0.0050	0.0057
<0.050	13200	0.610	<0.20	<0.0050	0.0096
<0.050	14300	0.801	<0.20	<0.0050	0.0094
<0.050	13500	0.887	<0.20	<0.0050	0.0121
<0.050	12900	0.669	<0.20	<0.0050	0.0141
<0.050	12900	0.566	<0.20	<0.0050	0.0125
<0.050	<5.0	<0.0050	0.37	<0.0050	0.0030
<0.050	39.5	1.16	1.21	<0.0050	0.0064
<0.050	37.4	1.57	0.51	<0.0050	0.0077
<0.050	92.5	1.41	0.42	<0.0050	0.0106
<0.050	45.2	2.17	0.35	<0.0050	0.0119
<0.050	28.1	1.23	0.39	<0.0050	0.0092
<0.050	40.3	1.53	0.45	<0.0050	0.0104
<0.00050	<0.050	0.000522	0.0129	0.000462	0.00281
<0.025	905	3.51	5.41	<0.0025	0.0310
<0.025	1010	7.50	1.27	<0.0025	0.0363
<0.025	818	6.07	0.77	<0.0025	0.0413
<0.025	132	1.16	0.20	<0.0025	0.0124
<0.025	496	1.66	0.74	<0.0025	0.0347
<0.025	584	1.67	0.68	<0.0025	0.0295
<0.00050	<0.050	0.000287	0.0619	0.000138	0.00110
0.0033	32.6	0.354	2.54	0.00990	0.0116

0.00656	7.95	1.12	18.1	0.00265	0.0111
0.00517	3.80	0.334	2.57	0.00123	0.0101
0.0070	4.90	1.72	5.34	0.00578	0.0294
0.00640	2.71	0.135	4.06	0.00195	0.00851
0.00521	2.79	0.139	3.52	0.00171	0.00822
0.00050	0.050	0.000050	0.0020	0.000050	0.000020
BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Potassium (K)	Dissolved Rubidium (Rb)	Dissolved Selenium (Se)	Dissolved Silicon (Si)	Dissolved Silver (Ag)	Dissolved Sodium (Na)
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<0.050	<0.000050	<0.000040	<0.10	0.0000089	<0.050
0.462	0.000240	0.000279	0.24	<0.0000050	0.307
0.410	0.000505	0.000187	0.22	<0.0000050	0.396
0.466	0.000408	0.000214	0.15	<0.0000050	0.641
0.614	0.000405	0.000333	0.25	<0.0000050	0.684
0.515	0.000324	0.000204	0.19	<0.0000050	0.591
0.670	0.000448	0.000143	0.14	<0.0000050	0.849
<5.0	<0.0050	<0.0040	<10	0.00135	<5.0
<5.0	<0.0050	<0.0040	<10	<0.00050	<5.0
<5.0	<0.0050	<0.0040	<10	0.00054	<5.0
<5.0	<0.0050	<0.0040	<10	<0.00050	<5.0
<5.0	<0.0050	<0.0040	<10	0.00079	<5.0
<5.0	<0.0050	<0.0040	<10	0.00071	<5.0
<5.0	<0.0050	<0.0040	<10	<0.00050	<5.0
<5.0	<0.0050	<0.0040	<10	<0.00050	10300
<5.0	<0.0050	<0.0040	<10	<0.00050	10200
<5.0	<0.0050	<0.0040	<10	<0.00050	10500
<5.0	<0.0050	<0.0040	<10	<0.00050	10500
<5.0	<0.0050	<0.0040	<10	<0.00050	10100
<5.0	<0.0050	<0.0040	<10	<0.00050	10300
<5.0	<0.0050	<0.0040	<10	<0.00050	10100
<0.050	<0.000050	<0.000040	<0.10	0.0000232	0.498
<2.5	0.0045	<0.0020	<5.0	<0.00025	30.6
<2.5	0.0042	<0.0020	<5.0	<0.00025	17.1
<2.5	0.0035	<0.0020	<5.0	<0.00025	15.1
<2.5	<0.0025	<0.0020	<5.0	<0.00025	7.3
<2.5	0.0042	<0.0020	<5.0	<0.00025	17.7
<2.5	0.0034	<0.0020	<5.0	<0.00025	15.2
<0.050	<0.000050	<0.000040	<0.10	0.0000090	<0.050
0.30	0.00170	0.00220	2.11	0.000602	0.15

0.432	0.00249	0.000737	3.36	0.000300	0.741
0.427	0.00213	0.000747	3.20	0.000322	0.171
0.51	0.00237	0.00127	5.80	0.000711	0.32
0.580	0.00284	0.000627	4.50	0.000196	0.276
0.402	0.00189	0.000803	3.28	0.000341	0.261
0.050	0.000050	0.000040	0.10	0.0000050	0.050
BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Strontium (Sr)	Dissolved Sulphur (S)	Dissolved Tellurium (Te)	Dissolved Thallium (Tl)	Dissolved Thorium (Th)	Dissolved Tin (Sn)
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<0.000050	<10	<0.000020	<0.0000020	0.0000077	<0.00020
0.00763	<10	<0.000020	0.0000142	0.0000138	<0.00020
0.0114	<10	<0.000020	0.0000098	0.0000053	<0.00020
0.0192	<10	<0.000020	0.0000330	0.0000064	<0.00020
0.0214	<10	<0.000020	0.0000331	0.0000123	<0.00020
0.0187	<10	<0.000020	0.0000389	0.0000094	<0.00020
0.0184	<10	<0.000020	0.0000301	<0.0000050	<0.00020
<0.0050	<1000	<0.0020	<0.00020	0.00051	<0.020
0.0373	<1000	<0.0020	<0.00020	<0.00050	<0.020
0.0382	<1000	<0.0020	<0.00020	<0.00050	<0.020
0.0350	<1000	<0.0020	<0.00020	<0.00050	<0.020
0.0528	<1000	<0.0020	<0.00020	<0.00050	<0.020
0.0428	<1000	<0.0020	<0.00020	<0.00050	<0.020
0.0432	<1000	<0.0020	<0.00020	<0.00050	<0.020
<0.0050	<1000	<0.0020	<0.00020	0.00079	<0.020
0.356	<1000	<0.0020	<0.00020	0.00095	<0.020
0.418	<1000	<0.0020	<0.00020	0.00149	<0.020
0.350	<1000	<0.0020	<0.00020	0.00128	<0.020
0.651	<1000	<0.0020	<0.00020	0.00125	<0.020
0.336	<1000	<0.0020	<0.00020	0.00134	<0.020
0.309	<1000	<0.0020	<0.00020	0.00141	<0.020
0.000052	<10	<0.000020	<0.0000020	0.0000175	<0.00020
0.649	<500	<0.0010	0.00030	0.00055	<0.010
0.697	<500	<0.0010	0.00019	0.00123	<0.010
0.448	<500	<0.0010	0.00028	0.00106	<0.010
0.165	<500	<0.0010	<0.00010	<0.00025	<0.010
0.273	<500	<0.0010	0.00016	0.00067	<0.010
0.358	<500	<0.0010	0.00015	0.00070	<0.010
0.000078	<10	<0.000020	0.0000032	0.0000201	0.0478
0.0267	38	<0.000040	0.000207	0.00438	0.0178

0.392	<10	0.000057	0.0000748	0.00306	0.0213
0.0165	<10	0.000033	0.000109	0.00196	0.0166
0.0485	<20	0.000074	0.000182	0.00310	0.0161
0.0446	<10	<0.000020	0.0000901	0.00224	0.0163
0.0421	<10	0.000031	0.000104	0.00204	0.0173
0.000050	10	0.000020	0.0000020	0.0000050	0.00020
BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Titanium (Ti)	Dissolved Tungsten (W)	Dissolved Uranium (U)	Dissolved Vanadium (V)	Dissolved Zinc (Zn)	Dissolved Zirconium (Zr)
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<0.00050	<0.000010	<0.0000020	0.00021	0.00021	<0.00010
0.00190	<0.000010	0.000258	0.00056	0.00093	0.00028
0.00159	<0.000010	0.000271	0.00057	0.00120	<0.00010
0.00169	0.000015	0.000243	0.00033	0.00480	<0.00010
0.00168	<0.000010	0.000495	0.00039	0.00520	<0.00010
0.00127	<0.000010	0.000433	0.00035	0.00074	<0.00010
0.00505	0.000023	0.000378	0.00033	0.00094	<0.00010
<0.050	0.0400	0.00020	<0.020	0.036	0.284
<0.050	0.0032	0.00030	<0.020	0.042	0.032
<0.050	0.0031	0.00025	<0.020	0.025	0.038
<0.050	0.0046	0.00042	<0.020	0.104	0.060
<0.050	0.0022	0.00113	<0.020	0.298	0.023
<0.050	0.0130	0.00099	<0.020	0.033	0.137
<0.050	0.0029	0.00040	<0.020	0.033	0.029
<0.050	0.0044	<0.00020	<0.020	0.066	0.021
<0.050	0.0062	0.00578	<0.020	0.062	0.028
<0.050	0.0188	0.00310	<0.020	0.045	0.145
<0.050	0.0093	0.00343	<0.020	0.074	0.057
<0.050	0.0042	0.0114	<0.020	0.224	0.037
<0.050	0.0059	0.00458	<0.020	0.058	0.043
<0.050	0.0046	0.00450	<0.020	0.046	0.038
0.00145	0.00140	0.0000023	<0.00020	0.00390	0.0154
<0.025	0.00228	0.00550	0.024	0.115	0.0709
<0.025	0.00128	0.00387	0.027	0.113	0.0691
<0.025	0.00198	0.00344	0.025	0.112	0.106
<0.025	0.00053	0.00229	<0.010	0.0491	0.0270
<0.025	0.00074	0.00381	0.028	0.0877	0.0514
<0.025	0.00210	0.00276	0.019	0.0862	0.0964
0.00059	0.000102	0.0000036	<0.00020	0.00123	0.00049
0.0714	0.00884	0.00127	0.00732	0.0133	0.300

0.247	0.00413	0.00229	0.0151	0.0270	0.0995
0.0970	0.00378	0.000927	0.00826	0.0418	0.0796
0.372	0.0122	0.0170	0.0190	0.335	0.206
0.240	0.00285	0.00305	0.0137	0.0288	0.0503
0.127	0.00587	0.00213	0.00980	0.0200	0.136
0.00050	0.000010	0.0000020	0.00020	0.00010	0.00010
BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Mercury (Hg)
mg/L
<0.000050
<0.000050
<0.000050
<0.000050
<0.000050
<0.000050
<0.000050
<0.000050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.0050
<0.000050
<0.0025
<0.0025
<0.0025
<0.0025
<0.0025
<0.0025
<0.000050
<0.00010

<0.000050
<0.000050
<0.00010
<0.000050
<0.000050
0.000050
BBY7SOP-00002



Table 2: Tessier So

Maxxam
Fraction 1: Water S
XE8534
XF9802
XF9803
XF9804
XF9805
XF9806
XF9807
Fraction 2: Exchar
XE8541
XF9809
XF9810
XF9811
XF9812
XF9813
XF9814
Fraction 3: Metals
XE8548
XF9816
XF9817
XF9818
XF9819
XF9820
XF9821
Fraction 4: Metals
XE8555
XF9823
XF9824
XF9825
XF9826
XF9827
XF9828
Fraction 5: Metals
XE8562
XF9830

XF9831
XF9832
XF9833
XF9834
XF9835
Detection Limits
BV Labs SOP #

Notes:

RDL raised due to cc

Client:

Sequential Extraction (Fractions 1-5) for project KUDZ ZE KAYAH

Sample ID
Units
Soluble Metals
BLANK - FRACTION 1
1A SOIL - FRACTION 1
1B SOIL - FRACTION 1
1C SOIL - FRACTION 1
4A SOIL - FRACTION 1
4B SOIL - FRACTION 1
4C SOIL - FRACTION 1
Exchangeable Metals and Calcite (1M MgCl)
BLANK - FRACTION 2
1A SOIL - FRACTION 2
1B SOIL - FRACTION 2
1C SOIL - FRACTION 2
4A SOIL - FRACTION 2
4B SOIL - FRACTION 2
4C SOIL - FRACTION 2
Bound to Carbonates (1M NaOAc)
BLANK - FRACTION 3
1A SOIL - FRACTION 3
1B SOIL - FRACTION 3
1C SOIL - FRACTION 3
4A SOIL - FRACTION 3
4B SOIL - FRACTION 3
4C SOIL - FRACTION 3
Bound to Fe and Mn Oxides (0.04M NH₂OH HCl)
BLANK - FRACTION 4
1A SOIL - FRACTION 4
1B SOIL - FRACTION 4
1C SOIL - FRACTION 4
4A SOIL - FRACTION 4
4B SOIL - FRACTION 4
4C SOIL - FRACTION 4
Bound to Organics and Sulfides (0.02M HNO₃ and 1.2M HN₄OAc)
BLANK - FRACTION 5
1A SOIL - FRACTION 5

1B SOIL - FRACTION 5
1C SOIL - FRACTION 5
4A SOIL - FRACTION 5
4B SOIL- FRACTION 5
4C SOIL - FRACTION 5

oncentration over linear range, sample dilution required.

Sample Weight	Final Volume	Dissolved Aluminum (Al)	Dissolved Antimony (Sb)	Dissolved Arsenic (As)	Dissolved Barium (Ba)
g	ml	mg/kg	mg/kg	mg/kg	mg/kg
0.00	25.00	0.20875	<0.0005	0.001600	<0.0005
1.00	25.00	1.2725	0.013600	0.05050	0.05475
1.00	25.00	1.7025	0.005100	0.017575	0.09225
1.00	25.00	0.9975	0.009150	0.012625	0.16725
1.00	25.00	1.8600	0.019550	0.014875	0.2550
1.00	25.00	1.0025	0.007625	0.008575	0.16950
1.00	25.00	0.7550	0.006950	0.009675	0.14925
0.00	25.00	2.050	<0.05	<0.05	<0.05
1.00	25.00	1.975	<0.05	<0.05	1.0050
1.00	25.00	2.275	<0.05	<0.05	0.8025
1.00	25.00	3.875	<0.05	<0.05	0.9750
1.00	25.00	2.700	<0.05	<0.05	2.1825
1.00	25.00	6.050	<0.05	<0.05	1.7975
1.00	25.00	2.300	<0.05	<0.05	1.4350
0.00	30.00	1.770	<0.06	<0.06	0.4020
1.00	30.00	3.570	<0.06	0.1440	1.6230
1.00	30.00	11.820	<0.06	0.0720	1.5360
1.00	30.00	7.110	<0.06	0.0960	1.3230
1.00	30.00	5.610	<0.06	0.1020	2.2980
1.00	30.00	4.710	<0.06	<0.06	1.6830
1.00	30.00	5.100	<0.06	0.0720	1.9050
0.00	30.00	0.10560	<0.0006	0.001560	0.002040
1.00	30.00	28.140	0.0510	0.3510	2.8350
1.00	30.00	33.90	<0.03	0.1680	3.600
1.00	30.00	36.00	0.0480	0.2910	3.450
1.00	30.00	10.980	<0.03	0.0420	0.7470
1.00	30.00	42.90	0.0330	0.1500	2.1390
1.00	30.00	38.70	0.0390	0.1320	1.9500
0.00	30.00	0.05490	<0.0006	0.000780	0.001710
1.00	30.00	44.40	0.03270	0.21150	0.6150

1.00	30.00	79.80	0.025650	0.26730	9.150
1.00	30.00	67.50	0.006930	0.16530	0.9030
1.00	30.00	98.10	0.05280	0.5430	2.1780
1.00	30.00	93.00	0.005160	0.11670	1.4130
1.00	30.00	77.70	0.006900	0.12240	1.1730
		0.015	0.0006	0.0006	0.0006
		BBY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Beryllium (Be)	Dissolved Bismuth (Bi)	Dissolved Boron (B)	Dissolved Cesium (Cs)	Dissolved Cadmium (Cd)	Dissolved Calcium (Ca)
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<0.00025	<0.000125	<1.25	<0.00125	<0.000125	<1.25
<0.00025	<0.000125	<1.25	<0.00125	0.0003500	64.25
<0.00025	<0.000125	<1.25	<0.00125	0.0003400	91.00
<0.00025	<0.000125	<1.25	<0.00125	0.0011250	138.00
<0.00025	<0.000125	<1.25	<0.00125	0.0012350	157.00
<0.00025	<0.000125	<1.25	<0.00125	0.0002075	131.25
<0.00025	<0.000125	<1.25	<0.00125	0.0001900	121.75
<0.025	0.01850	<125	<0.125	<0.0125	<125
<0.025	<0.0125	<125	<0.125	0.01625	547.5
<0.025	<0.0125	<125	<0.125	<0.0125	547.5
<0.025	<0.0125	<125	<0.125	0.03175	577.5
<0.025	<0.0125	<125	<0.125	0.05725	697.5
<0.025	<0.0125	<125	<0.125	<0.0125	595.0
<0.025	<0.0125	<125	<0.125	<0.0125	575.0
<0.03	<0.015	<150	<0.15	<0.015	<150
<0.03	<0.015	<150	<0.15	0.03600	15660
<0.03	<0.015	<150	<0.15	0.03900	16530
<0.03	<0.015	<150	<0.15	0.03870	16710
<0.03	<0.015	<150	<0.15	0.07380	19590
<0.03	<0.015	<150	<0.15	0.02700	14010
<0.03	<0.015	<150	<0.15	0.03060	14610
<0.0003	0.0001620	<1.5	<0.0015	<0.00015	<1.5
0.02700	<0.0075	<75	<0.075	0.03960	57900
0.03360	<0.0075	<75	<0.075	0.03330	61200
0.03810	<0.0075	<75	<0.075	0.03240	47400
<0.015	<0.0075	<75	<0.075	0.01890	8910
0.03180	<0.0075	<75	<0.075	0.01920	31500
0.02580	<0.0075	<75	<0.075	0.01590	32100
<0.0003	0.0006690	<1.5	<0.0015	<0.00015	<1.5
0.005520	0.001950	<3	<0.003	0.008520	1755.0

0.05730	0.0015060	<1.5	0.005070	0.006810	1428.0
0.007530	0.0018390	<1.5	0.004980	0.009060	333.0
0.018000	0.003180	<3	0.00540	0.03900	591.0
0.012210	0.0015870	<1.5	0.005220	0.004350	357.0
0.026070	0.0015870	<1.5	0.004920	0.012960	333.0
0.0003	0.00015	1.5	0.0015	0.00015	1.5
BBY7SOP-00002	BY7SOP-00003	BY7SOP-00003	BY7SOP-00003	BBY7SOP-00002	BBY7SOP-00002

Dissolved Chromium (Cr)	Dissolved Cobalt (Co)	Dissolved Copper (Cu)	Dissolved Lanthanum (La)	Dissolved Iron (Fe)	Dissolved Lead (Pb)
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<0.0025	<0.000125	0.001275	<0.00125	0.0450	0.0002225
<0.0025	0.004325	0.020375	<0.00125	1.9425	0.012625
0.00625	0.0017925	0.024250	<0.00125	2.1975	0.012700
0.00275	0.0021575	0.014125	<0.00125	1.2500	0.022175
0.00275	0.002675	0.03700	<0.00125	2.2450	0.03450
0.00275	0.003050	0.019350	<0.00125	2.1825	0.003175
0.00375	0.003375	0.024650	<0.00125	2.0700	0.004050
<0.25	<0.0125	0.2075	<0.125	8.00	0.02200
<0.25	0.07250	0.2125	<0.125	<2.5	0.14125
<0.25	0.03400	0.2050	<0.125	3.50	0.09850
<0.25	0.04600	0.2300	<0.125	6.00	0.3050
<0.25	0.06975	0.3750	<0.125	5.00	0.6600
<0.25	0.06475	0.3075	<0.125	22.75	0.07950
<0.25	0.05450	0.2025	<0.125	4.25	0.03450
<0.3	<0.015	<0.15	<0.15	<3	<0.015
<0.3	0.11280	0.2520	0.2490	36.30	0.24930
<0.3	0.07920	0.3120	0.2700	59.10	0.18330
1.290	0.10680	0.2970	0.3060	75.00	0.3090
<0.3	0.14370	0.5310	0.3150	75.90	0.8340
<0.3	0.08340	0.2730	0.2880	99.60	0.12150
<0.3	0.10680	0.3810	0.2760	93.00	0.16590
0.14580	0.0017430	0.04320	<0.0015	0.7470	0.0018300
0.5130	0.3450	0.3060	0.5520	801.0	0.4530
0.5490	0.3510	0.4950	0.6570	1479.0	0.5430
0.5040	0.3510	0.2700	0.6990	1125.0	0.6990
0.1710	0.08580	<0.075	0.1530	209.40	0.4050
0.4590	0.28680	0.6480	0.5670	849.0	0.4560
0.4560	0.23640	0.3540	0.4560	930.0	0.3690
0.03630	0.0023490	0.018570	<0.0015	0.2580	0.04980
0.13920	0.09270	0.7560	0.5880	825.0	0.15990

0.16620	0.11640	0.9720	1.7430	299.40	0.3870
0.16380	0.11970	1.5390	0.5310	218.40	0.18270
0.3240	0.17220	2.7450	1.5600	230.10	0.7320
0.20700	0.12720	1.0020	1.0470	165.00	0.14190
0.19980	0.11280	6.210	0.5820	143.10	0.14850
0.003	0.00015	0.0015	0.0015	0.03	0.00015
BBY7SOP-00002	BBY7SOP-00002	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Lithium (Li)	Dissolved Magnesium (Mg)	Dissolved Manganese (Mn)	Dissolved Phosphorus (P)	Dissolved Molybdenum (Mo)	Dissolved Nickel (Ni)
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<0.0125	<1.25	0.001300	0.2075	<0.00125	0.000850
<0.0125	7.875	0.5125	2.525	0.009450	0.020200
<0.0125	10.400	0.6575	0.6350	0.008675	0.009200
0.02825	31.00	1.0025	0.3300	0.21950	0.011225
0.01350	15.850	1.0000	0.3300	0.022675	0.016175
<0.0125	13.075	0.6675	0.3075	0.016075	0.013175
<0.0125	14.875	0.5850	0.4350	0.016025	0.014475
<1.25	330000	<0.125	10.00	<0.125	<0.05
<1.25	330000	14.125	<5	<0.125	0.1425
<1.25	330000	15.250	<5	<0.125	0.2400
<1.25	357500	20.025	<5	<0.125	0.2350
<1.25	337500	22.175	<5	<0.125	0.3025
<1.25	322500	16.725	<5	<0.125	0.3525
<1.25	322500	14.150	<5	<0.125	0.3125
<1.5	<150	<0.15	11.10	<0.15	0.0900
<1.5	1185.0	34.80	36.30	<0.15	0.1920
<1.5	1122.0	47.10	15.30	<0.15	0.2310
<1.5	2775.0	42.30	12.60	<0.15	0.3180
<1.5	1356.0	65.10	10.50	<0.15	0.3570
<1.5	843.0	36.90	11.70	<0.15	0.2760
<1.5	1209.0	45.90	13.50	<0.15	0.3120
<0.015	<1.5	0.015660	0.3870	0.013860	0.08430
<0.75	27150	105.30	162.30	<0.075	0.9300
<0.75	30300	225.00	38.10	<0.075	1.0890
<0.75	24540	182.10	23.10	<0.075	1.2390
<0.75	3960	34.80	6.00	<0.075	0.3720
<0.75	14880	49.80	22.20	<0.075	1.0410
<0.75	17520	50.10	20.40	<0.075	0.8850
<0.015	<1.5	0.008610	1.8570	0.004140	0.03300
0.0990	978.0	10.620	76.20	0.29700	0.3480

0.19680	238.50	33.60	543.0	0.07950	0.3330
0.15510	114.00	10.020	77.10	0.03690	0.3030
0.2100	147.00	51.60	160.20	0.17340	0.8820
0.19200	81.30	4.050	121.80	0.05850	0.25530
0.15630	83.70	4.170	105.60	0.05130	0.24660
0.015	1.5	0.0015	0.06	0.0015	0.0006
BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Potassium (K)	Dissolved Rubidium (Rb)	Dissolved Selenium (Se)	Dissolved Silicon (Si)	Dissolved Silver (Ag)	Dissolved Sodium (Na)
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<1.25	<0.00125	<0.001	<2.5	0.0002225	<1.25
11.550	0.006000	0.006975	6.00	<0.000125	7.675
10.250	0.012625	0.004675	5.50	<0.000125	9.900
11.650	0.010200	0.005350	3.75	<0.000125	16.025
15.350	0.010125	0.008325	6.25	<0.000125	17.100
12.875	0.008100	0.005100	4.75	<0.000125	14.775
16.750	0.011200	0.003575	3.50	<0.000125	21.225
<125	<0.125	<0.1	<250	0.03375	<125
<125	<0.125	<0.1	<250	<0.0125	<125
<125	<0.125	<0.1	<250	0.01350	<125
<125	<0.125	<0.1	<250	<0.0125	<125
<125	<0.125	<0.1	<250	0.01975	<125
<125	<0.125	<0.1	<250	0.01775	<125
<125	<0.125	<0.1	<250	<0.0125	<125
<150	<0.15	<0.12	<300	<0.015	309000
<150	<0.15	<0.12	<300	<0.015	306000
<150	<0.15	<0.12	<300	<0.015	315000
<150	<0.15	<0.12	<300	<0.015	315000
<150	<0.15	<0.12	<300	<0.015	303000
<150	<0.15	<0.12	<300	<0.015	309000
<150	<0.15	<0.12	<300	<0.015	303000
<1.5	<0.0015	<0.0012	<3	0.0006960	14.940
<75	0.1350	<0.06	<150	<0.0075	918.0
<75	0.1260	<0.06	<150	<0.0075	513.0
<75	0.1050	<0.06	<150	<0.0075	453.0
<75	<0.075	<0.06	<150	<0.0075	219.0
<75	0.1260	<0.06	<150	<0.0075	531.0
<75	0.1020	<0.06	<150	<0.0075	456.0
<1.5	<0.0015	<0.0012	<3	0.0002700	<1.5
9.00	0.05100	0.06600	63.30	0.018060	4.50

12.960	0.07470	0.022110	100.80	0.009000	22.230
12.810	0.06390	0.022410	96.00	0.009660	5.130
15.30	0.07110	0.03810	174.00	0.021330	9.60
17.400	0.08520	0.018810	135.00	0.005880	8.280
12.060	0.05670	0.024090	98.40	0.010230	7.830
1.5	0.0015	0.0012	3	0.00015	1.5
BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Strontium (Sr)	Dissolved Sulphur (S)	Dissolved Tellurium (Te)	Dissolved Thallium (Tl)	Dissolved Thorium (Th)	Dissolved Tin (Sn)
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<0.00125	<250	<0.0005	<0.00005	0.0001925	<0.005
0.19075	<250	<0.0005	0.0003550	0.0003450	<0.005
0.2850	<250	<0.0005	0.0002450	0.0001325	<0.005
0.4800	<250	<0.0005	0.0008250	0.0001600	<0.005
0.5350	<250	<0.0005	0.0008275	0.0003075	<0.005
0.4675	<250	<0.0005	0.0009725	0.0002350	<0.005
0.4600	<250	<0.0005	0.0007525	<0.000125	<0.005
<0.125	<25000	<0.05	<0.005	0.01275	<0.5
0.9325	<25000	<0.05	<0.005	<0.0125	<0.5
0.9550	<25000	<0.05	<0.005	<0.0125	<0.5
0.8750	<25000	<0.05	<0.005	<0.0125	<0.5
1.3200	<25000	<0.05	<0.005	<0.0125	<0.5
1.0700	<25000	<0.05	<0.005	<0.0125	<0.5
1.0800	<25000	<0.05	<0.005	<0.0125	<0.5
<0.15	<30000	<0.06	<0.006	0.02370	<0.6
10.680	<30000	<0.06	<0.006	0.02850	<0.6
12.540	<30000	<0.06	<0.006	0.04470	<0.6
10.500	<30000	<0.06	<0.006	0.03840	<0.6
19.530	<30000	<0.06	<0.006	0.03750	<0.6
10.080	<30000	<0.06	<0.006	0.04020	<0.6
9.270	<30000	<0.06	<0.006	0.04230	<0.6
0.001560	<300	<0.0006	<0.00006	0.0005250	<0.006
19.470	<15000	<0.03	0.00900	0.01650	<0.3
20.910	<15000	<0.03	0.00570	0.03690	<0.3
13.440	<15000	<0.03	0.00840	0.03180	<0.3
4.950	<15000	<0.03	<0.003	<0.0075	<0.3
8.190	<15000	<0.03	0.00480	0.02010	<0.3
10.740	<15000	<0.03	0.00450	0.02100	<0.3
0.002340	<300	<0.0006	0.0000960	0.0006030	1.4340
0.8010	1140	<0.0012	0.006210	0.13140	0.5340

11.760	<300	0.001710	0.0022440	0.09180	0.6390
0.4950	<300	0.000990	0.003270	0.05880	0.4980
1.4550	<600	0.002220	0.005460	0.09300	0.4830
1.3380	<300	<0.0006	0.0027030	0.06720	0.4890
1.2630	<300	0.000930	0.003120	0.06120	0.5190
0.0015	300	0.0006	0.00006	0.00015	0.006
BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Titanium (Ti)	Dissolved Tungsten (W)	Dissolved Uranium (U)	Dissolved Vanadium (V)	Dissolved Zinc (Zn)	Dissolved Zirconium (Zr)
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<0.0125	<0.00025	<0.00005	0.00525	0.00525	<0.0025
0.04750	<0.00025	0.006450	0.01400	0.02325	0.00700
0.03975	<0.00025	0.006775	0.01425	0.03000	<0.0025
0.04225	0.000375	0.006075	0.00825	0.12000	<0.0025
0.04200	<0.00025	0.012375	0.00975	0.13000	<0.0025
0.03175	<0.00025	0.010825	0.00875	0.01850	<0.0025
0.12625	0.000575	0.009450	0.00825	0.02350	<0.0025
<1.25	1.0000	0.00500	<0.5	0.900	7.100
<1.25	0.0800	0.00750	<0.5	1.050	0.800
<1.25	0.0775	0.00625	<0.5	0.625	0.950
<1.25	0.1150	0.01050	<0.5	2.600	1.500
<1.25	0.0550	0.02825	<0.5	7.450	0.575
<1.25	0.3250	0.02475	<0.5	0.825	3.425
<1.25	0.0725	0.01000	<0.5	0.825	0.725
<1.5	0.1320	<0.006	<0.6	1.980	0.630
<1.5	0.1860	0.17340	<0.6	1.860	0.840
<1.5	0.5640	0.09300	<0.6	1.350	4.350
<1.5	0.2790	0.10290	<0.6	2.220	1.710
<1.5	0.1260	0.3420	<0.6	6.720	1.110
<1.5	0.1770	0.13740	<0.6	1.740	1.290
<1.5	0.1380	0.13500	<0.6	1.380	1.140
0.04350	0.04200	0.0000690	<0.006	0.11700	0.4620
<0.75	0.06840	0.16500	0.720	3.450	2.1270
<0.75	0.03840	0.11610	0.810	3.390	2.0730
<0.75	0.05940	0.10320	0.750	3.360	3.180
<0.75	0.01590	0.06870	<0.3	1.4730	0.8100
<0.75	0.02220	0.11430	0.840	2.6310	1.5420
<0.75	0.06300	0.08280	0.570	2.5860	2.8920
0.01770	0.003060	0.0001080	<0.006	0.03690	0.01470
2.1420	0.26520	0.03810	0.21960	0.3990	9.000

7.410	0.12390	0.06870	0.4530	0.8100	2.9850
2.9100	0.11340	0.027810	0.24780	1.2540	2.3880
11.160	0.3660	0.5100	0.5700	10.050	6.180
7.200	0.08550	0.09150	0.4110	0.8640	1.5090
3.810	0.17610	0.06390	0.29400	0.6000	4.080
0.015	0.0003	0.00006	0.006	0.003	0.003
BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000

Dissolved Mercury (Hg)
mg/kg
<0.00125
<0.00125
<0.00125
<0.00125
<0.00125
<0.00125
<0.00125
<0.125
<0.125
<0.125
<0.125
<0.125
<0.125
<0.125
<0.15
<0.15
<0.15
<0.15
<0.15
<0.15
<0.15
<0.0015
<0.075
<0.075
<0.075
<0.075
<0.075
<0.075
<0.0015
<0.003

<0.0015
<0.0015
<0.003
<0.0015
<0.0015
0.0015
BBY7SOP-00002



Client:

BMC MINERAL (NO. 1) LTD.

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Table 3: Tessier Sequential Extraction (Fraction 6) Test Results for project KUDZ ZE KAY

Sample No	Sample ID	Mo	Cu	Pb
	Units	ppm	ppm	ppm
Fraction 6: Residual Metals (Silicates)				
XF9836	1A SOIL - FRACTION 6	1.02	4.8	11.2
XF9837	1B SOIL - FRACTION 6	0.44	5.5	11.8
XF9838	1C SOIL - FRACTION 6	0.51	4.0	11.8
XF9839	4A SOIL - FRACTION 6	1.08	4.5	9.70
XF9840	4B SOIL - FRACTION 6	0.30	6.3	9.77
XF9841	4C SOIL - FRACTION 6	0.24	4.5	15.4
QA/QC				
Blanks				
Method Blank				
Method Blank				
Method Blank		<0.05	0.2	<0.02
Reference Material				
OREAS45E % (9762067)				
True Values OREAS45E %				
Percent Difference (9762067)				
Reference Material				
OREAS45E PPB (9762120)				
True Values OREAS45E PPB				
Percent Difference (9762120)				
Reference Material				
OREAS45E PPM (9762262)		2.83	824.7	18.95
True Values OREAS45E PPM		2.4	780	18.2
Percent Difference (9762262)		17.9	5.7	4.1
Reference Material				
OREAS25A-4% (9762067)				
True Values OREAS25A-4%				
Percent Difference (9762067)				
Reference Material				
OREAS25A-4A PPM (9762262)		2.76	34.5	24.95
True Values OREAS25A-4A PPM		2.41	33.9	25.2
Percent Difference (9762262)		14.5	1.8	-1.0
Detection Limits		0.05	0.02	0.02

BV Labs SOP #	MA-250	MA-250	MA-250
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AH

Zn	Ag	Ni	Co	Mn	Fe	As
ppm	ppb	ppm	ppm	ppm	%	ppm
16.2	40	6.7	2.7	156	1.31	3.0
17.0	30	10.0	3.2	188	1.16	2.8
21.3	110	10.4	3.6	181	1.19	3.1
22.1	80	11.1	3.1	345	1.87	3.9
17.1	40	7.6	3.0	162	1.06	2.1
12.8	40	5.6	2.3	85	0.94	2.5

					<0.02	
	<20					
0.4		<0.1	<0.2	<2		<0.2

					25.9	
					24.12	
					7.4	

	291					
	311					
	-6.4					

48.2		499.8	65	593		18.1
46.7		454	57	570		16.3
3.2		10.1	14.0	4.0		11.0

					6.84	
					6.6	
					3.6	

45.9		51.4	8.5	503		10.3
44.4		45.8	7.7	480		9.94
3.4		12.2	10.4	4.8		3.6
0.2	0.02	0.1	0.2	2	0.02	0.2

U	Th	Sr	Cd	Sb	Bi	V
ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.8	3.1	196	<0.02	0.17	<0.04	18
0.9	2.1	252	<0.02	0.17	<0.04	20
0.8	2.3	256	<0.02	0.18	<0.04	16
1.0	2.3	171	<0.02	0.39	<0.04	17
0.6	2.3	234	<0.02	0.12	<0.04	20
1.0	2.7	198	<0.02	0.12	<0.04	16

<0.1	<0.1	<1	<0.02	<0.02	<0.04	<1

2.5	14.3	17		1.12	0.34	341
2.41	12.9	15.9		1	0.28	322
3.7	10.9	6.9		12.0	21.4	5.9

2.6	15	45		0.59	0.35	167
2.94	15.8	48.5		0.65	0.37	157
-11.6	-5.1	-7.2		-9.2	-5.4	6.4
0.1	0.1	1	0.02	0.02	0.04	1

Ca	P	La	Cr	Mg	Ba	Ti
%	%	ppm	ppm	%	ppm	%
0.67	0.014	10.8	14	0.20	477	0.074
0.82	0.024	8.8	24	0.30	547	0.080
0.78	0.015	8.4	33	0.30	658	0.062
0.63	0.014	7.9	17	0.21	542	0.074
0.87	0.010	7.5	14	0.26	504	0.076
0.68	0.015	8.4	11	0.19	650	0.073

<0.02	<0.001			<0.02		<0.001
		<0.1	<1		<1	

0.06	0.031			0.15		0.555
0.065	0.034			0.156		0.559
-7.7	-8.8			-3.8		-0.7

		11.3	1056		261	
		11	979		252	
		2.7	7.9		3.6	

0.27	0.048			0.3		0.941
0.301	0.048			0.327		0.93
-10.3	0.0			-8.3		1.2

		18	132		146	
		21.8	115		147	
		-17.4	14.8		-0.7	
0.02	0.001	0.1	1	0.02	1	0.001

Al	Na	K	W	Zr	Sn	Be
%	%	%	ppm	ppm	ppm	ppm
4.13	1.30	1.38	0.7	67.8	1.1	<1
4.76	1.58	1.66	0.5	80.3	1.2	1
4.53	1.39	1.73	0.6	83.4	1.1	<1
3.97	1.18	1.45	0.7	92.9	1.3	<1
4.33	1.55	1.40	0.3	53.2	0.9	1
5.05	1.55	2.74	0.5	79.7	1.0	<1

<0.02	0.002	<0.02				
			<0.1	<0.2	<0.1	<1

7.31	0.052	0.33				
6.78	0.059	0.324				
7.8	-11.9	1.9				

			1.1	96.3	1.2	
			1.07	97	1.32	
			2.8	-0.7	-9.1	

8.84	0.123	0.47				
8.87	0.131	0.482				
-0.3	-6.1	-2.5				

			2.1	152.9	3.7	
			2	155	4.06	
			5.0	-1.4	-8.9	
0.02	0.002	0.02	0.1	0.2	0.1	1

Sc	S	Y	Ce	Pr	Nd	Sm
ppm	%	ppm	ppm	ppm	ppm	ppm
3.0	<0.04	5.0	20.6	2.2	8.0	1.3
3.2	<0.04	5.7	23.5	1.9	7.7	1.3
3.5	<0.04	4.5	16.0	1.7	6.1	1.0
3.5	<0.04	5.8	14.7	1.6	6.5	1.2
3.5	<0.04	5.3	14.3	1.6	5.9	1.2
2.5	<0.04	3.7	15.3	1.6	6.5	1.0

	<0.04					
0.1		<0.1	<0.02	<0.1	<0.1	<0.1

	0.04					
	0.046					
	-13.0					

93.2		8.2	25.07	2.6	9.9	2.3
93		8.28	23.5	2.47	9.57	2.28
0.2		-1.0	6.7	5.3	3.4	0.9

	0.05					
	0.047					
	6.4					

11.5		9.4	41.35	4.6	17.3	3.2
13.7		10.5	47.3	5.11	18.2	3.55
-16.1		-10.5	-12.6	-10.0	-4.9	-9.9
0.1	0.04	0.1	0.02	0.1	0.1	0.1

Eu	Gd	Tb	Dy	Ho	Er	Tm
ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.5	0.9	<0.1	0.9	0.2	0.5	<0.1
0.5	1.0	<0.1	1.0	0.2	0.6	<0.1
0.4	0.9	<0.1	0.8	0.2	0.5	<0.1
0.4	1.0	<0.1	1.0	0.2	0.7	0.1
0.5	1.2	<0.1	0.9	0.2	0.7	<0.1
0.6	0.9	<0.1	0.7	0.1	0.4	<0.1

<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

0.6	1.8	0.2	2	0.4	1.2	0.2
0.52	1.99	0.33	2.05	0.38	1.2	0.17
15.4	-9.5	-39.4	-2.4	5.3	0.0	17.6

0.6	2.3	0.3	2.1	0.4	1.2	0.2
0.69	2.68	0.36	2.25	0.43	1.23	0.19
-13.0	-14.2	-16.7	-6.7	-7.0	-2.4	5.3
0.1	0.1	0.1	0.1	0.1	0.1	0.1

Yb	Lu	Hf	Li	Rb	Ta	Nb
ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.6	<0.1	0.93	8.4	38.1	0.4	2.46
0.5	<0.1	1.51	11.6	40.4	0.2	2.32
0.5	<0.1	1.16	8.9	46.2	0.1	1.49
0.8	<0.1	0.87	9.4	37.8	0.1	1.75
0.7	<0.1	0.93	8.4	37.5	0.2	2.06
0.5	<0.1	1.05	10.3	83.0	0.1	2.10

<0.1	<0.1	<0.02	0.2	<0.1	<0.1	<0.04

1.4	0.2	2.74	6.6	21.8	0.5	6.42
1.19	0.175	3.11	6.58	21.2	0.54	6.8
17.6	14.3	-11.9	0.3	2.8	-7.4	-5.6

1.3	0.2	4.08	35.9	52	1.3	20.19
1.3	0.2	4.14	36.7	61	1.4	20.9
0.0	0.0	-1.4	-2.2	-14.8	-7.1	-3.4
0.1	0.1	0.02	0.1	0.1	0.1	0.04

Cs	Ga
ppm	ppm
0.6	8.49
0.5	9.63
0.6	8.82
0.6	7.64
0.6	8.87
0.7	10.6

<0.1	0.05

1.2	17.63
1.26	16.5
-4.8	6.8

4.9	25.78
6	25.9
-18.3	-0.5
0.1	0.02

MA-250	MA-250
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Client:

BMC MINERAL (NO. 1) LTD.

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Table 4: Tessier Sequential Extraction (Fraction 6) Test Results for project KUDZ ZE KAYA

Sample No	Sample ID	Mo	Cu	Pb
	Units	mg/kg	mg/kg	mg/kg
Fraction 6: Residual Metals (Silicates)				
XF9836	1A SOIL - FRACTION 6	1.02	4.8	11.2
XF9837	1B SOIL - FRACTION 6	0.44	5.5	11.8
XF9838	1C SOIL - FRACTION 6	0.51	4.0	11.8
XF9839	4A SOIL - FRACTION 6	1.08	4.5	9.70
XF9840	4B SOIL - FRACTION 6	0.30	6.3	9.77
XF9841	4C SOIL - FRACTION 6	0.24	4.5	15.4
QA/QC				
Blanks				
Method Blank				
Method Blank				
Method Blank		<0.05	0.2	<0.02
Reference Material				
OREAS45E % (9762067)				
True Values OREAS45E %				
Percent Difference (9762067)				
Reference Material				
OREAS45E PPB (9762120)				
True Values OREAS45E PPB				
Percent Difference (9762120)				
Reference Material				
OREAS45E PPM (9762262)		2.83	824.7	18.95
True Values OREAS45E PPM		2.4	780	18.2
Percent Difference (9762262)		17.9	5.7	4.1
Reference Material				
OREAS25A-4% (9762067)				
True Values OREAS25A-4%				
Percent Difference (9762067)				
Reference Material				
OREAS25A-4A PPM (9762262)		2.76	34.5	24.95
True Values OREAS25A-4A PPM		2.41	33.9	25.2
Percent Difference (9762262)		14.5	1.8	-1.0
Detection Limits		0.05	0.02	0.02

BV Labs SOP #	MA-250	MA-250	MA-250
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Zn	Ag	Ni	Co	Mn	Fe	As
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
16.2	0.04	6.7	2.7	156	13100	3.0
17.0	0.03	10.0	3.2	188	11600	2.8
21.3	0.11	10.4	3.6	181	11900	3.1
22.1	0.08	11.1	3.1	345	18700	3.9
17.1	0.04	7.6	3.0	162	10600	2.1
12.8	0.04	5.6	2.3	85	9400	2.5

					<200	
	<0.02					
0.4		<0.1	<0.2	<2		<0.2

					259000	
					241200	
					7.4	

	0.291					
	0.311					
	-6.4					

48.2		499.8	65	593		18.1
46.7		454	57	570		16.3
3.2		10.1	14.0	4.0		11.0

					68400	
					66000	
					3.6	

45.9		51.4	8.5	503		10.3
44.4		45.8	7.7	480		9.94
3.4		12.2	10.4	4.8		3.6
0.2	0.02	0.1	0.2	2	200	0.2

U	Th	Sr	Cd	Sb	Bi	V
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.8	3.1	196	<0.02	0.17	<0.04	18
0.9	2.1	252	<0.02	0.17	<0.04	20
0.8	2.3	256	<0.02	0.18	<0.04	16
1.0	2.3	171	<0.02	0.39	<0.04	17
0.6	2.3	234	<0.02	0.12	<0.04	20
1.0	2.7	198	<0.02	0.12	<0.04	16

<0.1	<0.1	<1	<0.02	<0.02	<0.04	<1

2.5	14.3	17		1.12	0.34	341
2.41	12.9	15.9		1	0.28	322
3.7	10.9	6.9		12.0	21.4	5.9

2.6	15	45		0.59	0.35	167
2.94	15.8	48.5		0.65	0.37	157
-11.6	-5.1	-7.2		-9.2	-5.4	6.4
0.1	0.1	1	0.02	0.02	0.04	1

Ca	P	La	Cr	Mg	Ba	Ti
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
6700	140	10.8	14	2000	477	740
8200	240	8.8	24	3000	547	800
7800	150	8.4	33	3000	658	620
6300	140	7.9	17	2100	542	740
8700	100	7.5	14	2600	504	760
6800	150	8.4	11	1900	650	730

<200	<10			<200		<10
		<0.1	<1		<1	

600	310			1500		5550
650	340			1560		5590
-7.7	-8.8			-3.8		-0.7

		11.3	1056		261	
		11	979		252	
		2.7	7.9		3.6	

2700	480			3000		9410
3010	480			3270		9300
-10.3	0.0			-8.3		1.2

		18	132		146	
		21.8	115		147	
		-17.4	14.8		-0.7	
200	10	0.1	1	200	1	10

Al	Na	K	W	Zr	Sn	Be
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
41300	13000	13800	0.7	67.8	1.1	<1
47600	15800	16600	0.5	80.3	1.2	1
45300	13900	17300	0.6	83.4	1.1	<1
39700	11800	14500	0.7	92.9	1.3	<1
43300	15500	14000	0.3	53.2	0.9	1
50500	15500	27400	0.5	79.7	1.0	<1

<200	20	<200				
			<0.1	<0.2	<0.1	<1

73100	520	3300				
67800	590	3240				
7.8	-11.9	1.9				

			1.1	96.3	1.2	
			1.07	97	1.32	
			2.8	-0.7	-9.1	

88400	1230	4700				
88700	1310	4820				
-0.3	-6.1	-2.5				

			2.1	152.9	3.7	
			2	155	4.06	
			5.0	-1.4	-8.9	
200	20	200	0.1	0.2	0.1	1

Sc	S	Y	Ce	Pr	Nd	Sm
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
3.0	<400	5.0	20.6	2.2	8.0	1.3
3.2	<400	5.7	23.5	1.9	7.7	1.3
3.5	<400	4.5	16.0	1.7	6.1	1.0
3.5	<400	5.8	14.7	1.6	6.5	1.2
3.5	<400	5.3	14.3	1.6	5.9	1.2
2.5	<400	3.7	15.3	1.6	6.5	1.0

	<400					
0.1		<0.1	<0.02	<0.1	<0.1	<0.1

	400					
	460					
	-13.0					

93.2		8.2	25.07	2.6	9.9	2.3
93		8.28	23.5	2.47	9.57	2.28
0.2		-1.0	6.7	5.3	3.4	0.9

	500					
	470					
	6.4					

11.5		9.4	41.35	4.6	17.3	3.2
13.7		10.5	47.3	5.11	18.2	3.55
-16.1		-10.5	-12.6	-10.0	-4.9	-9.9
0.1	400	0.1	0.02	0.1	0.1	0.1

Eu	Gd	Tb	Dy	Ho	Er	Tm
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.5	0.9	<0.1	0.9	0.2	0.5	<0.1
0.5	1.0	<0.1	1.0	0.2	0.6	<0.1
0.4	0.9	<0.1	0.8	0.2	0.5	<0.1
0.4	1.0	<0.1	1.0	0.2	0.7	0.1
0.5	1.2	<0.1	0.9	0.2	0.7	<0.1
0.6	0.9	<0.1	0.7	0.1	0.4	<0.1

<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

0.6	1.8	0.2	2	0.4	1.2	0.2
0.52	1.99	0.33	2.05	0.38	1.2	0.17
15.4	-9.5	-39.4	-2.4	5.3	0.0	17.6

0.6	2.3	0.3	2.1	0.4	1.2	0.2
0.69	2.68	0.36	2.25	0.43	1.23	0.19
-13.0	-14.2	-16.7	-6.7	-7.0	-2.4	5.3
0.1	0.1	0.1	0.1	0.1	0.1	0.1

Yb	Lu	Hf	Li	Rb	Ta	Nb
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.6	<0.1	0.93	8.4	38.1	0.4	2.46
0.5	<0.1	1.51	11.6	40.4	0.2	2.32
0.5	<0.1	1.16	8.9	46.2	0.1	1.49
0.8	<0.1	0.87	9.4	37.8	0.1	1.75
0.7	<0.1	0.93	8.4	37.5	0.2	2.06
0.5	<0.1	1.05	10.3	83.0	0.1	2.10

<0.1	<0.1	<0.02	0.2	<0.1	<0.1	<0.04

1.4	0.2	2.74	6.6	21.8	0.5	6.42
1.19	0.175	3.11	6.58	21.2	0.54	6.8
17.6	14.3	-11.9	0.3	2.8	-7.4	-5.6

1.3	0.2	4.08	35.9	52	1.3	20.19
1.3	0.2	4.14	36.7	61	1.4	20.9
0.0	0.0	-1.4	-2.2	-14.8	-7.1	-3.4
0.1	0.1	0.02	0.1	0.1	0.1	0.04

Cs	Ga
mg/kg	mg/kg
0.6	8.49
0.5	9.63
0.6	8.82
0.6	7.64
0.6	8.87
0.7	10.6

<0.1	0.05

1.2	17.63
1.26	16.5
-4.8	6.8

4.9	25.78
6	25.9
-18.3	-0.5
0.1	0.02

MA-250	MA-250
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Table 5: Sample Summary for project KUD

Date Samples Rec'd by Bureau Veritas:

Sample Prep Conducted by Bureau Veritas:

Date of Analysis:

Date Reported:

Client:

Client Project Name:

Client Project No:

ARD Project #:

Maxxam Job No:

Contact Person:

E-mail Address:

Data Validated by:

Position:

Sample Storage

Sample rejects (and selected test residues wh
Standard archive protocol is archiving for sam
If archiving is required past 3 months a fee will

Z ZE KAYAH

BMC MINERAL (NO. 1) LTD., KUDZ ZE KAYAH

Page 5 of 5

6 sample were rec'd on 16-Jan-20

YES

January 2020

BMC MINERAL (NO. 1) LTD.

KUDZ ZE KAYAH

BMC-18-02

N/A

C003223

Rachel Martz; Renate Vanderhorst

rmartz@alexcoenv.com; rvanderhorst@alexcoenv.com

Tim O'Hearn

Senior Scientific Specialist

iere applicable) have been archived
ples for 3 months after testing is complete.
be required.



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/01/22
 Report #: R2836093
 Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Sample Matrix: Soil
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride (soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00011	SM 23 4500-Cl- E m
Conductivity (Soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00029	SM 23 2510 B m
Elements by ICPMS (total) (1)	6	2020/01/15	2020/01/15	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Moisture	6	N/A	2020/01/18	AB SOP-00002	CCME PHC-CWS m
Nitrite and Nitrate Available (10:1) Wet	5	2020/01/18	2020/01/20	AB SOP-00027 / AB SOP- 00023	SM 23 4110 B m
Nitrite and Nitrate Available (10:1) Wet	1	2020/01/20	2020/01/20	AB SOP-00027 / AB SOP- 00023	SM 23 4110 B m
Ammonia-N (Available)	5	2020/01/18	2020/01/20	AB SOP-00027 / AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N (Available)	1	2020/01/20	2020/01/20	AB SOP-00027 / AB SOP-00007	SM 23 4500 NH3 A G m
NO2 + NO3 Available (10:1 Wet)	6	2020/01/14	2020/01/20		Auto Calc
pH (2:1 DI Water Extract) (1)	6	2020/01/15	2020/01/15	BBY6SOP-00028	BCMOE BCLM Mar2005 m
pH (Soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00025	SM 23 4500-H+ B
Phosphorus, Potassium - Available	6	2020/01/20	2020/01/20	AB SOP-00028 / AB SOP- 00042	EPA 6010d R5 m
Sodium Adsorption Ratio SP (1)	6	N/A	2020/01/16	BBY WI-00033	Auto Calc
Saturated Paste (1)	6	2020/01/16	2020/01/16	BBY6SOP-00030	BC Lab Manual 2015
Sulphur (Available)	6	2020/01/20	2020/01/20	AB SOP-00029 / AB SOP- 00042	EPA 6010d R5 m
Soluble Ions Calculation (mg/kg) (1)	6	N/A	2020/01/17	BBY WI-00033	Auto Calc
Sulphate (soluble) (soil) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00017	SM 23 4500-SO42- E m
Soluble Cations (Ca,K,Mg,Na,S) (1)	6	N/A	2020/01/16	BBY7SOP-00018 / BBY7SOP-00030 / BCLM Nov 2015	EPA 6010d m

Sample Matrix: Tissue (Plant)
 # Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Moisture in Tissue (1)	12	2020/01/17	2020/01/20	BBY8SOP-00017	BCMOE BCLM Dec2000 m



BV Labs - Partial / Rush Results

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/22
Report #: R2836093
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Safiann Maiter, Key Account Specialist

Email: Safiann.Maiter@bvlabs.com

Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



BUREAU
VERITAS

BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF SOIL

BV Labs ID		XF6390	XF6391		XF6392		XF6393		XF6394		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50		2020/01/13 12:45		2020/01/13 12:40		2020/01/13 12:35		
COC Number		08476858	08476858		08476858		08476858		08476858		
	UNITS	1A SOIL	1B SOIL	RDL	1C SOIL	RDL	4A SOIL	RDL	4B SOIL	RDL	QC Batch

ANIONS

Soluble Sulphate (SO4)	mg/L	247	255	20	244	20	443	20	568	20	9736318
Soluble Chloride (Cl)	mg/L	47	46	10	57	10	78	10	122	10	9736317

Calculated Parameters

Soluble Chloride (Cl)	mg/kg	13.9	13.8	3.0	17.4	3.1	23.7	3.0	36.7	3.0	9734055
Soluble Sodium (Na)	mg/kg	7.5	8.2	1.5	7.2	1.5	11.6	1.5	13.8	1.5	9734055
Soluble Calcium (Ca)	mg/kg	31.7	35.2	1.5	39.4	1.5	54.9	1.5	70.8	1.5	9734055
Soluble Magnesium (Mg)	mg/kg	4.5	5.3	1.5	5.8	1.5	7.2	1.5	9.1	1.5	9734055
Soluble Potassium (K)	mg/kg	<6.0	<6.0	6.0	<6.2	6.2	6.3	6.1	8.9	6.0	9734055
Soluble Sulphur (S)	mg/kg	26.4	27.1	9.0	31.4	9.2	50.1	9.1	68.2	9.0	9734055
Soluble Sulphate (SO4)	mg/kg	73.8	76.9	6.0	75.1	6.2	135	6.1	171	6.0	9734055
Sodium Adsorption Ratio	N/A	0.61	0.62	0.10	0.51	0.10	0.71	0.10	0.75	0.10	9734054

Nutrients

Available (KCl) Ammonia (N)	mg/kg	<2.0	<2.0	2.0	<2.0	2.0	5.5	2.0	<2.0	2.0	9737984
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	<2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	9734074
Available (Mod Kel) Phosphorus (P)	mg/kg	<4.0	<4.0	4.0	<4.0	4.0	<4.0	4.0	<4.0	4.0	9738275
Available (Mod Kel) Potassium (K)	mg/kg	11	11	4.0	12	4.0	20	4.0	23	4.0	9738275
Available (CaCl2) Sulphur (S)	mg/kg	23	31	2.0	33	2.0	55	2.0	51	2.0	9737980
Available (KCl) Nitrite (N)	mg/kg	<2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	9737989
Available (KCl) Nitrate (N)	mg/kg	<2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	9737989

Physical Properties

Soluble (2:1) pH	pH	7.90	8.16	N/A	8.36	N/A	8.07	N/A	8.20	N/A	9734625
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Soluble Parameters

Soluble Conductivity	uS/cm	733	732	5.0	743	5.0	1140	5.0	1470	5.0	9736297
Soluble pH	pH	7.88	8.14	N/A	8.04	N/A	7.85	N/A	7.88	N/A	9735441
Soluble Calcium (Ca)	mg/L	106	117	5.0	128	5.0	181	5.0	235	5.0	9736148
Saturation %	%	29.9	30.1	N/A	30.8	N/A	30.4	N/A	30.2	N/A	9735409
Soluble Magnesium (Mg)	mg/L	15.0	17.4	5.0	18.9	5.0	23.8	5.0	30.0	5.0	9736148
Soluble Potassium (K)	mg/L	<20	<20	20	<20	20	21	20	29	20	9736148
Soluble Sodium (Na)	mg/L	25.1	27.3	5.0	23.3	5.0	38.1	5.0	45.6	5.0	9736148
Soluble Sulphur (S)	mg/L	88	90	30	102	30	165	30	226	30	9736148

RDL = Reportable Detection Limit

N/A = Not Applicable



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BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF SOIL

BV Labs ID		XF6395		
Sampling Date		2020/01/13 12:30		
COC Number		08476858		
	UNITS	4C SOIL	RDL	QC Batch
ANIONS				
Soluble Sulphate (SO ₄)	mg/L	525	20	9736318
Soluble Chloride (Cl)	mg/L	89	10	9736317
Calculated Parameters				
Soluble Chloride (Cl)	mg/kg	26.8	3.0	9734055
Soluble Sodium (Na)	mg/kg	13.4	1.5	9734055
Soluble Calcium (Ca)	mg/kg	64.0	1.5	9734055
Soluble Magnesium (Mg)	mg/kg	9.0	1.5	9734055
Soluble Potassium (K)	mg/kg	<6.1	6.1	9734055
Soluble Sulphur (S)	mg/kg	59.2	9.1	9734055
Soluble Sulphate (SO ₄)	mg/kg	159	6.1	9734055
Sodium Adsorption Ratio	N/A	0.75	0.10	9734054
Nutrients				
Available (KCl) Ammonia (N)	mg/kg	<2.0	2.0	9737984
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	<2.0	2.0	9734074
Available (Mod Kel) Phosphorus (P)	mg/kg	<4.0	4.0	9738275
Available (Mod Kel) Potassium (K)	mg/kg	16	4.0	9738275
Available (CaCl ₂) Sulphur (S)	mg/kg	54	2.0	9737980
Available (KCl) Nitrite (N)	mg/kg	<2.0	2.0	9737989
Available (KCl) Nitrate (N)	mg/kg	<2.0	2.0	9737989
Physical Properties				
Soluble (2:1) pH	pH	8.28	N/A	9734625
Soluble Parameters				
Soluble Conductivity	uS/cm	1290	5.0	9736297
Soluble pH	pH	7.91	N/A	9735441
Soluble Calcium (Ca)	mg/L	211	5.0	9736148
Saturation %	%	30.3	N/A	9735409
Soluble Magnesium (Mg)	mg/L	29.6	5.0	9736148
Soluble Potassium (K)	mg/L	<20	20	9736148
Soluble Sodium (Na)	mg/L	44.2	5.0	9736148
Soluble Sulphur (S)	mg/L	195	30	9736148
RDL = Reportable Detection Limit N/A = Not Applicable				



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BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

PHYSICAL TESTING (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Physical Properties									
Moisture	%	17	19	20	21	19	20	0.30	9737552
RDL = Reportable Detection Limit									



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BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch

Total Metals by ICPMS

Total Aluminum (Al)	mg/kg	1360	1590	1380	1420	1420	1280	100	9734894
Total Antimony (Sb)	mg/kg	0.34	0.14	0.23	0.42	0.27	0.18	0.10	9734894
Total Arsenic (As)	mg/kg	3.33	2.39	2.79	2.85	2.30	1.92 (1)	0.20	9734894
Total Barium (Ba)	mg/kg	18.5	14.5	18.1	15.0	25.0	30.6 (1)	0.10	9734894
Total Beryllium (Be)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	9734894
Total Bismuth (Bi)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9734894
Total Cadmium (Cd)	mg/kg	0.147	0.089	0.087	0.103	0.075	0.110	0.050	9734894
Total Calcium (Ca)	mg/kg	41700	57100	41400	41800	46400	48000	100	9734894
Total Chromium (Cr)	mg/kg	4.35	4.24	6.42	5.70	4.62	5.16	0.50	9734894
Total Cobalt (Co)	mg/kg	2.07	1.87	1.91	2.19	1.61	1.42 (1)	0.10	9734894
Total Copper (Cu)	mg/kg	4.20	2.45	3.09	3.81	3.14	2.75	0.50	9734894
Total Iron (Fe)	mg/kg	7530	6780	6890	6580	5610	5090 (1)	100	9734894
Total Lead (Pb)	mg/kg	2.98	1.62	1.43	1.75	1.16	1.18	0.10	9734894
Total Lithium (Li)	mg/kg	1.98	3.15	2.48	2.48	2.93	2.39	0.50	9734894
Total Magnesium (Mg)	mg/kg	11500	19700	11200	15400	15600	16400	100	9734894
Total Manganese (Mn)	mg/kg	225	379	212	173	198	201	0.20	9734894
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9734894
Total Molybdenum (Mo)	mg/kg	0.44	0.45	0.43	0.40	0.38	0.32 (1)	0.10	9734894
Total Nickel (Ni)	mg/kg	5.55	5.17	5.96	6.69	5.02	4.42 (1)	0.50	9734894
Total Phosphorus (P)	mg/kg	266	168	248	167	251	195 (1)	10	9734894
Total Potassium (K)	mg/kg	286	338	327	360	333	258	100	9734894
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9734894
Total Silver (Ag)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9734894
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	<100	<100	100	9734894
Total Strontium (Sr)	mg/kg	25.9	31.4	26.2	21.6	25.8	26.3	0.10	9734894
Total Thallium (Tl)	mg/kg	<0.050	0.071	<0.050	0.057	<0.050	<0.050	0.050	9734894
Total Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9734894
Total Titanium (Ti)	mg/kg	109	111	145	101	111	101	1.0	9734894
Total Uranium (U)	mg/kg	0.687	0.483	0.673	0.802	0.713	0.529	0.050	9734894
Total Vanadium (V)	mg/kg	7.9	7.2	8.5	7.2	6.9	7.7	1.0	9734894
Total Zinc (Zn)	mg/kg	15.7	11.1	14.5	14.6	11.3	11.1	1.0	9734894

RDL = Reportable Detection Limit

(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Reanalysis yields similar results.



ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Total Zirconium (Zr)	mg/kg	1.73	1.63	2.11	1.64	1.57	1.66	0.50	9734894
RDL = Reportable Detection Limit									



PHYSICAL TESTING (TISSUE (PLANT))

BV Labs ID		XF6396	XF6397	XF6398	XF6399	XF6401	XF6402	XF6403		
Sampling Date		2020/01/13 11:55	2020/01/13 11:50	2020/01/13 11:45	2020/01/13 11:40	2020/01/13 11:35	2020/01/13 11:30	2020/01/13 11:10		
COC Number		08476858	08476858	08476858	08476858	08476859	08476859	08476859		
	UNITS	1A BIOMASS	1B BIOMASS	1C BIOMASS	4A BIOMASS	4B BIOMASS	4C BIOMASS	1A BULRUSH	RDL	QC Batch
Physical Properties										
Moisture	%	83	86	76	91	93	91	57	0.30	9737121
RDL = Reportable Detection Limit										

BV Labs ID		XF6404	XF6405	XF6406	XF6407	XF6408		
Sampling Date		2020/01/13 11:05	2020/01/13 11:00	2020/01/13 11:25	2020/01/13 11:20	2020/01/13 11:15		
COC Number		08476859	08476859	08476859	08476859	08476859		
	UNITS	1B BULRUSH	1C BULRUSH	4A CAREX	4B CAREX	4C CAREX	RDL	QC Batch
Physical Properties								
Moisture	%	43	62	56	48	47	0.30	9737121
RDL = Reportable Detection Limit								



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BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Results relate only to the items tested.

BV Labs - Partial/Rush Results



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BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	9734625	LO1	Spiked Blank	Soluble (2:1) pH	2020/01/15		100	%	N/A
	9734625	LO1	RPD [XF6393-01]	Soluble (2:1) pH	2020/01/15	0.12		%	20
	9734894	JLP	Matrix Spike [XF6395-01]	Total Aluminum (Al)	2020/01/15		164 (1)	%	75 - 125
				Total Antimony (Sb)	2020/01/15		99	%	75 - 125
				Total Arsenic (As)	2020/01/15		98	%	75 - 125
				Total Barium (Ba)	2020/01/15		95	%	75 - 125
				Total Beryllium (Be)	2020/01/15		96	%	75 - 125
				Total Bismuth (Bi)	2020/01/15		86	%	75 - 125
				Total Cadmium (Cd)	2020/01/15		94	%	75 - 125
				Total Calcium (Ca)	2020/01/15		NC	%	75 - 125
				Total Chromium (Cr)	2020/01/15		92	%	75 - 125
				Total Cobalt (Co)	2020/01/15		91	%	75 - 125
				Total Copper (Cu)	2020/01/15		92	%	75 - 125
				Total Iron (Fe)	2020/01/15		NC	%	75 - 125
				Total Lead (Pb)	2020/01/15		92	%	75 - 125
				Total Lithium (Li)	2020/01/15		93	%	75 - 125
				Total Magnesium (Mg)	2020/01/15		NC	%	75 - 125
				Total Manganese (Mn)	2020/01/15		80	%	75 - 125
				Total Mercury (Hg)	2020/01/15		95	%	75 - 125
				Total Molybdenum (Mo)	2020/01/15		94	%	75 - 125
				Total Nickel (Ni)	2020/01/15		89	%	75 - 125
				Total Phosphorus (P)	2020/01/15		101	%	75 - 125
				Total Potassium (K)	2020/01/15		115	%	75 - 125
				Total Selenium (Se)	2020/01/15		98	%	75 - 125
				Total Silver (Ag)	2020/01/15		91	%	75 - 125
				Total Sodium (Na)	2020/01/15		111	%	75 - 125
				Total Strontium (Sr)	2020/01/15		101	%	75 - 125
				Total Thallium (Tl)	2020/01/15		90	%	75 - 125
				Total Tin (Sn)	2020/01/15		97	%	75 - 125
				Total Titanium (Ti)	2020/01/15		103	%	75 - 125
				Total Uranium (U)	2020/01/15		91	%	75 - 125
				Total Vanadium (V)	2020/01/15		94	%	75 - 125
				Total Zinc (Zn)	2020/01/15		89	%	75 - 125
				Total Zirconium (Zr)	2020/01/15		107	%	75 - 125
	9734894	JLP	QC Standard	Total Aluminum (Al)	2020/01/15		103	%	70 - 130
				Total Antimony (Sb)	2020/01/15		110	%	70 - 130
				Total Arsenic (As)	2020/01/15		95	%	70 - 130
				Total Barium (Ba)	2020/01/15		104	%	70 - 130
				Total Beryllium (Be)	2020/01/15		103	%	70 - 130
				Total Cadmium (Cd)	2020/01/15		102	%	70 - 130
				Total Calcium (Ca)	2020/01/15		101	%	70 - 130
				Total Chromium (Cr)	2020/01/15		103	%	70 - 130
				Total Cobalt (Co)	2020/01/15		97	%	70 - 130
				Total Copper (Cu)	2020/01/15		114	%	70 - 130
				Total Iron (Fe)	2020/01/15		101	%	70 - 130
				Total Lead (Pb)	2020/01/15		108	%	70 - 130
				Total Lithium (Li)	2020/01/15		101	%	70 - 130
				Total Magnesium (Mg)	2020/01/15		105	%	70 - 130
				Total Manganese (Mn)	2020/01/15		105	%	70 - 130
				Total Mercury (Hg)	2020/01/15		101	%	70 - 130
				Total Molybdenum (Mo)	2020/01/15		102	%	70 - 130
				Total Nickel (Ni)	2020/01/15		104	%	70 - 130
				Total Phosphorus (P)	2020/01/15		98	%	70 - 130
				Total Potassium (K)	2020/01/15		91	%	70 - 130

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VERITASBV Labs Job #: C002517
Report Date: 2020/01/22ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9734894	JLP	Spiked Blank	Total Silver (Ag)	2020/01/15		83	%	70 - 130	
			Total Sodium (Na)	2020/01/15		93	%	70 - 130	
			Total Strontium (Sr)	2020/01/15		107	%	70 - 130	
			Total Thallium (Tl)	2020/01/15		94	%	70 - 130	
			Total Tin (Sn)	2020/01/15		100	%	70 - 130	
			Total Uranium (U)	2020/01/15		95	%	70 - 130	
			Total Vanadium (V)	2020/01/15		104	%	70 - 130	
			Total Zinc (Zn)	2020/01/15		101	%	70 - 130	
			Total Aluminum (Al)	2020/01/15		104	%	75 - 125	
			Total Antimony (Sb)	2020/01/15		102	%	75 - 125	
			Total Arsenic (As)	2020/01/15		102	%	75 - 125	
			Total Barium (Ba)	2020/01/15		99	%	75 - 125	
			Total Beryllium (Be)	2020/01/15		98	%	75 - 125	
			Total Bismuth (Bi)	2020/01/15		92	%	75 - 125	
			Total Cadmium (Cd)	2020/01/15		99	%	75 - 125	
			Total Calcium (Ca)	2020/01/15		101	%	75 - 125	
			Total Chromium (Cr)	2020/01/15		99	%	75 - 125	
			Total Cobalt (Co)	2020/01/15		99	%	75 - 125	
			Total Copper (Cu)	2020/01/15		102	%	75 - 125	
			Total Iron (Fe)	2020/01/15		100	%	75 - 125	
			Total Lead (Pb)	2020/01/15		99	%	75 - 125	
			Total Lithium (Li)	2020/01/15		94	%	75 - 125	
			Total Magnesium (Mg)	2020/01/15		97	%	75 - 125	
			Total Manganese (Mn)	2020/01/15		100	%	75 - 125	
			Total Mercury (Hg)	2020/01/15		102	%	75 - 125	
			Total Molybdenum (Mo)	2020/01/15		96	%	75 - 125	
			Total Nickel (Ni)	2020/01/15		98	%	75 - 125	
			Total Phosphorus (P)	2020/01/15		96	%	75 - 125	
			Total Potassium (K)	2020/01/15		100	%	75 - 125	
			Total Selenium (Se)	2020/01/15		101	%	75 - 125	
			Total Silver (Ag)	2020/01/15		96	%	75 - 125	
			Total Sodium (Na)	2020/01/15		103	%	75 - 125	
Total Strontium (Sr)	2020/01/15		100	%	75 - 125				
Total Thallium (Tl)	2020/01/15		97	%	75 - 125				
Total Tin (Sn)	2020/01/15		99	%	75 - 125				
Total Titanium (Ti)	2020/01/15		105	%	75 - 125				
Total Uranium (U)	2020/01/15		98	%	75 - 125				
Total Vanadium (V)	2020/01/15		99	%	75 - 125				
Total Zinc (Zn)	2020/01/15		100	%	75 - 125				
Total Zirconium (Zr)	2020/01/15		92	%	75 - 125				
9734894	JLP	Method Blank	Total Aluminum (Al)	2020/01/15	<100			mg/kg	
			Total Antimony (Sb)	2020/01/15	<0.10			mg/kg	
			Total Arsenic (As)	2020/01/15	<0.20			mg/kg	
			Total Barium (Ba)	2020/01/15	<0.10			mg/kg	
			Total Beryllium (Be)	2020/01/15	<0.20			mg/kg	
			Total Bismuth (Bi)	2020/01/15	<0.10			mg/kg	
			Total Cadmium (Cd)	2020/01/15	<0.050			mg/kg	
			Total Calcium (Ca)	2020/01/15	<100			mg/kg	
			Total Chromium (Cr)	2020/01/15	<0.50			mg/kg	
			Total Cobalt (Co)	2020/01/15	<0.10			mg/kg	
			Total Copper (Cu)	2020/01/15	<0.50			mg/kg	
			Total Iron (Fe)	2020/01/15	<100			mg/kg	
			Total Lead (Pb)	2020/01/15	<0.10			mg/kg	
			Total Lithium (Li)	2020/01/15	<0.50			mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Total Magnesium (Mg)	2020/01/15	<100		mg/kg	
				Total Manganese (Mn)	2020/01/15	<0.20		mg/kg	
				Total Mercury (Hg)	2020/01/15	<0.050		mg/kg	
				Total Molybdenum (Mo)	2020/01/15	<0.10		mg/kg	
				Total Nickel (Ni)	2020/01/15	<0.50		mg/kg	
				Total Phosphorus (P)	2020/01/15	<10		mg/kg	
				Total Potassium (K)	2020/01/15	<100		mg/kg	
				Total Selenium (Se)	2020/01/15	<0.50		mg/kg	
				Total Silver (Ag)	2020/01/15	<0.050		mg/kg	
				Total Sodium (Na)	2020/01/15	<100		mg/kg	
				Total Strontium (Sr)	2020/01/15	<0.10		mg/kg	
				Total Thallium (Tl)	2020/01/15	<0.050		mg/kg	
				Total Tin (Sn)	2020/01/15	<0.10		mg/kg	
				Total Titanium (Ti)	2020/01/15	<1.0		mg/kg	
				Total Uranium (U)	2020/01/15	<0.050		mg/kg	
				Total Vanadium (V)	2020/01/15	<1.0		mg/kg	
				Total Zinc (Zn)	2020/01/15	<1.0		mg/kg	
				Total Zirconium (Zr)	2020/01/15	<0.50		mg/kg	
9734894	JLP	RPD [XF6395-01]		Total Aluminum (Al)	2020/01/15	17		%	40
				Total Antimony (Sb)	2020/01/15	2.4		%	30
				Total Arsenic (As)	2020/01/15	80 (1)		%	30
				Total Barium (Ba)	2020/01/15	70 (1)		%	40
				Total Beryllium (Be)	2020/01/15	NC		%	30
				Total Bismuth (Bi)	2020/01/15	NC		%	30
				Total Cadmium (Cd)	2020/01/15	24		%	30
				Total Calcium (Ca)	2020/01/15	1.7		%	30
				Total Chromium (Cr)	2020/01/15	7.6		%	30
				Total Cobalt (Co)	2020/01/15	79 (1)		%	30
				Total Copper (Cu)	2020/01/15	0.81		%	30
				Total Iron (Fe)	2020/01/15	57 (1)		%	30
				Total Lead (Pb)	2020/01/15	10		%	40
				Total Lithium (Li)	2020/01/15	28		%	30
				Total Magnesium (Mg)	2020/01/15	14		%	30
				Total Manganese (Mn)	2020/01/15	22		%	30
				Total Mercury (Hg)	2020/01/15	NC		%	40
				Total Molybdenum (Mo)	2020/01/15	84 (1)		%	40
				Total Nickel (Ni)	2020/01/15	52 (1)		%	30
				Total Phosphorus (P)	2020/01/15	49 (1)		%	30
				Total Potassium (K)	2020/01/15	NC		%	40
				Total Selenium (Se)	2020/01/15	NC		%	30
				Total Silver (Ag)	2020/01/15	NC		%	40
				Total Sodium (Na)	2020/01/15	NC		%	40
				Total Strontium (Sr)	2020/01/15	1.2		%	40
				Total Thallium (Tl)	2020/01/15	NC		%	30
				Total Tin (Sn)	2020/01/15	NC		%	40
				Total Titanium (Ti)	2020/01/15	28		%	40
				Total Uranium (U)	2020/01/15	9.5		%	30
				Total Vanadium (V)	2020/01/15	5.4		%	30
				Total Zinc (Zn)	2020/01/15	15		%	30
				Total Zirconium (Zr)	2020/01/15	31		%	40
9735409	JGD	QC Standard		Saturation %	2020/01/16		101	%	75 - 125
9735409	JGD	Method Blank		Saturation %	2020/01/16	0		%	
9735409	JGD	RPD [XF6390-01]		Saturation %	2020/01/16	0		%	30
9735441	JGD	QC Standard		Soluble pH	2020/01/16		100	%	97 - 103



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BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	9735441	JGD	Spiked Blank	Soluble pH	2020/01/16		100	%	97 - 103
	9735441	JGD	RPD [XF6390-01]	Soluble pH	2020/01/16	0		%	N/A
	9736148	JBN	Matrix Spike [XF6390-01]	Soluble Calcium (Ca)	2020/01/16		NC	%	80 - 120
				Soluble Magnesium (Mg)	2020/01/16		90	%	80 - 120
				Soluble Potassium (K)	2020/01/16		94	%	80 - 120
				Soluble Sodium (Na)	2020/01/16		100	%	80 - 120
				Soluble Sulphur (S)	2020/01/16		NC	%	80 - 120
	9736148	JBN	QC Standard	Soluble Calcium (Ca)	2020/01/16		102	%	75 - 125
				Soluble Magnesium (Mg)	2020/01/16		99	%	75 - 125
				Soluble Potassium (K)	2020/01/16		97	%	75 - 125
				Soluble Sodium (Na)	2020/01/16		114	%	75 - 125
				Soluble Sulphur (S)	2020/01/16		94	%	75 - 125
	9736148	JBN	Spiked Blank	Soluble Calcium (Ca)	2020/01/16		96	%	80 - 120
				Soluble Magnesium (Mg)	2020/01/16		94	%	80 - 120
				Soluble Potassium (K)	2020/01/16		94	%	80 - 120
				Soluble Sodium (Na)	2020/01/16		101	%	80 - 120
				Soluble Sulphur (S)	2020/01/16		93	%	80 - 120
	9736148	JBN	Method Blank	Soluble Calcium (Ca)	2020/01/16	<5.0		mg/L	
				Soluble Magnesium (Mg)	2020/01/16	<5.0		mg/L	
				Soluble Potassium (K)	2020/01/16	<20		mg/L	
				Soluble Sodium (Na)	2020/01/16	<5.0		mg/L	
				Soluble Sulphur (S)	2020/01/16	<30		mg/L	
	9736148	JBN	RPD [XF6390-01]	Soluble Calcium (Ca)	2020/01/16	0.66		%	30
				Soluble Magnesium (Mg)	2020/01/16	1.1		%	30
				Soluble Potassium (K)	2020/01/16	NC		%	40
				Soluble Sodium (Na)	2020/01/16	1.5		%	40
				Soluble Sulphur (S)	2020/01/16	1.0		%	30
	9736297	WAY	Spiked Blank	Soluble Conductivity	2020/01/16		99	%	80 - 120
	9736297	WAY	Method Blank	Soluble Conductivity	2020/01/16	<5.0		uS/cm	
	9736297	WAY	RPD [XF6390-01]	Soluble Conductivity	2020/01/16	0.26		%	35
	9736317	BB3	Matrix Spike [XF6390-01]	Soluble Chloride (Cl)	2020/01/16		99	%	75 - 125
	9736317	BB3	QC Standard	Soluble Chloride (Cl)	2020/01/16		83	%	75 - 125
	9736317	BB3	Spiked Blank	Soluble Chloride (Cl)	2020/01/16		102	%	80 - 120
	9736317	BB3	Method Blank	Soluble Chloride (Cl)	2020/01/16	<10		mg/L	
	9736317	BB3	RPD [XF6390-01]	Soluble Chloride (Cl)	2020/01/16	0.53		%	30
	9736318	BB3	Matrix Spike [XF6390-01]	Soluble Sulphate (SO4)	2020/01/16		NC	%	75 - 125
	9736318	BB3	QC Standard	Soluble Sulphate (SO4)	2020/01/16		99	%	75 - 125
	9736318	BB3	Spiked Blank	Soluble Sulphate (SO4)	2020/01/16		106	%	80 - 120
	9736318	BB3	Method Blank	Soluble Sulphate (SO4)	2020/01/16	<20		mg/L	
	9736318	BB3	RPD [XF6390-01]	Soluble Sulphate (SO4)	2020/01/16	1.9		%	30
	9737121	KPA	Method Blank	Moisture	2020/01/20	<0.30		%	
	9737121	KPA	RPD [XF6396-01]	Moisture	2020/01/20	5.3		%	20
	9737552	TL0	Method Blank	Moisture	2020/01/18	<0.30		%	
	9737552	TL0	RPD	Moisture	2020/01/18	2.7		%	20
	9737980	MAP	Matrix Spike [XF6391-01]	Available (CaCl2) Sulphur (S)	2020/01/20		109	%	75 - 125
	9737980	MAP	QC Standard	Available (CaCl2) Sulphur (S)	2020/01/20		104	%	75 - 125
	9737980	MAP	Spiked Blank	Available (CaCl2) Sulphur (S)	2020/01/20		103	%	80 - 120
	9737980	MAP	Method Blank	Available (CaCl2) Sulphur (S)	2020/01/20	<2.0		mg/kg	
	9737980	MAP	RPD [XF6391-01]	Available (CaCl2) Sulphur (S)	2020/01/20	3.1		%	35
	9737984	ZI	Matrix Spike [XF6394-01]	Available (KCl) Ammonia (N)	2020/01/20		101	%	75 - 125
	9737984	ZI	Spiked Blank	Available (KCl) Ammonia (N)	2020/01/20		103	%	80 - 120
	9737984	ZI	Method Blank	Available (KCl) Ammonia (N)	2020/01/20	<2.0		mg/kg	
	9737984	ZI	RPD [XF6394-01]	Available (KCl) Ammonia (N)	2020/01/20	NC		%	35
	9737989	KD9	Matrix Spike [XF6394-01]	Available (KCl) Nitrite (N)	2020/01/20		94	%	75 - 125



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BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9737989	KD9	Spiked Blank	Available (KCl) Nitrate (N)	2020/01/20		101	%	75 - 125
			Available (KCl) Nitrite (N)	2020/01/20		94	%	80 - 120
			Available (KCl) Nitrate (N)	2020/01/20		101	%	80 - 120
9737989	KD9	Method Blank	Available (KCl) Nitrite (N)	2020/01/20	<2.0		mg/kg	
			Available (KCl) Nitrate (N)	2020/01/20	<2.0		mg/kg	
			Available (KCl) Nitrite (N)	2020/01/20	NC		%	30
9737989	KD9	RPD [XF6394-01]	Available (KCl) Nitrate (N)	2020/01/20	NC		%	30
			Available (Mod Kel) Phosphorus (P)	2020/01/20		112	%	75 - 125
			Available (Mod Kel) Potassium (K)	2020/01/20		101	%	75 - 125
9738275	MAP	Spiked Blank	Available (Mod Kel) Phosphorus (P)	2020/01/20		107	%	80 - 120
			Available (Mod Kel) Potassium (K)	2020/01/20		97	%	80 - 120
			Available (Mod Kel) Phosphorus (P)	2020/01/20	<4.0		mg/kg	
9738275	MAP	Method Blank	Available (Mod Kel) Potassium (K)	2020/01/20	<4.0		mg/kg	
			Available (Mod Kel) Phosphorus (P)	2020/01/20	NC		%	35
			Available (Mod Kel) Potassium (K)	2020/01/20	10		%	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

BV Labs - Partial/Rush Results



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BV Labs Job #: C002517
Report Date: 2020/01/22

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Gita Pokhrel, Senior Analyst

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs - Partial/Rush Results



BV Labs - Partial/Rush Results

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/28
Report #: R2838356
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride (soluble)	6	2020/01/16	2020/01/16	BBY6SOP-00011	SM 23 4500-Cl- E m
Conductivity (Soluble)	6	2020/01/16	2020/01/16	BBY6SOP-00029	SM 23 2510 B m
Elements by ICPMS (total)	6	2020/01/15	2020/01/15	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Moisture (1)	6	N/A	2020/01/18	AB SOP-00002	CCME PHC-CWS m
Nitrite and Nitrate Available (10:1) Wet (1)	5	2020/01/18	2020/01/20	AB SOP-00027 / AB SOP- 00023	SM 23 4110 B m
Nitrite and Nitrate Available (10:1) Wet (1)	1	2020/01/20	2020/01/20	AB SOP-00027 / AB SOP- 00023	SM 23 4110 B m
Ammonia-N (Available) (1)	5	2020/01/18	2020/01/20	AB SOP-00027 / AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N (Available) (1)	1	2020/01/20	2020/01/20	AB SOP-00027 / AB SOP-00007	SM 23 4500 NH3 A G m
NO2 + NO3 Available (10:1) Wet (1)	6	2020/01/14	2020/01/20		Auto Calc
pH (2:1 DI Water Extract)	6	2020/01/15	2020/01/15	BBY6SOP-00028	BCMOE BCLM Mar2005 m
pH (Soluble)	6	2020/01/16	2020/01/16	BBY6SOP-00025	SM 23 4500-H+ B
Phosphorus, Potassium - Available (1)	6	2020/01/20	2020/01/20	AB SOP-00028 / AB SOP- 00042	EPA 6010d R5 m
Sodium Adsorption Ratio SP	6	N/A	2020/01/16	BBY WI-00033	Auto Calc
Saturated Paste	6	2020/01/16	2020/01/16	BBY6SOP-00030	BC Lab Manual 2015
Sulphur (Available) (1)	6	2020/01/20	2020/01/20	AB SOP-00029 / AB SOP- 00042	EPA 6010d R5 m
Soluble Ions Calculation (mg/kg)	6	N/A	2020/01/17	BBY WI-00033	Auto Calc
Sulphate (soluble) (soil)	6	2020/01/16	2020/01/16	BBY6SOP-00017	SM 23 4500-SO42- E m
Soluble Cations (Ca,K,Mg,Na,S)	6	N/A	2020/01/16	BBY7SOP-00018 / BBY7SOP-00030 / BCLM Nov 2015	EPA 6010d m
Total Organic Carbon LECO Method (1)	6	N/A	2020/01/21	CAL SOP-00243	LECO 203-821-498 m
Total Carbon, Nitrogen & Sulphur in Soil (1)	6	N/A	2020/01/21	CAL SOP-00243	LECO 203-821-498 m
Total Inorganic Carbon Calculation (1)	6	N/A	2020/01/26		Auto Calc
AVS/SEM in Soil Subcontract (2)	4	N/A	2020/01/25		



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/28
Report #: R2838356
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Sample Matrix: Tissue (Plant)
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Moisture in Tissue	12	2020/01/17	2020/01/20	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Calgary Environmental

(2) This test was performed by Sub Vancouver to ALS Burnaby

Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

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Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/01/28
Report #: R2838356
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Safiann Maiter, Key Account Specialist
Email: Safiann.Maiter@bvlabs.com
Phone# (604)639-2616

=====

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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

NUTRIENT PACKAGE 1 (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch

Nutrients									
Available (KCl) Ammonia (N)	mg/kg	<2.0	<2.0	<2.0	5.5	<2.0	<2.0	2.0	9737984
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9734074
Available (Mod Kel) Phosphorus (P)	mg/kg	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	9738275
Available (Mod Kel) Potassium (K)	mg/kg	11	11	12	20	23	16	4.0	9738275
Available (CaCl ₂) Sulphur (S)	mg/kg	23	31	33	55	51	54	2.0	9737980
Available (KCl) Nitrite (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9737989
Available (KCl) Nitrate (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9737989

RDL = Reportable Detection Limit



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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF SOIL

BV Labs ID		XF6390	XF6392	XF6393	XF6395	
Sampling Date		2020/01/13 12:55	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:30	
COC Number		08476858	08476858	08476858	08476858	
	UNITS	1A SOIL	1C SOIL	4A SOIL	4C SOIL	QC Batch
External Sublet Analysis						
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	9743988



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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

PHYSICAL TESTING (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Physical Properties									
Moisture	%	17	19	20	21	19	20	0.30	9737552
RDL = Reportable Detection Limit									



MISCELLANEOUS (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Misc. Inorganics									
Total Inorganic Carbon (C)	%	2.7	3.0	2.8	2.1	2.6	2.6	0.050	9734091
Total Organic Carbon (C)	%	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9739352
Total Carbon	%	2.7	3.0	2.8	2.1	2.6	2.6	0.05	9739355
Total Sulphur (S)	%	0.34	0.23	0.21	0.20	0.16	0.16	0.06	9739355
RDL = Reportable Detection Limit									



PHYSICAL TESTING (TISSUE (PLANT))

BV Labs ID		XF6396	XF6397	XF6398	XF6399	XF6401	XF6402	XF6403		
Sampling Date		2020/01/13 11:55	2020/01/13 11:50	2020/01/13 11:45	2020/01/13 11:40	2020/01/13 11:35	2020/01/13 11:30	2020/01/13 11:10		
COC Number		08476858	08476858	08476858	08476858	08476859	08476859	08476859		
	UNITS	1A BIOMASS	1B BIOMASS	1C BIOMASS	4A BIOMASS	4B BIOMASS	4C BIOMASS	1A BULRUSH	RDL	QC Batch
Physical Properties										
Moisture	%	83	86	76	91	93	91	57	0.30	9737121
RDL = Reportable Detection Limit										

BV Labs ID		XF6404	XF6405	XF6406	XF6407	XF6408		
Sampling Date		2020/01/13 11:05	2020/01/13 11:00	2020/01/13 11:25	2020/01/13 11:20	2020/01/13 11:15		
COC Number		08476859	08476859	08476859	08476859	08476859		
	UNITS	1B BULRUSH	1C BULRUSH	4A CAREX	4B CAREX	4C CAREX	RDL	QC Batch
Physical Properties								
Moisture	%	43	62	56	48	47	0.30	9737121
RDL = Reportable Detection Limit								

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Report Date: 2020/01/28ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR/CCME METALS IN SOIL WITH HG (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch

Physical Properties

Soluble (2:1) pH	pH	7.90	8.16	8.36	8.07	8.20	8.28	N/A	9734625
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Total Metals by ICPMS

Total Aluminum (Al)	mg/kg	1360	1590	1380	1420	1420	1280	100	9734894
Total Antimony (Sb)	mg/kg	0.34	0.14	0.23	0.42	0.27	0.18	0.10	9734894
Total Arsenic (As)	mg/kg	3.33	2.39	2.79	2.85	2.30	1.92 (1)	0.20	9734894
Total Barium (Ba)	mg/kg	18.5	14.5	18.1	15.0	25.0	30.6 (1)	0.10	9734894
Total Beryllium (Be)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	9734894
Total Bismuth (Bi)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9734894
Total Cadmium (Cd)	mg/kg	0.147	0.089	0.087	0.103	0.075	0.110	0.050	9734894
Total Calcium (Ca)	mg/kg	41700	57100	41400	41800	46400	48000	100	9734894
Total Chromium (Cr)	mg/kg	4.35	4.24	6.42	5.70	4.62	5.16	0.50	9734894
Total Cobalt (Co)	mg/kg	2.07	1.87	1.91	2.19	1.61	1.42 (1)	0.10	9734894
Total Copper (Cu)	mg/kg	4.20	2.45	3.09	3.81	3.14	2.75	0.50	9734894
Total Iron (Fe)	mg/kg	7530	6780	6890	6580	5610	5090 (1)	100	9734894
Total Lead (Pb)	mg/kg	2.98	1.62	1.43	1.75	1.16	1.18	0.10	9734894
Total Lithium (Li)	mg/kg	1.98	3.15	2.48	2.48	2.93	2.39	0.50	9734894
Total Magnesium (Mg)	mg/kg	11500	19700	11200	15400	15600	16400	100	9734894
Total Manganese (Mn)	mg/kg	225	379	212	173	198	201	0.20	9734894
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9734894
Total Molybdenum (Mo)	mg/kg	0.44	0.45	0.43	0.40	0.38	0.32 (1)	0.10	9734894
Total Nickel (Ni)	mg/kg	5.55	5.17	5.96	6.69	5.02	4.42 (1)	0.50	9734894
Total Phosphorus (P)	mg/kg	266	168	248	167	251	195 (1)	10	9734894
Total Potassium (K)	mg/kg	286	338	327	360	333	258	100	9734894
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9734894
Total Silver (Ag)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9734894
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	<100	<100	100	9734894
Total Strontium (Sr)	mg/kg	25.9	31.4	26.2	21.6	25.8	26.3	0.10	9734894
Total Thallium (Tl)	mg/kg	<0.050	0.071	<0.050	0.057	<0.050	<0.050	0.050	9734894
Total Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9734894
Total Titanium (Ti)	mg/kg	109	111	145	101	111	101	1.0	9734894

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Reanalysis yields similar results.



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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR/CCME METALS IN SOIL WITH HG (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Total Uranium (U)	mg/kg	0.687	0.483	0.673	0.802	0.713	0.529	0.050	9734894
Total Vanadium (V)	mg/kg	7.9	7.2	8.5	7.2	6.9	7.7	1.0	9734894
Total Zinc (Zn)	mg/kg	15.7	11.1	14.5	14.6	11.3	11.1	1.0	9734894
Total Zirconium (Zr)	mg/kg	1.73	1.63	2.11	1.64	1.57	1.66	0.50	9734894
RDL = Reportable Detection Limit									



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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

SALINITY 4 PACKAGE FOR SOIL (SOIL)

BV Labs ID		XF6390	XF6391		XF6392		XF6393		XF6394		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50		2020/01/13 12:45		2020/01/13 12:40		2020/01/13 12:35		
COC Number		08476858	08476858		08476858		08476858		08476858		
	UNITS	1A SOIL	1B SOIL	RDL	1C SOIL	RDL	4A SOIL	RDL	4B SOIL	RDL	QC Batch
ANIONS											
Soluble Sulphate (SO ₄)	mg/L	247	255	20	244	20	443	20	568	20	9736318
Soluble Chloride (Cl)	mg/L	47	46	10	57	10	78	10	122	10	9736317
Calculated Parameters											
Soluble Chloride (Cl)	mg/kg	13.9	13.8	3.0	17.4	3.1	23.7	3.0	36.7	3.0	9734055
Soluble Sodium (Na)	mg/kg	7.5	8.2	1.5	7.2	1.5	11.6	1.5	13.8	1.5	9734055
Soluble Calcium (Ca)	mg/kg	31.7	35.2	1.5	39.4	1.5	54.9	1.5	70.8	1.5	9734055
Soluble Magnesium (Mg)	mg/kg	4.5	5.3	1.5	5.8	1.5	7.2	1.5	9.1	1.5	9734055
Soluble Potassium (K)	mg/kg	<6.0	<6.0	6.0	<6.2	6.2	6.3	6.1	8.9	6.0	9734055
Soluble Sulphur (S)	mg/kg	26.4	27.1	9.0	31.4	9.2	50.1	9.1	68.2	9.0	9734055
Soluble Sulphate (SO ₄)	mg/kg	73.8	76.9	6.0	75.1	6.2	135	6.1	171	6.0	9734055
Sodium Adsorption Ratio	N/A	0.61	0.62	0.10	0.51	0.10	0.71	0.10	0.75	0.10	9734054
Soluble Parameters											
Soluble Conductivity	uS/cm	733	732	5.0	743	5.0	1140	5.0	1470	5.0	9736297
Soluble pH	pH	7.88	8.14	N/A	8.04	N/A	7.85	N/A	7.88	N/A	9735441
Soluble Calcium (Ca)	mg/L	106	117	5.0	128	5.0	181	5.0	235	5.0	9736148
Saturation %	%	29.9	30.1	N/A	30.8	N/A	30.4	N/A	30.2	N/A	9735409
Soluble Magnesium (Mg)	mg/L	15.0	17.4	5.0	18.9	5.0	23.8	5.0	30.0	5.0	9736148
Soluble Potassium (K)	mg/L	<20	<20	20	<20	20	21	20	29	20	9736148
Soluble Sodium (Na)	mg/L	25.1	27.3	5.0	23.3	5.0	38.1	5.0	45.6	5.0	9736148
Soluble Sulphur (S)	mg/L	88	90	30	102	30	165	30	226	30	9736148
RDL = Reportable Detection Limit N/A = Not Applicable											



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BV Labs Job #: C002517
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ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

SALINITY 4 PACKAGE FOR SOIL (SOIL)

BV Labs ID		XF6395		
Sampling Date		2020/01/13 12:30		
COC Number		08476858		
	UNITS	4C SOIL	RDL	QC Batch
ANIONS				
Soluble Sulphate (SO4)	mg/L	525	20	9736318
Soluble Chloride (Cl)	mg/L	89	10	9736317
Calculated Parameters				
Soluble Chloride (Cl)	mg/kg	26.8	3.0	9734055
Soluble Sodium (Na)	mg/kg	13.4	1.5	9734055
Soluble Calcium (Ca)	mg/kg	64.0	1.5	9734055
Soluble Magnesium (Mg)	mg/kg	9.0	1.5	9734055
Soluble Potassium (K)	mg/kg	<6.1	6.1	9734055
Soluble Sulphur (S)	mg/kg	59.2	9.1	9734055
Soluble Sulphate (SO4)	mg/kg	159	6.1	9734055
Sodium Adsorption Ratio	N/A	0.75	0.10	9734054
Soluble Parameters				
Soluble Conductivity	uS/cm	1290	5.0	9736297
Soluble pH	pH	7.91	N/A	9735441
Soluble Calcium (Ca)	mg/L	211	5.0	9736148
Saturation %	%	30.3	N/A	9735409
Soluble Magnesium (Mg)	mg/L	29.6	5.0	9736148
Soluble Potassium (K)	mg/L	<20	20	9736148
Soluble Sodium (Na)	mg/L	44.2	5.0	9736148
Soluble Sulphur (S)	mg/L	195	30	9736148
RDL = Reportable Detection Limit N/A = Not Applicable				



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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

GENERAL COMMENTS

Results relate only to the items tested.

BV Labs - Partial/Rush Results



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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	9734625	LO1	Spiked Blank	Soluble (2:1) pH	2020/01/15		100	%	N/A
	9734625	LO1	RPD [XF6393-01]	Soluble (2:1) pH	2020/01/15	0.12		%	20
	9734894	JLP	Matrix Spike [XF6395-01]	Total Aluminum (Al)	2020/01/15		164 (1)	%	75 - 125
				Total Antimony (Sb)	2020/01/15		99	%	75 - 125
				Total Arsenic (As)	2020/01/15		98	%	75 - 125
				Total Barium (Ba)	2020/01/15		95	%	75 - 125
				Total Beryllium (Be)	2020/01/15		96	%	75 - 125
				Total Bismuth (Bi)	2020/01/15		86	%	75 - 125
				Total Cadmium (Cd)	2020/01/15		94	%	75 - 125
				Total Calcium (Ca)	2020/01/15		NC	%	75 - 125
				Total Chromium (Cr)	2020/01/15		92	%	75 - 125
				Total Cobalt (Co)	2020/01/15		91	%	75 - 125
				Total Copper (Cu)	2020/01/15		92	%	75 - 125
				Total Iron (Fe)	2020/01/15		NC	%	75 - 125
				Total Lead (Pb)	2020/01/15		92	%	75 - 125
				Total Lithium (Li)	2020/01/15		93	%	75 - 125
				Total Magnesium (Mg)	2020/01/15		NC	%	75 - 125
				Total Manganese (Mn)	2020/01/15		80	%	75 - 125
				Total Mercury (Hg)	2020/01/15		95	%	75 - 125
				Total Molybdenum (Mo)	2020/01/15		94	%	75 - 125
				Total Nickel (Ni)	2020/01/15		89	%	75 - 125
				Total Phosphorus (P)	2020/01/15		101	%	75 - 125
				Total Potassium (K)	2020/01/15		115	%	75 - 125
				Total Selenium (Se)	2020/01/15		98	%	75 - 125
				Total Silver (Ag)	2020/01/15		91	%	75 - 125
				Total Sodium (Na)	2020/01/15		111	%	75 - 125
				Total Strontium (Sr)	2020/01/15		101	%	75 - 125
				Total Thallium (Tl)	2020/01/15		90	%	75 - 125
				Total Tin (Sn)	2020/01/15		97	%	75 - 125
				Total Titanium (Ti)	2020/01/15		103	%	75 - 125
				Total Uranium (U)	2020/01/15		91	%	75 - 125
				Total Vanadium (V)	2020/01/15		94	%	75 - 125
				Total Zinc (Zn)	2020/01/15		89	%	75 - 125
				Total Zirconium (Zr)	2020/01/15		107	%	75 - 125
	9734894	JLP	QC Standard	Total Aluminum (Al)	2020/01/15		103	%	70 - 130
				Total Antimony (Sb)	2020/01/15		110	%	70 - 130
				Total Arsenic (As)	2020/01/15		95	%	70 - 130
				Total Barium (Ba)	2020/01/15		104	%	70 - 130
				Total Beryllium (Be)	2020/01/15		103	%	70 - 130
				Total Cadmium (Cd)	2020/01/15		102	%	70 - 130
				Total Calcium (Ca)	2020/01/15		101	%	70 - 130
				Total Chromium (Cr)	2020/01/15		103	%	70 - 130
				Total Cobalt (Co)	2020/01/15		97	%	70 - 130
				Total Copper (Cu)	2020/01/15		114	%	70 - 130
				Total Iron (Fe)	2020/01/15		101	%	70 - 130
				Total Lead (Pb)	2020/01/15		108	%	70 - 130
				Total Lithium (Li)	2020/01/15		101	%	70 - 130
				Total Magnesium (Mg)	2020/01/15		105	%	70 - 130
				Total Manganese (Mn)	2020/01/15		105	%	70 - 130
				Total Mercury (Hg)	2020/01/15		101	%	70 - 130
				Total Molybdenum (Mo)	2020/01/15		102	%	70 - 130
				Total Nickel (Ni)	2020/01/15		104	%	70 - 130
				Total Phosphorus (P)	2020/01/15		98	%	70 - 130
				Total Potassium (K)	2020/01/15		91	%	70 - 130

BV Labs - Partial/Rush Results



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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9734894	JLP	Spiked Blank		Total Silver (Ag)	2020/01/15		83	%	70 - 130
				Total Sodium (Na)	2020/01/15		93	%	70 - 130
				Total Strontium (Sr)	2020/01/15		107	%	70 - 130
				Total Thallium (Tl)	2020/01/15		94	%	70 - 130
				Total Tin (Sn)	2020/01/15		100	%	70 - 130
				Total Uranium (U)	2020/01/15		95	%	70 - 130
				Total Vanadium (V)	2020/01/15		104	%	70 - 130
				Total Zinc (Zn)	2020/01/15		101	%	70 - 130
				Total Aluminum (Al)	2020/01/15		104	%	75 - 125
				Total Antimony (Sb)	2020/01/15		102	%	75 - 125
				Total Arsenic (As)	2020/01/15		102	%	75 - 125
				Total Barium (Ba)	2020/01/15		99	%	75 - 125
				Total Beryllium (Be)	2020/01/15		98	%	75 - 125
				Total Bismuth (Bi)	2020/01/15		92	%	75 - 125
				Total Cadmium (Cd)	2020/01/15		99	%	75 - 125
				Total Calcium (Ca)	2020/01/15		101	%	75 - 125
				Total Chromium (Cr)	2020/01/15		99	%	75 - 125
				Total Cobalt (Co)	2020/01/15		99	%	75 - 125
				Total Copper (Cu)	2020/01/15		102	%	75 - 125
				Total Iron (Fe)	2020/01/15		100	%	75 - 125
				Total Lead (Pb)	2020/01/15		99	%	75 - 125
				Total Lithium (Li)	2020/01/15		94	%	75 - 125
				Total Magnesium (Mg)	2020/01/15		97	%	75 - 125
				Total Manganese (Mn)	2020/01/15		100	%	75 - 125
				Total Mercury (Hg)	2020/01/15		102	%	75 - 125
				Total Molybdenum (Mo)	2020/01/15		96	%	75 - 125
				Total Nickel (Ni)	2020/01/15		98	%	75 - 125
				Total Phosphorus (P)	2020/01/15		96	%	75 - 125
				Total Potassium (K)	2020/01/15		100	%	75 - 125
				Total Selenium (Se)	2020/01/15		101	%	75 - 125
				Total Silver (Ag)	2020/01/15		96	%	75 - 125
				Total Sodium (Na)	2020/01/15		103	%	75 - 125
				Total Strontium (Sr)	2020/01/15		100	%	75 - 125
				Total Thallium (Tl)	2020/01/15		97	%	75 - 125
				Total Tin (Sn)	2020/01/15		99	%	75 - 125
				Total Titanium (Ti)	2020/01/15		105	%	75 - 125
				Total Uranium (U)	2020/01/15		98	%	75 - 125
				Total Vanadium (V)	2020/01/15		99	%	75 - 125
				Total Zinc (Zn)	2020/01/15		100	%	75 - 125
				Total Zirconium (Zr)	2020/01/15		92	%	75 - 125
9734894	JLP	Method Blank		Total Aluminum (Al)	2020/01/15	<100		mg/kg	
				Total Antimony (Sb)	2020/01/15	<0.10		mg/kg	
				Total Arsenic (As)	2020/01/15	<0.20		mg/kg	
				Total Barium (Ba)	2020/01/15	<0.10		mg/kg	
				Total Beryllium (Be)	2020/01/15	<0.20		mg/kg	
				Total Bismuth (Bi)	2020/01/15	<0.10		mg/kg	
				Total Cadmium (Cd)	2020/01/15	<0.050		mg/kg	
				Total Calcium (Ca)	2020/01/15	<100		mg/kg	
				Total Chromium (Cr)	2020/01/15	<0.50		mg/kg	
				Total Cobalt (Co)	2020/01/15	<0.10		mg/kg	
				Total Copper (Cu)	2020/01/15	<0.50		mg/kg	
				Total Iron (Fe)	2020/01/15	<100		mg/kg	
				Total Lead (Pb)	2020/01/15	<0.10		mg/kg	
				Total Lithium (Li)	2020/01/15	<0.50		mg/kg	

BV Labs - Partial/Rush Results



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BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Total Magnesium (Mg)	2020/01/15	<100		mg/kg	
				Total Manganese (Mn)	2020/01/15	<0.20		mg/kg	
				Total Mercury (Hg)	2020/01/15	<0.050		mg/kg	
				Total Molybdenum (Mo)	2020/01/15	<0.10		mg/kg	
				Total Nickel (Ni)	2020/01/15	<0.50		mg/kg	
				Total Phosphorus (P)	2020/01/15	<10		mg/kg	
				Total Potassium (K)	2020/01/15	<100		mg/kg	
				Total Selenium (Se)	2020/01/15	<0.50		mg/kg	
				Total Silver (Ag)	2020/01/15	<0.050		mg/kg	
				Total Sodium (Na)	2020/01/15	<100		mg/kg	
				Total Strontium (Sr)	2020/01/15	<0.10		mg/kg	
				Total Thallium (Tl)	2020/01/15	<0.050		mg/kg	
				Total Tin (Sn)	2020/01/15	<0.10		mg/kg	
				Total Titanium (Ti)	2020/01/15	<1.0		mg/kg	
				Total Uranium (U)	2020/01/15	<0.050		mg/kg	
				Total Vanadium (V)	2020/01/15	<1.0		mg/kg	
				Total Zinc (Zn)	2020/01/15	<1.0		mg/kg	
				Total Zirconium (Zr)	2020/01/15	<0.50		mg/kg	
9734894	JLP	RPD [XF6395-01]		Total Aluminum (Al)	2020/01/15	17		%	40
				Total Antimony (Sb)	2020/01/15	2.4		%	30
				Total Arsenic (As)	2020/01/15	80 (1)		%	30
				Total Barium (Ba)	2020/01/15	70 (1)		%	40
				Total Beryllium (Be)	2020/01/15	NC		%	30
				Total Bismuth (Bi)	2020/01/15	NC		%	30
				Total Cadmium (Cd)	2020/01/15	24		%	30
				Total Calcium (Ca)	2020/01/15	1.7		%	30
				Total Chromium (Cr)	2020/01/15	7.6		%	30
				Total Cobalt (Co)	2020/01/15	79 (1)		%	30
				Total Copper (Cu)	2020/01/15	0.81		%	30
				Total Iron (Fe)	2020/01/15	57 (1)		%	30
				Total Lead (Pb)	2020/01/15	10		%	40
				Total Lithium (Li)	2020/01/15	28		%	30
				Total Magnesium (Mg)	2020/01/15	14		%	30
				Total Manganese (Mn)	2020/01/15	22		%	30
				Total Mercury (Hg)	2020/01/15	NC		%	40
				Total Molybdenum (Mo)	2020/01/15	84 (1)		%	40
				Total Nickel (Ni)	2020/01/15	52 (1)		%	30
				Total Phosphorus (P)	2020/01/15	49 (1)		%	30
				Total Potassium (K)	2020/01/15	NC		%	40
				Total Selenium (Se)	2020/01/15	NC		%	30
				Total Silver (Ag)	2020/01/15	NC		%	40
				Total Sodium (Na)	2020/01/15	NC		%	40
				Total Strontium (Sr)	2020/01/15	1.2		%	40
				Total Thallium (Tl)	2020/01/15	NC		%	30
				Total Tin (Sn)	2020/01/15	NC		%	40
				Total Titanium (Ti)	2020/01/15	28		%	40
				Total Uranium (U)	2020/01/15	9.5		%	30
				Total Vanadium (V)	2020/01/15	5.4		%	30
				Total Zinc (Zn)	2020/01/15	15		%	30
				Total Zirconium (Zr)	2020/01/15	31		%	40
9735409	JGD	QC Standard		Saturation %	2020/01/16		101	%	75 - 125
9735409	JGD	Method Blank		Saturation %	2020/01/16	0		%	
9735409	JGD	RPD [XF6390-01]		Saturation %	2020/01/16	0		%	30
9735441	JGD	QC Standard		Soluble pH	2020/01/16		100	%	97 - 103

BV Labs - Partial/Rush Results



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VERITAS

BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	9735441	JGD	Spiked Blank	Soluble pH	2020/01/16		100	%	97 - 103
	9735441	JGD	RPD [XF6390-01]	Soluble pH	2020/01/16	0		%	N/A
	9736148	JBN	Matrix Spike [XF6390-01]	Soluble Calcium (Ca)	2020/01/16		NC	%	80 - 120
				Soluble Magnesium (Mg)	2020/01/16		90	%	80 - 120
				Soluble Potassium (K)	2020/01/16		94	%	80 - 120
				Soluble Sodium (Na)	2020/01/16		100	%	80 - 120
				Soluble Sulphur (S)	2020/01/16		NC	%	80 - 120
	9736148	JBN	QC Standard	Soluble Calcium (Ca)	2020/01/16		102	%	75 - 125
				Soluble Magnesium (Mg)	2020/01/16		99	%	75 - 125
				Soluble Potassium (K)	2020/01/16		97	%	75 - 125
				Soluble Sodium (Na)	2020/01/16		114	%	75 - 125
				Soluble Sulphur (S)	2020/01/16		94	%	75 - 125
	9736148	JBN	Spiked Blank	Soluble Calcium (Ca)	2020/01/16		96	%	80 - 120
				Soluble Magnesium (Mg)	2020/01/16		94	%	80 - 120
				Soluble Potassium (K)	2020/01/16		94	%	80 - 120
				Soluble Sodium (Na)	2020/01/16		101	%	80 - 120
				Soluble Sulphur (S)	2020/01/16		93	%	80 - 120
	9736148	JBN	Method Blank	Soluble Calcium (Ca)	2020/01/16	<5.0		mg/L	
				Soluble Magnesium (Mg)	2020/01/16	<5.0		mg/L	
				Soluble Potassium (K)	2020/01/16	<20		mg/L	
				Soluble Sodium (Na)	2020/01/16	<5.0		mg/L	
				Soluble Sulphur (S)	2020/01/16	<30		mg/L	
	9736148	JBN	RPD [XF6390-01]	Soluble Calcium (Ca)	2020/01/16	0.66		%	30
				Soluble Magnesium (Mg)	2020/01/16	1.1		%	30
				Soluble Potassium (K)	2020/01/16	NC		%	40
				Soluble Sodium (Na)	2020/01/16	1.5		%	40
				Soluble Sulphur (S)	2020/01/16	1.0		%	30
	9736297	WAY	Spiked Blank	Soluble Conductivity	2020/01/16		99	%	80 - 120
	9736297	WAY	Method Blank	Soluble Conductivity	2020/01/16	<5.0		uS/cm	
	9736297	WAY	RPD [XF6390-01]	Soluble Conductivity	2020/01/16	0.26		%	35
	9736317	BB3	Matrix Spike [XF6390-01]	Soluble Chloride (Cl)	2020/01/16		99	%	75 - 125
	9736317	BB3	QC Standard	Soluble Chloride (Cl)	2020/01/16		83	%	75 - 125
	9736317	BB3	Spiked Blank	Soluble Chloride (Cl)	2020/01/16		102	%	80 - 120
	9736317	BB3	Method Blank	Soluble Chloride (Cl)	2020/01/16	<10		mg/L	
	9736317	BB3	RPD [XF6390-01]	Soluble Chloride (Cl)	2020/01/16	0.53		%	30
	9736318	BB3	Matrix Spike [XF6390-01]	Soluble Sulphate (SO4)	2020/01/16		NC	%	75 - 125
	9736318	BB3	QC Standard	Soluble Sulphate (SO4)	2020/01/16		99	%	75 - 125
	9736318	BB3	Spiked Blank	Soluble Sulphate (SO4)	2020/01/16		106	%	80 - 120
	9736318	BB3	Method Blank	Soluble Sulphate (SO4)	2020/01/16	<20		mg/L	
	9736318	BB3	RPD [XF6390-01]	Soluble Sulphate (SO4)	2020/01/16	1.9		%	30
	9737121	KPA	Method Blank	Moisture	2020/01/20	<0.30		%	
	9737121	KPA	RPD [XF6396-01]	Moisture	2020/01/20	5.3		%	20
	9737552	TL0	Method Blank	Moisture	2020/01/18	<0.30		%	
	9737552	TL0	RPD	Moisture	2020/01/18	2.7		%	20
	9737980	MAP	Matrix Spike [XF6391-01]	Available (CaCl2) Sulphur (S)	2020/01/20		109	%	75 - 125
	9737980	MAP	QC Standard	Available (CaCl2) Sulphur (S)	2020/01/20		104	%	75 - 125
	9737980	MAP	Spiked Blank	Available (CaCl2) Sulphur (S)	2020/01/20		103	%	80 - 120
	9737980	MAP	Method Blank	Available (CaCl2) Sulphur (S)	2020/01/20	<2.0		mg/kg	
	9737980	MAP	RPD [XF6391-01]	Available (CaCl2) Sulphur (S)	2020/01/20	3.1		%	35
	9737984	ZI	Matrix Spike [XF6394-01]	Available (KCl) Ammonia (N)	2020/01/20		101	%	75 - 125
	9737984	ZI	Spiked Blank	Available (KCl) Ammonia (N)	2020/01/20		103	%	80 - 120
	9737984	ZI	Method Blank	Available (KCl) Ammonia (N)	2020/01/20	<2.0		mg/kg	
	9737984	ZI	RPD [XF6394-01]	Available (KCl) Ammonia (N)	2020/01/20	NC		%	35
	9737989	KD9	Matrix Spike [XF6394-01]	Available (KCl) Nitrite (N)	2020/01/20		94	%	75 - 125



BUREAU
VERITAS

BV Labs Job #: C002517
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ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9737989	KD9	Spiked Blank	Available (KCl) Nitrate (N)	2020/01/20		101	%	75 - 125
			Available (KCl) Nitrite (N)	2020/01/20		94	%	80 - 120
			Available (KCl) Nitrate (N)	2020/01/20		101	%	80 - 120
9737989	KD9	Method Blank	Available (KCl) Nitrite (N)	2020/01/20	<2.0		mg/kg	
			Available (KCl) Nitrate (N)	2020/01/20	<2.0		mg/kg	
9737989	KD9	RPD [XF6394-01]	Available (KCl) Nitrite (N)	2020/01/20	NC		%	30
			Available (KCl) Nitrate (N)	2020/01/20	NC		%	30
			Available (Mod Kel) Phosphorus (P)	2020/01/20		112	%	75 - 125
9738275	MAP	Spiked Blank	Available (Mod Kel) Potassium (K)	2020/01/20		101	%	75 - 125
			Available (Mod Kel) Phosphorus (P)	2020/01/20		107	%	80 - 120
9738275	MAP	Method Blank	Available (Mod Kel) Potassium (K)	2020/01/20		97	%	80 - 120
			Available (Mod Kel) Phosphorus (P)	2020/01/20	<4.0		mg/kg	
9738275	MAP	RPD [XF6391-01]	Available (Mod Kel) Potassium (K)	2020/01/20	<4.0		mg/kg	
			Available (Mod Kel) Phosphorus (P)	2020/01/20	NC		%	35
			Available (Mod Kel) Potassium (K)	2020/01/20	10		%	35
9739352	PL	QC Standard	Total Organic Carbon (C)	2020/01/21		100	%	75 - 125
9739352	PL	Spiked Blank	Total Organic Carbon (C)	2020/01/21		100	%	80 - 120
9739352	PL	Method Blank	Total Organic Carbon (C)	2020/01/21	<0.050		%	
9739352	PL	RPD [XF6390-01]	Total Organic Carbon (C)	2020/01/21	NC		%	35
9739355	PL	QC Standard	Total Carbon	2020/01/21		101	%	75 - 125
			Total Sulphur (S)	2020/01/21		78	%	75 - 125
			Total Carbon	2020/01/21		102	%	80 - 120
9739355	PL	Spiked Blank	Total Sulphur (S)	2020/01/21		85	%	80 - 120
			Total Carbon	2020/01/21	<0.05		%	
9739355	PL	Method Blank	Total Sulphur (S)	2020/01/21	<0.06		%	
			Total Carbon	2020/01/21	23		%	30
9739355	PL	RPD [XF6390-01]	Total Sulphur (S)	2020/01/21	NC		%	30

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

BV Labs - Partial/Rush Results



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VERITAS

BV Labs Job #: C002517
Report Date: 2020/01/28

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Gita Pokhrel, Senior Analyst

Jennifer Villocero, Project Solutions Representative

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/02/11
 Report #: R2843471
 Version: 3 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Sample Matrix: Soil
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride (soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00011	SM 23 4500-Cl- E m
Conductivity (Soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00029	SM 23 2510 B m
Elements by ICPMS (total) (1)	6	2020/01/15	2020/01/15	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Moisture	6	N/A	2020/01/18	AB SOP-00002	CCME PHC-CWS m
Nitrite and Nitrate Available (10:1) Wet	5	2020/01/18	2020/01/20	AB SOP-00027 / AB SOP- 00023	SM 23 4110 B m
Nitrite and Nitrate Available (10:1) Wet	1	2020/01/20	2020/01/20	AB SOP-00027 / AB SOP- 00023	SM 23 4110 B m
Ammonia-N (Available)	5	2020/01/18	2020/01/20	AB SOP-00027 / AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N (Available)	1	2020/01/20	2020/01/20	AB SOP-00027 / AB SOP-00007	SM 23 4500 NH3 A G m
NO2 + NO3 Available (10:1 Wet)	6	2020/01/14	2020/01/20		Auto Calc
pH (2:1 DI Water Extract) (1)	6	2020/01/15	2020/01/15	BBY6SOP-00028	BCMOE BCLM Mar2005 m
pH (Soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00025	SM 23 4500-H+ B
Phosphorus, Potassium - Available	6	2020/01/20	2020/01/20	AB SOP-00028 / AB SOP- 00042	EPA 6010d R5 m
Sodium Adsorption Ratio SP (1)	6	N/A	2020/01/16	BBY WI-00033	Auto Calc
Saturated Paste (1)	6	2020/01/16	2020/01/16	BBY6SOP-00030	BC Lab Manual 2015
Sulphur (Available)	6	2020/01/20	2020/01/20	AB SOP-00029 / AB SOP- 00042	EPA 6010d R5 m
Soluble Ions Calculation (mg/kg) (1)	6	N/A	2020/01/17	BBY WI-00033	Auto Calc
Sulphate (soluble) (soil) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00017	SM 23 4500-SO42- E m
Soluble Cations (Ca,K,Mg,Na,S) (1)	6	N/A	2020/01/16	BBY7SOP-00018 / BBY7SOP-00030 / BCLM Nov 2015	EPA 6010d m
Total Organic Carbon LECO Method	6	N/A	2020/01/21	CAL SOP-00243	LECO 203-821-498 m
Total Carbon, Nitrogen & Sulphur in Soil	6	N/A	2020/01/21	CAL SOP-00243	LECO 203-821-498 m
Total Inorganic Carbon Calculation	6	N/A	2020/01/26		Auto Calc
AVS/SEM in Soil Subcontract (2)	4	N/A	2020/01/25		



Your Project #: BMC-18-02
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Canada Y1A 2V3

Report Date: 2020/02/11
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Version: 3 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Sample Matrix: Tissue (Plant)
Samples Received: 12

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Elements in Tissue by CRC ICPMS - Dry Wt (1)	12	2020/01/22	2020/01/31	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Moisture in Tissue (1)	12	2020/01/17	2020/01/20	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) This test was performed by Sub Vancouver to ALS Burnaby



Your Project #: BMC-18-02
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Report Date: 2020/02/11
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CERTIFICATE OF ANALYSIS

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Safiann Maiter, Key Account Specialist
Email: Safiann.Maiter@bvlabs.com
Phone# (604)639-2616

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



NUTRIENT PACKAGE 1 (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch

Nutrients									
Available (KCl) Ammonia (N)	mg/kg	<2.0	<2.0	<2.0	5.5	<2.0	<2.0	2.0	9737984
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9734074
Available (Mod Kel) Phosphorus (P)	mg/kg	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	9738275
Available (Mod Kel) Potassium (K)	mg/kg	11	11	12	20	23	16	4.0	9738275
Available (CaCl ₂) Sulphur (S)	mg/kg	23	31	33	55	51	54	2.0	9737980
Available (KCl) Nitrite (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9737989
Available (KCl) Nitrate (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9737989

RDL = Reportable Detection Limit



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BV Labs Job #: C002517
Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF SOIL

BV Labs ID		XF6390	XF6392	XF6393	XF6395	
Sampling Date		2020/01/13 12:55	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:30	
COC Number		08476858	08476858	08476858	08476858	
	UNITS	1A SOIL	1C SOIL	4A SOIL	4C SOIL	QC Batch
External Sublet Analysis						
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	9743988



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BV Labs Job #: C002517
Report Date: 2020/02/11

ALEXCO ENVIRONMENTAL GROUP INC.
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Site Location: KUDZ ZE KAYAH

PHYSICAL TESTING (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Physical Properties									
Moisture	%	17	19	20	21	19	20	0.30	9737552
RDL = Reportable Detection Limit									



MISCELLANEOUS (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Misc. Inorganics									
Total Inorganic Carbon (C)	%	2.7	3.0	2.8	2.1	2.6	2.6	0.050	9734091
Total Organic Carbon (C)	%	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9739352
Total Carbon	%	2.7	3.0	2.8	2.1	2.6	2.6	0.05	9739355
Total Sulphur (S)	%	0.34	0.23	0.21	0.20	0.16	0.16	0.06	9739355
RDL = Reportable Detection Limit									

**ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE (PLANT))**

BV Labs ID		XF6396	XF6397	XF6398	XF6399	XF6401	XF6402		
Sampling Date		2020/01/13 11:55	2020/01/13 11:50	2020/01/13 11:45	2020/01/13 11:40	2020/01/13 11:35	2020/01/13 11:30		
COC Number		08476858	08476858	08476858	08476858	08476859	08476859		
	UNITS	1A BIOMASS	1B BIOMASS	1C BIOMASS	4A BIOMASS	4B BIOMASS	4C BIOMASS	RDL	QC Batch

Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	2340	643	820	1230	130	132	1.0	9740454
Total (Dry Wt) Antimony (Sb)	mg/kg	11.5	20.8	19.6	36.4	27.0	16.6	0.0050	9740454
Total (Dry Wt) Arsenic (As)	mg/kg	107	345	358	431	310	150	0.020	9740454
Total (Dry Wt) Barium (Ba)	mg/kg	79.2	106	129	62.3	55.0	49.4	0.050	9740454
Total (Dry Wt) Beryllium (Be)	mg/kg	0.241	0.077	0.103	0.074	<0.010	0.016	0.010	9740454
Total (Dry Wt) Bismuth (Bi)	mg/kg	0.023	0.023	0.017	0.020	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Boron (B)	mg/kg	30.5	90.7	137	501	1130	714	1.0	9740454
Total (Dry Wt) Cadmium (Cd)	mg/kg	15.6	26.1	19.5	16.6	12.0	5.07	0.0050	9740454
Total (Dry Wt) Calcium (Ca)	mg/kg	65700	28500	27600	35800	25800	18700	10	9740454
Total (Dry Wt) Chromium (Cr)	mg/kg	177	52.4	81.7	66.2	4.27	5.81	0.10	9740454
Total (Dry Wt) Cobalt (Co)	mg/kg	86.9	47.8	11.5	52.1	14.9	7.74	0.020	9740454
Total (Dry Wt) Copper (Cu)	mg/kg	312	620	158	276	85.4	35.1	0.050	9740454
Total (Dry Wt) Iron (Fe)	mg/kg	8510	5790	8950	7140	3740	2970	5.0	9740454
Total (Dry Wt) Lead (Pb)	mg/kg	363	227	33.1	310	30.5	8.22	0.010	9740454
Total (Dry Wt) Magnesium (Mg)	mg/kg	20200	3270	7370	9690	5030	5110	5.0	9740454
Total (Dry Wt) Manganese (Mn)	mg/kg	3620	4970	4220	1820	1410	1670	0.050	9740454
Total (Dry Wt) Mercury (Hg)	mg/kg	<0.010	0.010	0.011	0.015	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Molybdenum (Mo)	mg/kg	2.93	3.11	3.49	4.60	5.21	3.51	0.020	9740454
Total (Dry Wt) Nickel (Ni)	mg/kg	89.4	169	107	35.2	41.3	22.7	0.050	9740454
Total (Dry Wt) Phosphorus (P)	mg/kg	1600	1410	1580	1540	2060	1620	10	9740454
Total (Dry Wt) Potassium (K)	mg/kg	2060	5320	5020	9200	20800	22200	10	9740454
Total (Dry Wt) Selenium (Se)	mg/kg	6.07	25.5	14.9	18.0	11.1	6.90	0.050	9740454
Total (Dry Wt) Silver (Ag)	mg/kg	0.0158	0.0339	0.0156	0.0282	0.0077	<0.0050	0.0050	9740454
Total (Dry Wt) Sodium (Na)	mg/kg	255	356	352	896	1070	1220	10	9740454
Total (Dry Wt) Strontium (Sr)	mg/kg	78.1	97.1	72.6	74.4	105	71.0	0.050	9740454
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0711	0.0345	0.0964	0.0910	0.0529	0.0917	0.0020	9740454
Total (Dry Wt) Tin (Sn)	mg/kg	0.23	0.36	0.20	0.23	0.16	0.13	0.10	9740454
Total (Dry Wt) Titanium (Ti)	mg/kg	123	12.5	16.6	34.0	1.12	5.68	0.50	9740454
Total (Dry Wt) Uranium (U)	mg/kg	40.5	173	85.1	49.9	37.3	13.8	0.0020	9740454
Total (Dry Wt) Vanadium (V)	mg/kg	11.0	4.17	7.21	5.15	0.79	1.48	0.20	9740454
Total (Dry Wt) Zinc (Zn)	mg/kg	671	1270	1270	845	901	530	0.20	9740454

RDL = Reportable Detection Limit

**ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE (PLANT))**

BV Labs ID		XF6403	XF6404	XF6405	XF6406	XF6407	XF6408		
Sampling Date		2020/01/13 11:10	2020/01/13 11:05	2020/01/13 11:00	2020/01/13 11:25	2020/01/13 11:20	2020/01/13 11:15		
COC Number		08476859	08476859	08476859	08476859	08476859	08476859		
	UNITS	1A BULRUSH	1B BULRUSH	1C BULRUSH	4A CAREX	4B CAREX	4C CAREX	RDL	QC Batch

Total Metals by ICPMS

Total (Dry Wt) Aluminum (Al)	mg/kg	19.4 (1)	15.9	10.8	51.7	31.7	41.2	1.0	9740454
Total (Dry Wt) Antimony (Sb)	mg/kg	0.218	0.180	0.345	1.29	0.220	0.504	0.0050	9740454
Total (Dry Wt) Arsenic (As)	mg/kg	1.16	1.08	2.20	7.16	2.81	1.85	0.020	9740454
Total (Dry Wt) Barium (Ba)	mg/kg	181 (1)	105	129	58.6	78.0	102	0.050	9740454
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Boron (B)	mg/kg	270 (1)	145	145	70.0	58.8	64.8	1.0	9740454
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0562	0.116	0.375	0.175	0.0716	0.0230	0.0050	9740454
Total (Dry Wt) Calcium (Ca)	mg/kg	47900 (1)	36000	36400	24900	22300	36300	10	9740454
Total (Dry Wt) Chromium (Cr)	mg/kg	1.59 (1)	2.14	1.05	0.86	0.72	0.54	0.10	9740454
Total (Dry Wt) Cobalt (Co)	mg/kg	0.176	0.135	0.154	0.382	0.165	0.062	0.020	9740454
Total (Dry Wt) Copper (Cu)	mg/kg	3.04 (1)	3.69	2.49	5.89	2.76	2.01	0.050	9740454
Total (Dry Wt) Iron (Fe)	mg/kg	149 (1)	127	154	152	98.8	86.3	5.0	9740454
Total (Dry Wt) Lead (Pb)	mg/kg	1.27	0.769	0.487	1.22	0.407	0.264	0.010	9740454
Total (Dry Wt) Magnesium (Mg)	mg/kg	3600 (1)	2100	3130	5120	4610	5310	5.0	9740454
Total (Dry Wt) Manganese (Mn)	mg/kg	14900 (1)	10500	14500	767	1270	1670	0.050	9740454
Total (Dry Wt) Mercury (Hg)	mg/kg	0.015	0.016	0.019	<0.010	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Molybdenum (Mo)	mg/kg	6.99 (1)	5.15	6.25	5.03	1.84	2.43	0.020	9740454
Total (Dry Wt) Nickel (Ni)	mg/kg	0.833	0.843	1.33	1.51	0.946	0.799	0.050	9740454
Total (Dry Wt) Phosphorus (P)	mg/kg	1670 (1)	1240	2330	1040	738	665	10	9740454
Total (Dry Wt) Potassium (K)	mg/kg	14900 (1)	13700	7430	12600	10700	8380	10	9740454
Total (Dry Wt) Selenium (Se)	mg/kg	0.862	0.627	0.483	1.35	0.566	0.267	0.050	9740454
Total (Dry Wt) Silver (Ag)	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9740454
Total (Dry Wt) Sodium (Na)	mg/kg	2930 (1)	2590	2410	5460	2630	3050	10	9740454
Total (Dry Wt) Strontium (Sr)	mg/kg	165 (1)	125	131	131	107	215	0.050	9740454
Total (Dry Wt) Thallium (Tl)	mg/kg	0.130	0.129	0.156	0.0058	0.0062	0.0082	0.0020	9740454
Total (Dry Wt) Tin (Sn)	mg/kg	0.14 (1)	0.14	0.11	0.16	0.13	0.14	0.10	9740454
Total (Dry Wt) Titanium (Ti)	mg/kg	<0.50	<0.50	<0.50	1.59	0.75	0.94	0.50	9740454
Total (Dry Wt) Uranium (U)	mg/kg	0.229	0.594	0.704	2.29	0.383	0.747	0.0020	9740454
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	9740454
Total (Dry Wt) Zinc (Zn)	mg/kg	31.3 (1)	32.9	54.8	93.4	39.5	32.2	0.20	9740454

RDL = Reportable Detection Limit

(1) Matrix Spike exceeds acceptance limits - Probable matrix interference.



PHYSICAL TESTING (TISSUE (PLANT))

BV Labs ID		XF6396	XF6397	XF6398	XF6399	XF6401	XF6402	XF6403		
Sampling Date		2020/01/13 11:55	2020/01/13 11:50	2020/01/13 11:45	2020/01/13 11:40	2020/01/13 11:35	2020/01/13 11:30	2020/01/13 11:10		
COC Number		08476858	08476858	08476858	08476858	08476859	08476859	08476859		
	UNITS	1A BIOMASS	1B BIOMASS	1C BIOMASS	4A BIOMASS	4B BIOMASS	4C BIOMASS	1A BULRUSH	RDL	QC Batch
Physical Properties										
Moisture	%	83	86	76	91	93	91	57	0.30	9737121
RDL = Reportable Detection Limit										

BV Labs ID		XF6404	XF6405	XF6406	XF6407	XF6408		
Sampling Date		2020/01/13 11:05	2020/01/13 11:00	2020/01/13 11:25	2020/01/13 11:20	2020/01/13 11:15		
COC Number		08476859	08476859	08476859	08476859	08476859		
	UNITS	1B BULRUSH	1C BULRUSH	4A CAREX	4B CAREX	4C CAREX	RDL	QC Batch
Physical Properties								
Moisture	%	43	62	56	48	47	0.30	9737121
RDL = Reportable Detection Limit								

**CSR/CCME METALS IN SOIL WITH HG (SOIL)**

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch

Physical Properties

Soluble (2:1) pH	pH	7.90	8.16	8.36	8.07	8.20	8.28	N/A	9734625
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Total Metals by ICPMS

Total Aluminum (Al)	mg/kg	1360	1590	1380	1420	1420	1280	100	9734894
Total Antimony (Sb)	mg/kg	0.34	0.14	0.23	0.42	0.27	0.18	0.10	9734894
Total Arsenic (As)	mg/kg	3.33	2.39	2.79	2.85	2.30	1.92 (1)	0.20	9734894
Total Barium (Ba)	mg/kg	18.5	14.5	18.1	15.0	25.0	30.6 (1)	0.10	9734894
Total Beryllium (Be)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	9734894
Total Bismuth (Bi)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9734894
Total Cadmium (Cd)	mg/kg	0.147	0.089	0.087	0.103	0.075	0.110	0.050	9734894
Total Calcium (Ca)	mg/kg	41700	57100	41400	41800	46400	48000	100	9734894
Total Chromium (Cr)	mg/kg	4.35	4.24	6.42	5.70	4.62	5.16	0.50	9734894
Total Cobalt (Co)	mg/kg	2.07	1.87	1.91	2.19	1.61	1.42 (1)	0.10	9734894
Total Copper (Cu)	mg/kg	4.20	2.45	3.09	3.81	3.14	2.75	0.50	9734894
Total Iron (Fe)	mg/kg	7530	6780	6890	6580	5610	5090 (1)	100	9734894
Total Lead (Pb)	mg/kg	2.98	1.62	1.43	1.75	1.16	1.18	0.10	9734894
Total Lithium (Li)	mg/kg	1.98	3.15	2.48	2.48	2.93	2.39	0.50	9734894
Total Magnesium (Mg)	mg/kg	11500	19700	11200	15400	15600	16400	100	9734894
Total Manganese (Mn)	mg/kg	225	379	212	173	198	201	0.20	9734894
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9734894
Total Molybdenum (Mo)	mg/kg	0.44	0.45	0.43	0.40	0.38	0.32 (1)	0.10	9734894
Total Nickel (Ni)	mg/kg	5.55	5.17	5.96	6.69	5.02	4.42 (1)	0.50	9734894
Total Phosphorus (P)	mg/kg	266	168	248	167	251	195 (1)	10	9734894
Total Potassium (K)	mg/kg	286	338	327	360	333	258	100	9734894
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9734894
Total Silver (Ag)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9734894
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	<100	<100	100	9734894
Total Strontium (Sr)	mg/kg	25.9	31.4	26.2	21.6	25.8	26.3	0.10	9734894
Total Thallium (Tl)	mg/kg	<0.050	0.071	<0.050	0.057	<0.050	<0.050	0.050	9734894
Total Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9734894
Total Titanium (Ti)	mg/kg	109	111	145	101	111	101	1.0	9734894

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Reanalysis yields similar results.



CSR/CCME METALS IN SOIL WITH HG (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Total Uranium (U)	mg/kg	0.687	0.483	0.673	0.802	0.713	0.529	0.050	9734894
Total Vanadium (V)	mg/kg	7.9	7.2	8.5	7.2	6.9	7.7	1.0	9734894
Total Zinc (Zn)	mg/kg	15.7	11.1	14.5	14.6	11.3	11.1	1.0	9734894
Total Zirconium (Zr)	mg/kg	1.73	1.63	2.11	1.64	1.57	1.66	0.50	9734894
RDL = Reportable Detection Limit									

BUREAU
VERITASBV Labs Job #: C002517
Report Date: 2020/02/11ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**SALINITY 4 PACKAGE FOR SOIL (SOIL)**

BV Labs ID		XF6390	XF6391		XF6392		XF6393		XF6394		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50		2020/01/13 12:45		2020/01/13 12:40		2020/01/13 12:35		
COC Number		08476858	08476858		08476858		08476858		08476858		
	UNITS	1A SOIL	1B SOIL	RDL	1C SOIL	RDL	4A SOIL	RDL	4B SOIL	RDL	QC Batch
ANIONS											
Soluble Sulphate (SO ₄)	mg/L	247	255	20	244	20	443	20	568	20	9736318
Soluble Chloride (Cl)	mg/L	47	46	10	57	10	78	10	122	10	9736317
Calculated Parameters											
Soluble Chloride (Cl)	mg/kg	13.9	13.8	3.0	17.4	3.1	23.7	3.0	36.7	3.0	9734055
Soluble Sodium (Na)	mg/kg	7.5	8.2	1.5	7.2	1.5	11.6	1.5	13.8	1.5	9734055
Soluble Calcium (Ca)	mg/kg	31.7	35.2	1.5	39.4	1.5	54.9	1.5	70.8	1.5	9734055
Soluble Magnesium (Mg)	mg/kg	4.5	5.3	1.5	5.8	1.5	7.2	1.5	9.1	1.5	9734055
Soluble Potassium (K)	mg/kg	<6.0	<6.0	6.0	<6.2	6.2	6.3	6.1	8.9	6.0	9734055
Soluble Sulphur (S)	mg/kg	26.4	27.1	9.0	31.4	9.2	50.1	9.1	68.2	9.0	9734055
Soluble Sulphate (SO ₄)	mg/kg	73.8	76.9	6.0	75.1	6.2	135	6.1	171	6.0	9734055
Sodium Adsorption Ratio	N/A	0.61	0.62	0.10	0.51	0.10	0.71	0.10	0.75	0.10	9734054
Soluble Parameters											
Soluble Conductivity	uS/cm	733	732	5.0	743	5.0	1140	5.0	1470	5.0	9736297
Soluble pH	pH	7.88	8.14	N/A	8.04	N/A	7.85	N/A	7.88	N/A	9735441
Soluble Calcium (Ca)	mg/L	106	117	5.0	128	5.0	181	5.0	235	5.0	9736148
Saturation %	%	29.9	30.1	N/A	30.8	N/A	30.4	N/A	30.2	N/A	9735409
Soluble Magnesium (Mg)	mg/L	15.0	17.4	5.0	18.9	5.0	23.8	5.0	30.0	5.0	9736148
Soluble Potassium (K)	mg/L	<20	<20	20	<20	20	21	20	29	20	9736148
Soluble Sodium (Na)	mg/L	25.1	27.3	5.0	23.3	5.0	38.1	5.0	45.6	5.0	9736148
Soluble Sulphur (S)	mg/L	88	90	30	102	30	165	30	226	30	9736148
RDL = Reportable Detection Limit N/A = Not Applicable											



SALINITY 4 PACKAGE FOR SOIL (SOIL)

BV Labs ID		XF6395		
Sampling Date		2020/01/13 12:30		
COC Number		08476858		
	UNITS	4C SOIL	RDL	QC Batch
ANIONS				
Soluble Sulphate (SO ₄)	mg/L	525	20	9736318
Soluble Chloride (Cl)	mg/L	89	10	9736317
Calculated Parameters				
Soluble Chloride (Cl)	mg/kg	26.8	3.0	9734055
Soluble Sodium (Na)	mg/kg	13.4	1.5	9734055
Soluble Calcium (Ca)	mg/kg	64.0	1.5	9734055
Soluble Magnesium (Mg)	mg/kg	9.0	1.5	9734055
Soluble Potassium (K)	mg/kg	<6.1	6.1	9734055
Soluble Sulphur (S)	mg/kg	59.2	9.1	9734055
Soluble Sulphate (SO ₄)	mg/kg	159	6.1	9734055
Sodium Adsorption Ratio	N/A	0.75	0.10	9734054
Soluble Parameters				
Soluble Conductivity	uS/cm	1290	5.0	9736297
Soluble pH	pH	7.91	N/A	9735441
Soluble Calcium (Ca)	mg/L	211	5.0	9736148
Saturation %	%	30.3	N/A	9735409
Soluble Magnesium (Mg)	mg/L	29.6	5.0	9736148
Soluble Potassium (K)	mg/L	<20	20	9736148
Soluble Sodium (Na)	mg/L	44.2	5.0	9736148
Soluble Sulphur (S)	mg/L	195	30	9736148
RDL = Reportable Detection Limit N/A = Not Applicable				



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	19.3°C
Package 2	12.7°C
Package 3	18.3°C
Package 4	11.0°C

Results relate only to the items tested.



BV Labs Job #: C002517
Report Date: 2020/02/11

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9734625	Soluble (2:1) pH	2020/01/15			100	N/A			0.12	20		
9734894	Total Aluminum (Al)	2020/01/15	164 (1)	75 - 125	104	75 - 125	<100	mg/kg	17	40	103	70 - 130
9734894	Total Antimony (Sb)	2020/01/15	99	75 - 125	102	75 - 125	<0.10	mg/kg	2.4	30	110	70 - 130
9734894	Total Arsenic (As)	2020/01/15	98	75 - 125	102	75 - 125	<0.20	mg/kg	80 (1)	30	95	70 - 130
9734894	Total Barium (Ba)	2020/01/15	95	75 - 125	99	75 - 125	<0.10	mg/kg	70 (1)	40	104	70 - 130
9734894	Total Beryllium (Be)	2020/01/15	96	75 - 125	98	75 - 125	<0.20	mg/kg	NC	30	103	70 - 130
9734894	Total Bismuth (Bi)	2020/01/15	86	75 - 125	92	75 - 125	<0.10	mg/kg	NC	30		
9734894	Total Cadmium (Cd)	2020/01/15	94	75 - 125	99	75 - 125	<0.050	mg/kg	24	30	102	70 - 130
9734894	Total Calcium (Ca)	2020/01/15	NC	75 - 125	101	75 - 125	<100	mg/kg	1.7	30	101	70 - 130
9734894	Total Chromium (Cr)	2020/01/15	92	75 - 125	99	75 - 125	<0.50	mg/kg	7.6	30	103	70 - 130
9734894	Total Cobalt (Co)	2020/01/15	91	75 - 125	99	75 - 125	<0.10	mg/kg	79 (1)	30	97	70 - 130
9734894	Total Copper (Cu)	2020/01/15	92	75 - 125	102	75 - 125	<0.50	mg/kg	0.81	30	114	70 - 130
9734894	Total Iron (Fe)	2020/01/15	NC	75 - 125	100	75 - 125	<100	mg/kg	57 (1)	30	101	70 - 130
9734894	Total Lead (Pb)	2020/01/15	92	75 - 125	99	75 - 125	<0.10	mg/kg	10	40	108	70 - 130
9734894	Total Lithium (Li)	2020/01/15	93	75 - 125	94	75 - 125	<0.50	mg/kg	28	30	101	70 - 130
9734894	Total Magnesium (Mg)	2020/01/15	NC	75 - 125	97	75 - 125	<100	mg/kg	14	30	105	70 - 130
9734894	Total Manganese (Mn)	2020/01/15	80	75 - 125	100	75 - 125	<0.20	mg/kg	22	30	105	70 - 130
9734894	Total Mercury (Hg)	2020/01/15	95	75 - 125	102	75 - 125	<0.050	mg/kg	NC	40	101	70 - 130
9734894	Total Molybdenum (Mo)	2020/01/15	94	75 - 125	96	75 - 125	<0.10	mg/kg	84 (1)	40	102	70 - 130
9734894	Total Nickel (Ni)	2020/01/15	89	75 - 125	98	75 - 125	<0.50	mg/kg	52 (1)	30	104	70 - 130
9734894	Total Phosphorus (P)	2020/01/15	101	75 - 125	96	75 - 125	<10	mg/kg	49 (1)	30	98	70 - 130
9734894	Total Potassium (K)	2020/01/15	115	75 - 125	100	75 - 125	<100	mg/kg	NC	40	91	70 - 130
9734894	Total Selenium (Se)	2020/01/15	98	75 - 125	101	75 - 125	<0.50	mg/kg	NC	30		
9734894	Total Silver (Ag)	2020/01/15	91	75 - 125	96	75 - 125	<0.050	mg/kg	NC	40	83	70 - 130
9734894	Total Sodium (Na)	2020/01/15	111	75 - 125	103	75 - 125	<100	mg/kg	NC	40	93	70 - 130
9734894	Total Strontium (Sr)	2020/01/15	101	75 - 125	100	75 - 125	<0.10	mg/kg	1.2	40	107	70 - 130
9734894	Total Thallium (Tl)	2020/01/15	90	75 - 125	97	75 - 125	<0.050	mg/kg	NC	30	94	70 - 130
9734894	Total Tin (Sn)	2020/01/15	97	75 - 125	99	75 - 125	<0.10	mg/kg	NC	40	100	70 - 130
9734894	Total Titanium (Ti)	2020/01/15	103	75 - 125	105	75 - 125	<1.0	mg/kg	28	40		
9734894	Total Uranium (U)	2020/01/15	91	75 - 125	98	75 - 125	<0.050	mg/kg	9.5	30	95	70 - 130
9734894	Total Vanadium (V)	2020/01/15	94	75 - 125	99	75 - 125	<1.0	mg/kg	5.4	30	104	70 - 130
9734894	Total Zinc (Zn)	2020/01/15	89	75 - 125	100	75 - 125	<1.0	mg/kg	15	30	101	70 - 130



QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9734894	Total Zirconium (Zr)	2020/01/15	107	75 - 125	92	75 - 125	<0.50	mg/kg	31	40		
9735409	Saturation %	2020/01/16					0	%	0	30	101	75 - 125
9735441	Soluble pH	2020/01/16			100	97 - 103			0	N/A	100	97 - 103
9736148	Soluble Calcium (Ca)	2020/01/16	NC	80 - 120	96	80 - 120	<5.0	mg/L	0.66	30	102	75 - 125
9736148	Soluble Magnesium (Mg)	2020/01/16	90	80 - 120	94	80 - 120	<5.0	mg/L	1.1	30	99	75 - 125
9736148	Soluble Potassium (K)	2020/01/16	94	80 - 120	94	80 - 120	<20	mg/L	NC	40	97	75 - 125
9736148	Soluble Sodium (Na)	2020/01/16	100	80 - 120	101	80 - 120	<5.0	mg/L	1.5	40	114	75 - 125
9736148	Soluble Sulphur (S)	2020/01/16	NC	80 - 120	93	80 - 120	<30	mg/L	1.0	30	94	75 - 125
9736297	Soluble Conductivity	2020/01/16			99	80 - 120	<5.0	uS/cm	0.26	35		
9736317	Soluble Chloride (Cl)	2020/01/16	99	75 - 125	102	80 - 120	<10	mg/L	0.53	30	83	75 - 125
9736318	Soluble Sulphate (SO4)	2020/01/16	NC	75 - 125	106	80 - 120	<20	mg/L	1.9	30	99	75 - 125
9737121	Moisture	2020/01/20					<0.30	%	5.3	20		
9737552	Moisture	2020/01/18					<0.30	%	2.7	20		
9737980	Available (CaCl2) Sulphur (S)	2020/01/20	109	75 - 125	103	80 - 120	<2.0	mg/kg	3.1	35	104	75 - 125
9737984	Available (KCl) Ammonia (N)	2020/01/20	101	75 - 125	103	80 - 120	<2.0	mg/kg	NC	35		
9737989	Available (KCl) Nitrate (N)	2020/01/20	101	75 - 125	101	80 - 120	<2.0	mg/kg	NC	30		
9737989	Available (KCl) Nitrite (N)	2020/01/20	94	75 - 125	94	80 - 120	<2.0	mg/kg	NC	30		
9738275	Available (Mod Kel) Phosphorus (P)	2020/01/20	112	75 - 125	107	80 - 120	<4.0	mg/kg	NC	35		
9738275	Available (Mod Kel) Potassium (K)	2020/01/20	101	75 - 125	97	80 - 120	<4.0	mg/kg	10	35		
9739352	Total Organic Carbon (C)	2020/01/21			100	80 - 120	<0.050	%	NC	35	100	75 - 125
9739355	Total Carbon	2020/01/21			102	80 - 120	<0.05	%	23	30	101	75 - 125
9739355	Total Sulphur (S)	2020/01/21			85	80 - 120	<0.06	%	NC	30	78	75 - 125
9740454	Total (Dry Wt) Aluminum (Al)	2020/01/31	205 (1)	80 - 120	110	80 - 120	<1.0	mg/kg	11	40	40	17 - 93
9740454	Total (Dry Wt) Antimony (Sb)	2020/01/31	101	80 - 120	102	80 - 120	<0.0050	mg/kg	2.2	40		
9740454	Total (Dry Wt) Arsenic (As)	2020/01/31	110	80 - 120	102	80 - 120	<0.020	mg/kg	0.62	40	96	42 - 199
9740454	Total (Dry Wt) Barium (Ba)	2020/01/31	674 (1)	80 - 120	99	80 - 120	<0.050	mg/kg	0.73	40		
9740454	Total (Dry Wt) Beryllium (Be)	2020/01/31	95	80 - 120	97	80 - 120	<0.010	mg/kg	NC	40		
9740454	Total (Dry Wt) Bismuth (Bi)	2020/01/31	94	80 - 120	105	80 - 120	<0.010	mg/kg	NC	40		
9740454	Total (Dry Wt) Boron (B)	2020/01/31	-63 (1)	80 - 120	97	80 - 120	<1.0	mg/kg	2.1	40	101	75 - 125
9740454	Total (Dry Wt) Cadmium (Cd)	2020/01/31	101	80 - 120	102	80 - 120	<0.0050	mg/kg	5.4	40	101	75 - 125
9740454	Total (Dry Wt) Calcium (Ca)	2020/01/31	2170 (1)	80 - 120	110	80 - 120	<10	mg/kg	2.0	60	102	75 - 125
9740454	Total (Dry Wt) Chromium (Cr)	2020/01/31	121 (1)	80 - 120	105	80 - 120	<0.10	mg/kg	3.6	40		



BV Labs Job #: C002517
Report Date: 2020/02/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9740454	Total (Dry Wt) Cobalt (Co)	2020/01/31	102	80 - 120	104	80 - 120	<0.020	mg/kg	5.3	40	92	75 - 125
9740454	Total (Dry Wt) Copper (Cu)	2020/01/31	121 (1)	80 - 120	108	80 - 120	<0.050	mg/kg	9.0	40	100	75 - 125
9740454	Total (Dry Wt) Iron (Fe)	2020/01/31	234 (1)	80 - 120	117	80 - 120	<5.0	mg/kg	2.6	40		
9740454	Total (Dry Wt) Lead (Pb)	2020/01/31	92	80 - 120	98	80 - 120	<0.010	mg/kg	7.8	40		
9740454	Total (Dry Wt) Magnesium (Mg)	2020/01/31	259 (1)	80 - 120	106	80 - 120	<5.0	mg/kg	4.6	40		
9740454	Total (Dry Wt) Manganese (Mn)	2020/01/31	35900 (1)	80 - 120	107	80 - 120	<0.050	mg/kg	5.6	40	102	75 - 125
9740454	Total (Dry Wt) Mercury (Hg)	2020/01/31	97	80 - 120	104	80 - 120	<0.010	mg/kg	1.2	40	93	75 - 125
9740454	Total (Dry Wt) Molybdenum (Mo)	2020/01/31	183 (1)	80 - 120	105	80 - 120	<0.020	mg/kg	1.8	40		
9740454	Total (Dry Wt) Nickel (Ni)	2020/01/31	109	80 - 120	110	80 - 120	<0.050	mg/kg	2.7	40	92	75 - 125
9740454	Total (Dry Wt) Phosphorus (P)	2020/01/31	169 (1)	80 - 120	100	80 - 120	<10	mg/kg	3.8	40	108	75 - 125
9740454	Total (Dry Wt) Potassium (K)	2020/01/31	692 (1)	80 - 120	100	80 - 120	<10	mg/kg	1.7	40	96	75 - 125
9740454	Total (Dry Wt) Selenium (Se)	2020/01/31	101	80 - 120	99	80 - 120	<0.050	mg/kg	0.25	40	112	75 - 125
9740454	Total (Dry Wt) Silver (Ag)	2020/01/31	84	80 - 120	83	80 - 120	<0.0050	mg/kg	NC	40		
9740454	Total (Dry Wt) Sodium (Na)	2020/01/31	210 (1)	80 - 120	107	80 - 120	<10	mg/kg	1.5	40	103	75 - 125
9740454	Total (Dry Wt) Strontium (Sr)	2020/01/31	-220 (1)	80 - 120	103	80 - 120	<0.050	mg/kg	3.7	60	101	75 - 125
9740454	Total (Dry Wt) Thallium (Tl)	2020/01/31	100	80 - 120	103	80 - 120	<0.0020	mg/kg	4.6	40		
9740454	Total (Dry Wt) Tin (Sn)	2020/01/31	69 (1)	80 - 120	104	80 - 120	<0.10	mg/kg	0.64	40		
9740454	Total (Dry Wt) Titanium (Ti)	2020/01/31	116	80 - 120	103	80 - 120	<0.50	mg/kg	NC	40		
9740454	Total (Dry Wt) Uranium (U)	2020/01/31	97	80 - 120	101	80 - 120	<0.0020	mg/kg	0.19	40		
9740454	Total (Dry Wt) Vanadium (V)	2020/01/31	111	80 - 120	105	80 - 120	<0.20	mg/kg	NC	40		



BUREAU
VERITAS
BV Labs Job #: C002517
Report Date: 2020/02/11

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9740454	Total (Dry Wt) Zinc (Zn)	2020/01/31	293 (1)	80 - 120	122 (2)	80 - 120	0.25, RD _L =0.20 (3)	mg/kg	3.0	40	102	75 - 125

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RD}_L$).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Blank Spike outside acceptance criteria (10% of analytes failure allowed).

(3) Method Blank exceeds acceptance limits for Zn. Sample values for Zn are $>10 \times$ the concentration of the method blank and the contamination is considered irrelevant.



VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Gita Pokhrel, Senior Analyst

Jennifer Villocero, Project Solutions Representative

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY



08476858

BBY FCD-00077/05

Page 1 of 1

Invoice Information				Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required											
Company Name: BMC MINERALS LTD.				Company Name: ALEXCO ENVIRONMENTAL				Quotation #: B60751				☒ Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS											
Contact Name: _____				Contact Name: Rachel Martz; Renate Vanderhorst				P.O. #/ A/FEB: _____				Rush TAT (Surcharges will be applied)											
Address: 530-1130 WEST PENDER ST				Address: UNIT 3 151 INDUSTRIAL RD				Project #: BMC-18-02				Same Day ☐ 2 Days ☐											
Vancouver, BC V6E 4A4				Whitehorse, YC V1A 2V3				Site Location: Kudze Keyah				1 Day ☐ 3 Days ☐											
Phone: _____				Phone: (867) 668-6463				Site #: _____				Date Required: _____											
Email: _____				Email: martz@alexcoenv.com				Sampled By: _____				Rush Confirmation #: _____											
Regulatory Criteria ☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality				Special Instructions ☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485				Analysis Requested Solinity Package 4 Nutrient Package 1 Carbon (Total, Organic, and Inorganic) Metals (soil) CRC ICPMS Total Sulphur (LECO) Metals (vegetation) and sulphur % Moisture AVS/SEM Tessier Sequential Extraction				Rush Confirmation #: LABORATORY USE ONLY CUSTODY SEAL Present ☒ Intact ☒ COOLER TEMPERATURES 15.5 / 15.5 / 15.5 / 15.5 29 / 15.5											
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM												HOLD - DO NOT ANALYZE COMMENTS: _____											
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Solinity Package 4	Nutrient Package 1	Carbon (Total, Organic, and Inorganic)	Metals (soil) CRC ICPMS	Total Sulphur (LECO)	Metals (vegetation) and sulphur	% Moisture	AVS/SEM	Tessier Sequential Extraction	# OF CONTAINERS SUBMITTED	COMMENTS								
1 1A Soil		13-Jan-20	18:55	Soil	X	X	X	X	X			X	X	3	Please contact r.vanderhorst@alexcoenv.com								
2 1B Soil		13-Jan-20	18:50	Soil	X	X	X	X	X			X	X	2	with any questions								
3 1C Soil		13-Jan-20	18:45	Soil	X	X	X	X	X			X	X	3									
4 4A Soil		13-Jan-20	18:40	Soil	X	X	X	X	X			X	X	3									
5 4B Soil		13-Jan-20	18:35	Soil	X	X	X	X	X			X	X	2	All samples contained in Ziploc bags except AVS/SEM and Tessier samples (glass jars)								
6 4C Soil		13-Jan-20	18:30	Soil	X	X	X	X	X			X	X	3									
7 1A Biomass		13-Jan-20	11:55	Tissue						X				1									
8 1B Biomass		13-Jan-20	11:50	Tissue						X				1									
9 1C Biomass		13-Jan-20	11:45	Tissue						X				1									
10 4A Biomass		13-Jan-20	11:40	Tissue						X				1									
RELINQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)				RECEIVED BY: (Signature/Print)				DATE: (YYYY/MM/DD)				TIME: (HH:MM)			
Tanner Webb				2020/01/13				13:00				R. Vanderhorst				2020/01/14				08:25			

0196



C002517_COC

CHAIN OF CUSTODY



08476859

BBV FCD-00077/05

Page 1 of 1

COC #:

Project Information (where applicable)

Report Information (if differs from invoice)

Invoice Information

Company Name:	BMC MINERALS LTD.	Company Name:	ALEKO ENVIRONMENTAL	Quotation #:	860751	Turnaround Time (TAT) Required	☒ Regular TAT 5 days (Most analyses)
Contact Name:		Contact Name:	Mary Miosha; Renate Vanderhorst	P.O. #/ A/E#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PRODUCTS	
Address:	530-1130 WEST PENDER ST Vancouver, BC V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitby, ON N2A 2V3	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)	
Phone:		Phone:	(867) 668-6463	Site location:	Kud. Ze Kayah	Same Day ☐ 2 Days ☐ 3 Days ☐	
Email:		Email:	mmiosha@alekocoeny.com	Site #:		Date Required:	

Regulatory Criteria	Special Instructions	Analysis Requested	Rush Confirmation #:
☐ BC CSR Soil ☐ BC CSR Water ☐ CCME (Specify) ☐ Other (Specify) ☐ Drinking Water ☐ BC Water Quality	☐ Return Cooler ☐ Ship Sample Bottles (Please Specify) USE SCENARIO # 12485		

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Metals (vegetation) and sulphur	% Moisture	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1 4B Biomass		13-Jan-20	11:35	Tissue	X	X	1	
2 4C Biomass		13-Jan-20	11:30	Tissue	X	X	1	
3 1A Bulrush		13-Jan-20	11:10	Tissue	X	X	1	
4 1B Bulrush		13-Jan-20	11:05	Tissue	X	X	1	
5 1C Bulrush		13-Jan-20	11:00	Tissue	X	X	1	
6 4A Carex		13-Jan-20	11:05	Tissue	X	X	1	
7 4B Carex		13-Jan-20	11:20	Tissue	X	X	1	
8 4C Carex		13-Jan-20	11:15	Tissue	X	X	1	
9								
10								

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
<i>Turner Webb</i>	2020/01/13	13:00	<i>Mary Miosha</i>	2020/01/14	08:25



C002517_COC



Your Project #: BMC-18-02
 Site Location: KUDZ ZE KAYAH
 Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
 Unit 3 Calcite Business Centre
 151 Industrial Road
 WHITEHORSE, YT
 Canada Y1A 2V3

Report Date: 2020/02/13
 Report #: R2844786
 Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Sample Matrix: Soil
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride (soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00011	SM 23 4500-Cl- E m
Conductivity (Soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00029	SM 23 2510 B m
Elements by ICPMS (total) (1)	6	2020/01/15	2020/01/15	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Moisture	6	N/A	2020/01/18	AB SOP-00002	CCME PHC-CWS m
Nitrite and Nitrate Available (10:1) Wet	5	2020/01/18	2020/01/20	AB SOP-00027 / AB SOP- 00023	SM 23 4110 B m
Nitrite and Nitrate Available (10:1) Wet	1	2020/01/20	2020/01/20	AB SOP-00027 / AB SOP- 00023	SM 23 4110 B m
Ammonia-N (Available)	5	2020/01/18	2020/01/20	AB SOP-00027 / AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N (Available)	1	2020/01/20	2020/01/20	AB SOP-00027 / AB SOP-00007	SM 23 4500 NH3 A G m
NO2 + NO3 Available (10:1 Wet)	6	2020/01/14	2020/01/20		Auto Calc
pH (2:1 DI Water Extract) (1)	6	2020/01/15	2020/01/15	BBY6SOP-00028	BCMOE BCLM Mar2005 m
pH (Soluble) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00025	SM 23 4500-H+ B
Phosphorus, Potassium - Available	6	2020/01/20	2020/01/20	AB SOP-00028 / AB SOP- 00042	EPA 6010d R5 m
Sodium Adsorption Ratio SP (1)	6	N/A	2020/01/16	BBY WI-00033	Auto Calc
Saturated Paste (1)	6	2020/01/16	2020/01/16	BBY6SOP-00030	BC Lab Manual 2015
Sulphur (Available)	6	2020/01/20	2020/01/20	AB SOP-00029 / AB SOP- 00042	EPA 6010d R5 m
Soluble Ions Calculation (mg/kg) (1)	6	N/A	2020/01/17	BBY WI-00033	Auto Calc
Sulphate (soluble) (soil) (1)	6	2020/01/16	2020/01/16	BBY6SOP-00017	SM 23 4500-SO42- E m
Soluble Cations (Ca,K,Mg,Na,S) (1)	6	N/A	2020/01/16	BBY7SOP-00018 / BBY7SOP-00030 / BCLM Nov 2015	EPA 6010d m
Total Organic Carbon LECO Method	6	N/A	2020/01/21	CAL SOP-00243	LECO 203-821-498 m
Total Carbon, Nitrogen & Sulphur in Soil	6	N/A	2020/01/21	CAL SOP-00243	LECO 203-821-498 m
Total Inorganic Carbon Calculation	6	N/A	2020/01/26		Auto Calc
AVS/SEM in Soil Subcontract (2)	4	N/A	2020/01/25		



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/02/13
Report #: R2844786
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Sample Matrix: Tissue (Plant)
Samples Received: 12

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Elements in Tissue by CRC ICPMS - Dry Wt (1)	12	2020/01/22	2020/01/31	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Moisture in Tissue (1)	12	2020/01/17	2020/01/20	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by BV Labs Vancouver

(2) This test was performed by Sub Vancouver to ALS Burnaby



Your Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH
Your C.O.C. #: 08476858, 08476859

Attention: KAI WOLOSHYN

ALEXCO ENVIRONMENTAL GROUP INC.
Unit 3 Calcite Business Centre
151 Industrial Road
WHITEHORSE, YT
Canada Y1A 2V3

Report Date: 2020/02/13
Report #: R2844786
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C002517

Received: 2020/01/13, 14:16

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Safiann Maiter, Key Account Specialist
Email: Safiann.Maiter@bvlabs.com
Phone# (604)639-2616

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



NUTRIENT PACKAGE 1 (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch

Nutrients									
Available (KCl) Ammonia (N)	mg/kg	<2.0	<2.0	<2.0	5.5	<2.0	<2.0	2.0	9737984
Available (KCl) Nitrate plus Nitrite (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9734074
Available (Mod Kel) Phosphorus (P)	mg/kg	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	9738275
Available (Mod Kel) Potassium (K)	mg/kg	11	11	12	20	23	16	4.0	9738275
Available (CaCl ₂) Sulphur (S)	mg/kg	23	31	33	55	51	54	2.0	9737980
Available (KCl) Nitrite (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9737989
Available (KCl) Nitrate (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	9737989

RDL = Reportable Detection Limit



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BV Labs Job #: C002517
Report Date: 2020/02/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

RESULTS OF CHEMICAL ANALYSES OF SOIL

BV Labs ID		XF6390	XF6392	XF6393	XF6395	
Sampling Date		2020/01/13 12:55	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:30	
COC Number		08476858	08476858	08476858	08476858	
	UNITS	1A SOIL	1C SOIL	4A SOIL	4C SOIL	QC Batch
External Sublet Analysis						
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	9743988



PHYSICAL TESTING (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Physical Properties									
Moisture	%	17	19	20	21	19	20	0.30	9737552
RDL = Reportable Detection Limit									



MISCELLANEOUS (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Misc. Inorganics									
Total Inorganic Carbon (C)	%	2.7	3.0	2.8	2.1	2.6	2.6	0.050	9734091
Total Organic Carbon (C)	%	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9739352
Total Carbon	%	2.7	3.0	2.8	2.1	2.6	2.6	0.05	9739355
Total Sulphur (S)	%	0.34	0.23	0.21	0.20	0.16	0.16	0.06	9739355
RDL = Reportable Detection Limit									

**ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE (PLANT))**

BV Labs ID		XF6396	XF6397	XF6398	XF6399	XF6401	XF6402		
Sampling Date		2020/01/13 11:55	2020/01/13 11:50	2020/01/13 11:45	2020/01/13 11:40	2020/01/13 11:35	2020/01/13 11:30		
COC Number		08476858	08476858	08476858	08476858	08476859	08476859		
	UNITS	1A BIOMASS	1B BIOMASS	1C BIOMASS	4A BIOMASS	4B BIOMASS	4C BIOMASS	RDL	QC Batch

Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	2340	643	820	1230	130	132	1.0	9740454
Total (Dry Wt) Antimony (Sb)	mg/kg	11.5	20.8	19.6	36.4	27.0	16.6	0.0050	9740454
Total (Dry Wt) Arsenic (As)	mg/kg	107	345	358	431	310	150	0.020	9740454
Total (Dry Wt) Barium (Ba)	mg/kg	79.2	106	129	62.3	55.0	49.4	0.050	9740454
Total (Dry Wt) Beryllium (Be)	mg/kg	0.241	0.077	0.103	0.074	<0.010	0.016	0.010	9740454
Total (Dry Wt) Bismuth (Bi)	mg/kg	0.023	0.023	0.017	0.020	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Boron (B)	mg/kg	30.5	90.7	137	501	1130	714	1.0	9740454
Total (Dry Wt) Cadmium (Cd)	mg/kg	15.6	26.1	19.5	16.6	12.0	5.07	0.0050	9740454
Total (Dry Wt) Calcium (Ca)	mg/kg	65700	28500	27600	35800	25800	18700	10	9740454
Total (Dry Wt) Chromium (Cr)	mg/kg	177	52.4	81.7	66.2	4.27	5.81	0.10	9740454
Total (Dry Wt) Cobalt (Co)	mg/kg	86.9	47.8	11.5	52.1	14.9	7.74	0.020	9740454
Total (Dry Wt) Copper (Cu)	mg/kg	312	620	158	276	85.4	35.1	0.050	9740454
Total (Dry Wt) Iron (Fe)	mg/kg	8510	5790	8950	7140	3740	2970	5.0	9740454
Total (Dry Wt) Lead (Pb)	mg/kg	363	227	33.1	310	30.5	8.22	0.010	9740454
Total (Dry Wt) Magnesium (Mg)	mg/kg	20200	3270	7370	9690	5030	5110	5.0	9740454
Total (Dry Wt) Manganese (Mn)	mg/kg	3620	4970	4220	1820	1410	1670	0.050	9740454
Total (Dry Wt) Mercury (Hg)	mg/kg	<0.010	0.010	0.011	0.015	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Molybdenum (Mo)	mg/kg	2.93	3.11	3.49	4.60	5.21	3.51	0.020	9740454
Total (Dry Wt) Nickel (Ni)	mg/kg	89.4	169	107	35.2	41.3	22.7	0.050	9740454
Total (Dry Wt) Phosphorus (P)	mg/kg	1600	1410	1580	1540	2060	1620	10	9740454
Total (Dry Wt) Potassium (K)	mg/kg	2060	5320	5020	9200	20800	22200	10	9740454
Total (Dry Wt) Selenium (Se)	mg/kg	6.07	25.5	14.9	18.0	11.1	6.90	0.050	9740454
Total (Dry Wt) Silver (Ag)	mg/kg	0.0158	0.0339	0.0156	0.0282	0.0077	<0.0050	0.0050	9740454
Total (Dry Wt) Sodium (Na)	mg/kg	255	356	352	896	1070	1220	10	9740454
Total (Dry Wt) Strontium (Sr)	mg/kg	78.1	97.1	72.6	74.4	105	71.0	0.050	9740454
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0711	0.0345	0.0964	0.0910	0.0529	0.0917	0.0020	9740454
Total (Dry Wt) Tin (Sn)	mg/kg	0.23	0.36	0.20	0.23	0.16	0.13	0.10	9740454
Total (Dry Wt) Titanium (Ti)	mg/kg	123	12.5	16.6	34.0	1.12	5.68	0.50	9740454
Total (Dry Wt) Uranium (U)	mg/kg	40.5	173	85.1	49.9	37.3	13.8	0.0020	9740454
Total (Dry Wt) Vanadium (V)	mg/kg	11.0	4.17	7.21	5.15	0.79	1.48	0.20	9740454
Total (Dry Wt) Zinc (Zn)	mg/kg	671	1270	1270	845	901	530	0.20	9740454

RDL = Reportable Detection Limit

**ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE (PLANT))**

BV Labs ID		XF6403	XF6404	XF6405	XF6406	XF6407	XF6408		
Sampling Date		2020/01/13 11:10	2020/01/13 11:05	2020/01/13 11:00	2020/01/13 11:25	2020/01/13 11:20	2020/01/13 11:15		
COC Number		08476859	08476859	08476859	08476859	08476859	08476859		
	UNITS	1A BULRUSH	1B BULRUSH	1C BULRUSH	4A CAREX	4B CAREX	4C CAREX	RDL	QC Batch

Total Metals by ICPMS

Total (Dry Wt) Aluminum (Al)	mg/kg	19.4 (1)	15.9	10.8	51.7	31.7	41.2	1.0	9740454
Total (Dry Wt) Antimony (Sb)	mg/kg	0.218	0.180	0.345	1.29	0.220	0.504	0.0050	9740454
Total (Dry Wt) Arsenic (As)	mg/kg	1.16	1.08	2.20	7.16	2.81	1.85	0.020	9740454
Total (Dry Wt) Barium (Ba)	mg/kg	181 (1)	105	129	58.6	78.0	102	0.050	9740454
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Boron (B)	mg/kg	270 (1)	145	145	70.0	58.8	64.8	1.0	9740454
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0562	0.116	0.375	0.175	0.0716	0.0230	0.0050	9740454
Total (Dry Wt) Calcium (Ca)	mg/kg	47900 (1)	36000	36400	24900	22300	36300	10	9740454
Total (Dry Wt) Chromium (Cr)	mg/kg	1.59 (1)	2.14	1.05	0.86	0.72	0.54	0.10	9740454
Total (Dry Wt) Cobalt (Co)	mg/kg	0.176	0.135	0.154	0.382	0.165	0.062	0.020	9740454
Total (Dry Wt) Copper (Cu)	mg/kg	3.04 (1)	3.69	2.49	5.89	2.76	2.01	0.050	9740454
Total (Dry Wt) Iron (Fe)	mg/kg	149 (1)	127	154	152	98.8	86.3	5.0	9740454
Total (Dry Wt) Lead (Pb)	mg/kg	1.27	0.769	0.487	1.22	0.407	0.264	0.010	9740454
Total (Dry Wt) Magnesium (Mg)	mg/kg	3600 (1)	2100	3130	5120	4610	5310	5.0	9740454
Total (Dry Wt) Manganese (Mn)	mg/kg	14900 (1)	10500	14500	767	1270	1670	0.050	9740454
Total (Dry Wt) Mercury (Hg)	mg/kg	0.015	0.016	0.019	<0.010	<0.010	<0.010	0.010	9740454
Total (Dry Wt) Molybdenum (Mo)	mg/kg	6.99 (1)	5.15	6.25	5.03	1.84	2.43	0.020	9740454
Total (Dry Wt) Nickel (Ni)	mg/kg	0.833	0.843	1.33	1.51	0.946	0.799	0.050	9740454
Total (Dry Wt) Phosphorus (P)	mg/kg	1670 (1)	1240	2330	1040	738	665	10	9740454
Total (Dry Wt) Potassium (K)	mg/kg	14900 (1)	13700	7430	12600	10700	8380	10	9740454
Total (Dry Wt) Selenium (Se)	mg/kg	0.862	0.627	0.483	1.35	0.566	0.267	0.050	9740454
Total (Dry Wt) Silver (Ag)	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9740454
Total (Dry Wt) Sodium (Na)	mg/kg	2930 (1)	2590	2410	5460	2630	3050	10	9740454
Total (Dry Wt) Strontium (Sr)	mg/kg	165 (1)	125	131	131	107	215	0.050	9740454
Total (Dry Wt) Thallium (Tl)	mg/kg	0.130	0.129	0.156	0.0058	0.0062	0.0082	0.0020	9740454
Total (Dry Wt) Tin (Sn)	mg/kg	0.14 (1)	0.14	0.11	0.16	0.13	0.14	0.10	9740454
Total (Dry Wt) Titanium (Ti)	mg/kg	<0.50	<0.50	<0.50	1.59	0.75	0.94	0.50	9740454
Total (Dry Wt) Uranium (U)	mg/kg	0.229	0.594	0.704	2.29	0.383	0.747	0.0020	9740454
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	9740454
Total (Dry Wt) Zinc (Zn)	mg/kg	31.3 (1)	32.9	54.8	93.4	39.5	32.2	0.20	9740454

RDL = Reportable Detection Limit

(1) Matrix Spike exceeds acceptance limits - Probable matrix interference.



PHYSICAL TESTING (TISSUE (PLANT))

BV Labs ID		XF6396	XF6397	XF6398	XF6399	XF6401	XF6402	XF6403		
Sampling Date		2020/01/13 11:55	2020/01/13 11:50	2020/01/13 11:45	2020/01/13 11:40	2020/01/13 11:35	2020/01/13 11:30	2020/01/13 11:10		
COC Number		08476858	08476858	08476858	08476858	08476859	08476859	08476859		
	UNITS	1A BIOMASS	1B BIOMASS	1C BIOMASS	4A BIOMASS	4B BIOMASS	4C BIOMASS	1A BULRUSH	RDL	QC Batch
Physical Properties										
Moisture	%	83	86	76	91	93	91	57	0.30	9737121
RDL = Reportable Detection Limit										

BV Labs ID		XF6404	XF6405	XF6406	XF6407	XF6408		
Sampling Date		2020/01/13 11:05	2020/01/13 11:00	2020/01/13 11:25	2020/01/13 11:20	2020/01/13 11:15		
COC Number		08476859	08476859	08476859	08476859	08476859		
	UNITS	1B BULRUSH	1C BULRUSH	4A CAREX	4B CAREX	4C CAREX	RDL	QC Batch
Physical Properties								
Moisture	%	43	62	56	48	47	0.30	9737121
RDL = Reportable Detection Limit								



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VERITAS

BV Labs Job #: C002517
Report Date: 2020/02/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

CSR/CCME METALS IN SOIL WITH HG (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch

Physical Properties									
Soluble (2:1) pH	pH	7.90	8.16	8.36	8.07	8.20	8.28	N/A	9734625
Total Metals by ICPMS									
Total Aluminum (Al)	mg/kg	1360	1590	1380	1420	1420	1280	100	9734894
Total Antimony (Sb)	mg/kg	0.34	0.14	0.23	0.42	0.27	0.18	0.10	9734894
Total Arsenic (As)	mg/kg	3.33	2.39	2.79	2.85	2.30	1.92 (1)	0.20	9734894
Total Barium (Ba)	mg/kg	18.5	14.5	18.1	15.0	25.0	30.6 (1)	0.10	9734894
Total Beryllium (Be)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	9734894
Total Bismuth (Bi)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9734894
Total Cadmium (Cd)	mg/kg	0.147	0.089	0.087	0.103	0.075	0.110	0.050	9734894
Total Calcium (Ca)	mg/kg	41700	57100	41400	41800	46400	48000	100	9734894
Total Chromium (Cr)	mg/kg	4.35	4.24	6.42	5.70	4.62	5.16	0.50	9734894
Total Cobalt (Co)	mg/kg	2.07	1.87	1.91	2.19	1.61	1.42 (1)	0.10	9734894
Total Copper (Cu)	mg/kg	4.20	2.45	3.09	3.81	3.14	2.75	0.50	9734894
Total Iron (Fe)	mg/kg	7530	6780	6890	6580	5610	5090 (1)	100	9734894
Total Lead (Pb)	mg/kg	2.98	1.62	1.43	1.75	1.16	1.18	0.10	9734894
Total Lithium (Li)	mg/kg	1.98	3.15	2.48	2.48	2.93	2.39	0.50	9734894
Total Magnesium (Mg)	mg/kg	11500	19700	11200	15400	15600	16400	100	9734894
Total Manganese (Mn)	mg/kg	225	379	212	173	198	201	0.20	9734894
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9734894
Total Molybdenum (Mo)	mg/kg	0.44	0.45	0.43	0.40	0.38	0.32 (1)	0.10	9734894
Total Nickel (Ni)	mg/kg	5.55	5.17	5.96	6.69	5.02	4.42 (1)	0.50	9734894
Total Phosphorus (P)	mg/kg	266	168	248	167	251	195 (1)	10	9734894
Total Potassium (K)	mg/kg	286	338	327	360	333	258	100	9734894
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9734894
Total Silver (Ag)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	9734894
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	<100	<100	100	9734894
Total Strontium (Sr)	mg/kg	25.9	31.4	26.2	21.6	25.8	26.3	0.10	9734894
Total Thallium (Tl)	mg/kg	<0.050	0.071	<0.050	0.057	<0.050	<0.050	0.050	9734894
Total Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9734894
Total Titanium (Ti)	mg/kg	109	111	145	101	111	101	1.0	9734894

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Reanalysis yields similar results.



CSR/CCME METALS IN SOIL WITH HG (SOIL)

BV Labs ID		XF6390	XF6391	XF6392	XF6393	XF6394	XF6395		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50	2020/01/13 12:45	2020/01/13 12:40	2020/01/13 12:35	2020/01/13 12:30		
COC Number		08476858	08476858	08476858	08476858	08476858	08476858		
	UNITS	1A SOIL	1B SOIL	1C SOIL	4A SOIL	4B SOIL	4C SOIL	RDL	QC Batch
Total Uranium (U)	mg/kg	0.687	0.483	0.673	0.802	0.713	0.529	0.050	9734894
Total Vanadium (V)	mg/kg	7.9	7.2	8.5	7.2	6.9	7.7	1.0	9734894
Total Zinc (Zn)	mg/kg	15.7	11.1	14.5	14.6	11.3	11.1	1.0	9734894
Total Zirconium (Zr)	mg/kg	1.73	1.63	2.11	1.64	1.57	1.66	0.50	9734894
RDL = Reportable Detection Limit									

BUREAU
VERITASBV Labs Job #: C002517
Report Date: 2020/02/13ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH**SALINITY 4 PACKAGE FOR SOIL (SOIL)**

BV Labs ID		XF6390	XF6391		XF6392		XF6393		XF6394		
Sampling Date		2020/01/13 12:55	2020/01/13 12:50		2020/01/13 12:45		2020/01/13 12:40		2020/01/13 12:35		
COC Number		08476858	08476858		08476858		08476858		08476858		
	UNITS	1A SOIL	1B SOIL	RDL	1C SOIL	RDL	4A SOIL	RDL	4B SOIL	RDL	QC Batch
ANIONS											
Soluble Sulphate (SO ₄)	mg/L	247	255	20	244	20	443	20	568	20	9736318
Soluble Chloride (Cl)	mg/L	47	46	10	57	10	78	10	122	10	9736317
Calculated Parameters											
Soluble Chloride (Cl)	mg/kg	13.9	13.8	3.0	17.4	3.1	23.7	3.0	36.7	3.0	9734055
Soluble Sodium (Na)	mg/kg	7.5	8.2	1.5	7.2	1.5	11.6	1.5	13.8	1.5	9734055
Soluble Calcium (Ca)	mg/kg	31.7	35.2	1.5	39.4	1.5	54.9	1.5	70.8	1.5	9734055
Soluble Magnesium (Mg)	mg/kg	4.5	5.3	1.5	5.8	1.5	7.2	1.5	9.1	1.5	9734055
Soluble Potassium (K)	mg/kg	<6.0	<6.0	6.0	<6.2	6.2	6.3	6.1	8.9	6.0	9734055
Soluble Sulphur (S)	mg/kg	26.4	27.1	9.0	31.4	9.2	50.1	9.1	68.2	9.0	9734055
Soluble Sulphate (SO ₄)	mg/kg	73.8	76.9	6.0	75.1	6.2	135	6.1	171	6.0	9734055
Sodium Adsorption Ratio	N/A	0.61	0.62	0.10	0.51	0.10	0.71	0.10	0.75	0.10	9734054
Soluble Parameters											
Soluble Conductivity	uS/cm	733	732	5.0	743	5.0	1140	5.0	1470	5.0	9736297
Soluble pH	pH	7.88	8.14	N/A	8.04	N/A	7.85	N/A	7.88	N/A	9735441
Soluble Calcium (Ca)	mg/L	106	117	5.0	128	5.0	181	5.0	235	5.0	9736148
Saturation %	%	29.9	30.1	N/A	30.8	N/A	30.4	N/A	30.2	N/A	9735409
Soluble Magnesium (Mg)	mg/L	15.0	17.4	5.0	18.9	5.0	23.8	5.0	30.0	5.0	9736148
Soluble Potassium (K)	mg/L	<20	<20	20	<20	20	21	20	29	20	9736148
Soluble Sodium (Na)	mg/L	25.1	27.3	5.0	23.3	5.0	38.1	5.0	45.6	5.0	9736148
Soluble Sulphur (S)	mg/L	88	90	30	102	30	165	30	226	30	9736148
RDL = Reportable Detection Limit N/A = Not Applicable											



SALINITY 4 PACKAGE FOR SOIL (SOIL)

BV Labs ID		XF6395		
Sampling Date		2020/01/13 12:30		
COC Number		08476858		
	UNITS	4C SOIL	RDL	QC Batch
ANIONS				
Soluble Sulphate (SO ₄)	mg/L	525	20	9736318
Soluble Chloride (Cl)	mg/L	89	10	9736317
Calculated Parameters				
Soluble Chloride (Cl)	mg/kg	26.8	3.0	9734055
Soluble Sodium (Na)	mg/kg	13.4	1.5	9734055
Soluble Calcium (Ca)	mg/kg	64.0	1.5	9734055
Soluble Magnesium (Mg)	mg/kg	9.0	1.5	9734055
Soluble Potassium (K)	mg/kg	<6.1	6.1	9734055
Soluble Sulphur (S)	mg/kg	59.2	9.1	9734055
Soluble Sulphate (SO ₄)	mg/kg	159	6.1	9734055
Sodium Adsorption Ratio	N/A	0.75	0.10	9734054
Soluble Parameters				
Soluble Conductivity	uS/cm	1290	5.0	9736297
Soluble pH	pH	7.91	N/A	9735441
Soluble Calcium (Ca)	mg/L	211	5.0	9736148
Saturation %	%	30.3	N/A	9735409
Soluble Magnesium (Mg)	mg/L	29.6	5.0	9736148
Soluble Potassium (K)	mg/L	<20	20	9736148
Soluble Sodium (Na)	mg/L	44.2	5.0	9736148
Soluble Sulphur (S)	mg/L	195	30	9736148
RDL = Reportable Detection Limit N/A = Not Applicable				



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	19.3°C
Package 2	12.7°C
Package 3	18.3°C
Package 4	11.0°C

Version 1 and Version 2 - Partial Reports Issued

Version 3 - Final Report - 2020/02/11

Version 4 - Revised report to included the Tessier Report (Job#C003223). 2020/02/13

Results relate only to the items tested.



BV Labs Job #: C002517
Report Date: 2020/02/13

QUALITY ASSURANCE REPORT

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9734625	Soluble (2:1) pH	2020/01/15			100	N/A			0.12	20		
9734894	Total Aluminum (Al)	2020/01/15	164 (1)	75 - 125	104	75 - 125	<100	mg/kg	17	40	103	70 - 130
9734894	Total Antimony (Sb)	2020/01/15	99	75 - 125	102	75 - 125	<0.10	mg/kg	2.4	30	110	70 - 130
9734894	Total Arsenic (As)	2020/01/15	98	75 - 125	102	75 - 125	<0.20	mg/kg	80 (1)	30	95	70 - 130
9734894	Total Barium (Ba)	2020/01/15	95	75 - 125	99	75 - 125	<0.10	mg/kg	70 (1)	40	104	70 - 130
9734894	Total Beryllium (Be)	2020/01/15	96	75 - 125	98	75 - 125	<0.20	mg/kg	NC	30	103	70 - 130
9734894	Total Bismuth (Bi)	2020/01/15	86	75 - 125	92	75 - 125	<0.10	mg/kg	NC	30		
9734894	Total Cadmium (Cd)	2020/01/15	94	75 - 125	99	75 - 125	<0.050	mg/kg	24	30	102	70 - 130
9734894	Total Calcium (Ca)	2020/01/15	NC	75 - 125	101	75 - 125	<100	mg/kg	1.7	30	101	70 - 130
9734894	Total Chromium (Cr)	2020/01/15	92	75 - 125	99	75 - 125	<0.50	mg/kg	7.6	30	103	70 - 130
9734894	Total Cobalt (Co)	2020/01/15	91	75 - 125	99	75 - 125	<0.10	mg/kg	79 (1)	30	97	70 - 130
9734894	Total Copper (Cu)	2020/01/15	92	75 - 125	102	75 - 125	<0.50	mg/kg	0.81	30	114	70 - 130
9734894	Total Iron (Fe)	2020/01/15	NC	75 - 125	100	75 - 125	<100	mg/kg	57 (1)	30	101	70 - 130
9734894	Total Lead (Pb)	2020/01/15	92	75 - 125	99	75 - 125	<0.10	mg/kg	10	40	108	70 - 130
9734894	Total Lithium (Li)	2020/01/15	93	75 - 125	94	75 - 125	<0.50	mg/kg	28	30	101	70 - 130
9734894	Total Magnesium (Mg)	2020/01/15	NC	75 - 125	97	75 - 125	<100	mg/kg	14	30	105	70 - 130
9734894	Total Manganese (Mn)	2020/01/15	80	75 - 125	100	75 - 125	<0.20	mg/kg	22	30	105	70 - 130
9734894	Total Mercury (Hg)	2020/01/15	95	75 - 125	102	75 - 125	<0.050	mg/kg	NC	40	101	70 - 130
9734894	Total Molybdenum (Mo)	2020/01/15	94	75 - 125	96	75 - 125	<0.10	mg/kg	84 (1)	40	102	70 - 130
9734894	Total Nickel (Ni)	2020/01/15	89	75 - 125	98	75 - 125	<0.50	mg/kg	52 (1)	30	104	70 - 130
9734894	Total Phosphorus (P)	2020/01/15	101	75 - 125	96	75 - 125	<10	mg/kg	49 (1)	30	98	70 - 130
9734894	Total Potassium (K)	2020/01/15	115	75 - 125	100	75 - 125	<100	mg/kg	NC	40	91	70 - 130
9734894	Total Selenium (Se)	2020/01/15	98	75 - 125	101	75 - 125	<0.50	mg/kg	NC	30		
9734894	Total Silver (Ag)	2020/01/15	91	75 - 125	96	75 - 125	<0.050	mg/kg	NC	40	83	70 - 130
9734894	Total Sodium (Na)	2020/01/15	111	75 - 125	103	75 - 125	<100	mg/kg	NC	40	93	70 - 130
9734894	Total Strontium (Sr)	2020/01/15	101	75 - 125	100	75 - 125	<0.10	mg/kg	1.2	40	107	70 - 130
9734894	Total Thallium (Tl)	2020/01/15	90	75 - 125	97	75 - 125	<0.050	mg/kg	NC	30	94	70 - 130
9734894	Total Tin (Sn)	2020/01/15	97	75 - 125	99	75 - 125	<0.10	mg/kg	NC	40	100	70 - 130
9734894	Total Titanium (Ti)	2020/01/15	103	75 - 125	105	75 - 125	<1.0	mg/kg	28	40		
9734894	Total Uranium (U)	2020/01/15	91	75 - 125	98	75 - 125	<0.050	mg/kg	9.5	30	95	70 - 130
9734894	Total Vanadium (V)	2020/01/15	94	75 - 125	99	75 - 125	<1.0	mg/kg	5.4	30	104	70 - 130
9734894	Total Zinc (Zn)	2020/01/15	89	75 - 125	100	75 - 125	<1.0	mg/kg	15	30	101	70 - 130



BV Labs Job #: C002517
Report Date: 2020/02/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9734894	Total Zirconium (Zr)	2020/01/15	107	75 - 125	92	75 - 125	<0.50	mg/kg	31	40		
9735409	Saturation %	2020/01/16					0	%	0	30	101	75 - 125
9735441	Soluble pH	2020/01/16			100	97 - 103			0	N/A	100	97 - 103
9736148	Soluble Calcium (Ca)	2020/01/16	NC	80 - 120	96	80 - 120	<5.0	mg/L	0.66	30	102	75 - 125
9736148	Soluble Magnesium (Mg)	2020/01/16	90	80 - 120	94	80 - 120	<5.0	mg/L	1.1	30	99	75 - 125
9736148	Soluble Potassium (K)	2020/01/16	94	80 - 120	94	80 - 120	<20	mg/L	NC	40	97	75 - 125
9736148	Soluble Sodium (Na)	2020/01/16	100	80 - 120	101	80 - 120	<5.0	mg/L	1.5	40	114	75 - 125
9736148	Soluble Sulphur (S)	2020/01/16	NC	80 - 120	93	80 - 120	<30	mg/L	1.0	30	94	75 - 125
9736297	Soluble Conductivity	2020/01/16			99	80 - 120	<5.0	uS/cm	0.26	35		
9736317	Soluble Chloride (Cl)	2020/01/16	99	75 - 125	102	80 - 120	<10	mg/L	0.53	30	83	75 - 125
9736318	Soluble Sulphate (SO4)	2020/01/16	NC	75 - 125	106	80 - 120	<20	mg/L	1.9	30	99	75 - 125
9737121	Moisture	2020/01/20					<0.30	%	5.3	20		
9737552	Moisture	2020/01/18					<0.30	%	2.7	20		
9737980	Available (CaCl2) Sulphur (S)	2020/01/20	109	75 - 125	103	80 - 120	<2.0	mg/kg	3.1	35	104	75 - 125
9737984	Available (KCl) Ammonia (N)	2020/01/20	101	75 - 125	103	80 - 120	<2.0	mg/kg	NC	35		
9737989	Available (KCl) Nitrate (N)	2020/01/20	101	75 - 125	101	80 - 120	<2.0	mg/kg	NC	30		
9737989	Available (KCl) Nitrite (N)	2020/01/20	94	75 - 125	94	80 - 120	<2.0	mg/kg	NC	30		
9738275	Available (Mod Kel) Phosphorus (P)	2020/01/20	112	75 - 125	107	80 - 120	<4.0	mg/kg	NC	35		
9738275	Available (Mod Kel) Potassium (K)	2020/01/20	101	75 - 125	97	80 - 120	<4.0	mg/kg	10	35		
9739352	Total Organic Carbon (C)	2020/01/21			100	80 - 120	<0.050	%	NC	35	100	75 - 125
9739355	Total Carbon	2020/01/21			102	80 - 120	<0.05	%	23	30	101	75 - 125
9739355	Total Sulphur (S)	2020/01/21			85	80 - 120	<0.06	%	NC	30	78	75 - 125
9740454	Total (Dry Wt) Aluminum (Al)	2020/01/31	205 (1)	80 - 120	110	80 - 120	<1.0	mg/kg	11	40	40	17 - 93
9740454	Total (Dry Wt) Antimony (Sb)	2020/01/31	101	80 - 120	102	80 - 120	<0.0050	mg/kg	2.2	40		
9740454	Total (Dry Wt) Arsenic (As)	2020/01/31	110	80 - 120	102	80 - 120	<0.020	mg/kg	0.62	40	96	42 - 199
9740454	Total (Dry Wt) Barium (Ba)	2020/01/31	674 (1)	80 - 120	99	80 - 120	<0.050	mg/kg	0.73	40		
9740454	Total (Dry Wt) Beryllium (Be)	2020/01/31	95	80 - 120	97	80 - 120	<0.010	mg/kg	NC	40		
9740454	Total (Dry Wt) Bismuth (Bi)	2020/01/31	94	80 - 120	105	80 - 120	<0.010	mg/kg	NC	40		
9740454	Total (Dry Wt) Boron (B)	2020/01/31	-63 (1)	80 - 120	97	80 - 120	<1.0	mg/kg	2.1	40	101	75 - 125
9740454	Total (Dry Wt) Cadmium (Cd)	2020/01/31	101	80 - 120	102	80 - 120	<0.0050	mg/kg	5.4	40	101	75 - 125
9740454	Total (Dry Wt) Calcium (Ca)	2020/01/31	2170 (1)	80 - 120	110	80 - 120	<10	mg/kg	2.0	60	102	75 - 125
9740454	Total (Dry Wt) Chromium (Cr)	2020/01/31	121 (1)	80 - 120	105	80 - 120	<0.10	mg/kg	3.6	40		



BV Labs Job #: C002517
Report Date: 2020/02/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9740454	Total (Dry Wt) Cobalt (Co)	2020/01/31	102	80 - 120	104	80 - 120	<0.020	mg/kg	5.3	40	92	75 - 125
9740454	Total (Dry Wt) Copper (Cu)	2020/01/31	121 (1)	80 - 120	108	80 - 120	<0.050	mg/kg	9.0	40	100	75 - 125
9740454	Total (Dry Wt) Iron (Fe)	2020/01/31	234 (1)	80 - 120	117	80 - 120	<5.0	mg/kg	2.6	40		
9740454	Total (Dry Wt) Lead (Pb)	2020/01/31	92	80 - 120	98	80 - 120	<0.010	mg/kg	7.8	40		
9740454	Total (Dry Wt) Magnesium (Mg)	2020/01/31	259 (1)	80 - 120	106	80 - 120	<5.0	mg/kg	4.6	40		
9740454	Total (Dry Wt) Manganese (Mn)	2020/01/31	35900 (1)	80 - 120	107	80 - 120	<0.050	mg/kg	5.6	40	102	75 - 125
9740454	Total (Dry Wt) Mercury (Hg)	2020/01/31	97	80 - 120	104	80 - 120	<0.010	mg/kg	1.2	40	93	75 - 125
9740454	Total (Dry Wt) Molybdenum (Mo)	2020/01/31	183 (1)	80 - 120	105	80 - 120	<0.020	mg/kg	1.8	40		
9740454	Total (Dry Wt) Nickel (Ni)	2020/01/31	109	80 - 120	110	80 - 120	<0.050	mg/kg	2.7	40	92	75 - 125
9740454	Total (Dry Wt) Phosphorus (P)	2020/01/31	169 (1)	80 - 120	100	80 - 120	<10	mg/kg	3.8	40	108	75 - 125
9740454	Total (Dry Wt) Potassium (K)	2020/01/31	692 (1)	80 - 120	100	80 - 120	<10	mg/kg	1.7	40	96	75 - 125
9740454	Total (Dry Wt) Selenium (Se)	2020/01/31	101	80 - 120	99	80 - 120	<0.050	mg/kg	0.25	40	112	75 - 125
9740454	Total (Dry Wt) Silver (Ag)	2020/01/31	84	80 - 120	83	80 - 120	<0.0050	mg/kg	NC	40		
9740454	Total (Dry Wt) Sodium (Na)	2020/01/31	210 (1)	80 - 120	107	80 - 120	<10	mg/kg	1.5	40	103	75 - 125
9740454	Total (Dry Wt) Strontium (Sr)	2020/01/31	-220 (1)	80 - 120	103	80 - 120	<0.050	mg/kg	3.7	60	101	75 - 125
9740454	Total (Dry Wt) Thallium (Tl)	2020/01/31	100	80 - 120	103	80 - 120	<0.0020	mg/kg	4.6	40		
9740454	Total (Dry Wt) Tin (Sn)	2020/01/31	69 (1)	80 - 120	104	80 - 120	<0.10	mg/kg	0.64	40		
9740454	Total (Dry Wt) Titanium (Ti)	2020/01/31	116	80 - 120	103	80 - 120	<0.50	mg/kg	NC	40		
9740454	Total (Dry Wt) Uranium (U)	2020/01/31	97	80 - 120	101	80 - 120	<0.0020	mg/kg	0.19	40		
9740454	Total (Dry Wt) Vanadium (V)	2020/01/31	111	80 - 120	105	80 - 120	<0.20	mg/kg	NC	40		



BV Labs Job #: C002517
Report Date: 2020/02/13

QUALITY ASSURANCE REPORT(CONT'D)

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAVAH

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9740454	Total (Dry Wt) Zinc (Zn)	2020/01/31	293 (1)	80 - 120	122 (2)	80 - 120	0.25, RD _L =0.20 (3)	mg/kg	3.0	40	102	75 - 125

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RD}_L$).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Blank Spike outside acceptance criteria (10% of analytes failure allowed).

(3) Method Blank exceeds acceptance limits for Zn. Sample values for Zn are $>10 \times$ the concentration of the method blank and the contamination is considered irrelevant.



BUREAU
VERITAS

BV Labs Job #: C002517
Report Date: 2020/02/13

ALEXCO ENVIRONMENTAL GROUP INC.
Client Project #: BMC-18-02
Site Location: KUDZ ZE KAYAH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Gita Pokhrel, Senior Analyst

Jennifer Villocero, Project Solutions Representative

Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

CHAIN OF CUSTODY



08476858

BBY FCD-00077/05
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Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEXCO ENVIRONMENTAL	Quotation #:	B60751	☒ Regular TAT 5 days (Most analyses)	
Contact Name:		Contact Name:	Rachel Martz; Renate Vanderhorst	P.O. #/ AFEB:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:	530-1130 WEST PENDER ST Vancouver, BC V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitby, ON L9A 2V3	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)	
Phone:		Phone:	(867) 668-6463 r.vanderhorst@alexcoenv.com	Site location:	Kudze Keyah	Same Day ☐ 2 Days ☐	
Email:		Email:	martz@alexcoenv.com	Site #:		1 Day ☐ 3 Days ☐	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil ☐ BC CSR Water		☐ Return Cooler					
☐ CCME (Specify) ☐ Other (Specify)		☐ Ship Sample Bottles (Please Specify)					
☐ Drinking Water ☐ BC Water Quality		USE SCENARIO # 12485					
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Solubility Package 4	Nutrient Package 1	Carbon (Total, Organic, and Inorganic)
1 1A Soil		13-Jan-20	18:55	Soil	X	X	X
2 1B Soil		13-Jan-20	19:50	Soil	X	X	X
3 1C Soil		13-Jan-20	19:45	Soil	X	X	X
4 4A Soil		13-Jan-20	19:40	Soil	X	X	X
5 4B Soil		13-Jan-20	19:35	Soil	X	X	X
6 4C Soil		13-Jan-20	19:30	Soil	X	X	X
7 1A Biomass		13-Jan-20	11:55	Tissue			
8 1B Biomass		13-Jan-20	11:50	Tissue			
9 1C Biomass		13-Jan-20	11:45	Tissue			
10 4A Biomass		13-Jan-20	11:40	Tissue			
REINQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	
Tanner Webb				2020/01/13	13:00	Alexco Environmental	
Tanner Webb						2020/01/14 08:25	



C002517_COC

CHAIN OF CUSTODY

COC #:



08476859

BBV FCD-00077/05

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Invoice Information		Report Information (if differs from Invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name:	BMC MINERALS LTD.	Company Name:	ALEKO ENVIRONMENTAL	Quotation #:	860751	☒ Regular TAT 5 days (Most analyses)	
Contact Name:		Contact Name:	Mary Miosha; Renate Vanderhorst	P.O. #/ A/E#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PRODUCTS	
Address:	530-1130 WEST PENDER ST Vancouver, BC V6E 4A4	Address:	UNIT 3 151 INDUSTRIAL RD Whitby, ON N2A 2V3	Project #:	BMC-18-02	Rush TAT (Surcharges will be applied)	
Phone:		Phone:	(867) 668-6463 rvanderhorst@alekocoeny.com	Site location:	Kud. Ze Kayah	Same Day ☐ 2 Days ☐ 3 Days ☐	
Email:		Email:	mmiosha@alekocoeny.com	Site #:		Date Required:	
Regulatory Criteria		Special Instructions		Analysis Requested		Rush Confirmation #:	
☐ BC CSR Soil	☐ BC CSR Water	☐ Return Cooler	USE SCENARIO # 12485			LABORATORY USE ONLY CUSTOMER SEAL COOLER TEMPERATURES Present: _____ Intact: _____ COOLING MEDIA PRESENT: Y: _____ N: _____ COMMENTS	
☐ CCME (Specify)	☐ Other (Specify)	☐ Ship Sample Bottles (Please Specify)					
☐ Drinking Water	☐ BC Water Quality						
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM				HOLD - DO NOT ANALYZE			
Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Metals (vegetation) and sulphur	% Moisture	# OF CONTAINERS SUBMITTED
1 4B Biomass		13-Jan-20	11:35	Tissue	X		1
2 4C Biomass		13-Jan-20	11:30	Tissue	X		1
3 1A Bulrush		13-Jan-20	11:10	Tissue	X		1
4 1B Bulrush		13-Jan-20	11:05	Tissue	X		1
5 1C Bulrush		13-Jan-20	11:00	Tissue	X		1
6 4A Carex		13-Jan-20	11:05	Tissue	X		1
7 4B Carex		13-Jan-20	11:20	Tissue	X		1
8 4C Carex		13-Jan-20	11:15	Tissue	X		1
9							
10							
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APPENDIX E: RECLAMATION AND CLOSURE COST ESTIMATE

(Provided Electronically as Excel File – Closure Cost Model)

APPENDIX F: TABLE OF CONCORDANCE

Reference No.	Proponent Commitment / Mitigation	Where addressed
YESAB R25	Risks associated with increased gully erosion of the Class A, B and C Waste Storage Facilities will be mitigated through the inclusion of benches to reduce the length of the overall slope. The benches will be sloped appropriately to minimize down slope flow, while the slopes will be contoured to minimize the potential for erosion. The upper terraces of the facilities will be graded to a slope of 2% to convey water at a reduced velocity and reduce ponding water. Concurrent reclamation and revegetation will minimize the areas susceptible to erosion during operations and the majority of the longer steeper slopes will be revegetated prior to the active closure phase. This design concept is commonly used for reducing the potential for gully erosion and has become accepted practise throughout the mining industry. If gully erosion is observed in areas on the storage facilities it will be remedied by a combination of some or all of: armoring, backfilling, recontouring, and revegetation.	See section 7.4 of the Reclamation and Closure Plan
YESAB R26	On-going Project development and detailed design will include refinement of the closure plan for the facilities, including shaping and/or re-sizing of the upper terraces to mimic pre-mining conditions and natural landforms.	See Chapter 5 and Section 7.4 of the Reclamation and Closure Plan
YESAB R28	The proposed landforms for the waste facilities are not final. As the design level for these facilities advances through subsequent regulatory phases, landform design details will advance in a commensurate fashion, consistent with the 'design for closure' philosophy that underpins all planning for the Project.	See Chapter 5 and Section 7.4 of the Reclamation and Closure Plan
YESAB R32	"How will interflow waters be managed to prevent excessive build-up of pore-water pressures within the cover system in the lower slope regions and limit the potential for shallow instability of cover layers above the reduced permeability layers?" This is an important design consideration, and the detailed design process will ensure that the rock used is sized, graded, and sloped appropriately, and placed so as to be stable. The planned drainage diversions around the waste facilities will reduce upslope run-on waters contributing to this potential, and the proposed slopes of the facilities and covers will further reduce this potential. Design and operational management practices will further address this consideration as facility cover design proceeds.	See Section 7.4 of the Reclamation and Closure Plan
YESAB R33	"How will higher or lower evapotranspiration rates from the 30 % estimate affect seepage rates from the base of the waste storage facilities and what are the implications to stability and water management?" This is an important design consideration that is addressed through the landform design of the facility, and water management structures. Less evapotranspiration would be associated with increased surface runoff, not necessarily increased seepage from the foundation of the facility. This will additionally be addressed through future detailed design studies and ongoing reclamation research during operations to determine the compaction and thickness of the lower permeability and frost protection layers, such that saturated flow conditions are not developed at the base of the Class B Storage Facility. Saturated conditions will not develop at the base of the Class A Storage Facility as the very low permeability layer will prevent sufficient seepage from creating these conditions.	Feasibility level designs (see Section 7.4), Reclamation research (see Section 2.5.1) and Monitoring (see Section 7.11)
YESAB R34	As part of final engineering design, the time required to achieve the final settled density will be estimated. This is the period in which more frequent inspections and maintenance would be expected. It is not unusual for a cover design to account for erosion, and still maintain the integrity of the cover to achieve the designed outcomes. There is always the potential for an extreme event that may necessitate a major repair or partial replacement. The triggers for requiring maintenance will be determined during the detailed design phase. The trigger for replacing all or a portion of the cover would be determined during the advancement of the Adaptive Management Plan. Overall the design, operating methodology and method of compaction will be signed off by the design engineers prior to final granting of the QML.	Section 2.5.1 of the Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
YESAB R35	Should a geosynthetic liner be selected as the very low permeability layer for the Class A Storage Facility, the triggers for major maintenance or repair will be determined during the detailed design phase. The service life of geosynthetic liners is highly dependent on site-specific conditions, with short term failures most commonly being a result of punctures or stresses during construction. Depending on the material of the liner and the exposure conditions the expected lifetime can range from decades to centuries.	Section 7.11 of the Reclamation and Closure Plan
YESAB R35	The Failure Modes Effects Analysis process will refine the Closure Plan elements, such as advancing the cover designs, as well as defining mitigation measures and alternatives.	See Appendix A (Failure Modes and Effects Assessment) of the Reclamation and Closure Plan
YESAB R36	The final design of the cover systems will include a monitoring and maintenance plan to ensure these objectives are met and to identify if the cover is performing as designed. If the design underperforms, additional measures will be required to reduce the environmental loading to those proposed in the conceptual design.	Section 7.11 of the Reclamation and Closure Plan
YESAB R36	The potential exists for an extreme event that would affect the cover system that may necessitate a major repair or partial replacement. The triggers for requiring maintenance will be determined during the detailed design phase. The trigger for replacing all or a portion of the cover would be determined during the advancement of the Adaptive Management Plan.	Section 7.11 of the Reclamation and Closure Plan
YESAB R107	A phased approach will be used for the design, construction and operation of the constructed wetland treatment system.	See Section 2.5.4 of the Reclamation and Closure Plan
YESAB R108	Project specific treatment rate coefficients will be further refined during future pilot-scale and/or demonstration-scale testing.	See Appendix D of the Reclamation and Closure Plan (Off Site Constructed Wetland Treatment System Pilot)
YESAB R109	As part of the site-specific CWTS design process, aspects that would facilitate continued treatment throughout cold-climate or freezing conditions are thoroughly assessed. Phase 3 of the CWTS design (off-site pilot-scale testing) incorporates freezing trials to inform on the effect that cold weather would have on treatment.	See Appendix D of the Reclamation and Closure Plan (Off Site Constructed Wetland Treatment System Pilot)
YESAB R109	The CWTS implementation timeline outlined in the response to R107 includes contingencies in the form of additional time to reassess and reconfigure the CWTS design should any unanticipated water chemistry conditions arise.	See Appendix D of the Reclamation and Closure Plan (Pilot-Scale CWTS)
YESAB R125	The design detail for the CWTS installations and infrastructure will be appropriately advanced with further development of site facility designs and with the collection of additional water quality information. This will be provided in applications to support the regulatory permitting process.	See Appendix D of the Reclamation and Closure Plan (Pilot-Scale CWTS)
YESAB R278	Given the Project focus on designing for closure, the FMEA process has been identified in the Conceptual Closure and Reclamation Plan (Section 7.12.1, February 2017, Appendix H of the Project Proposal), and BMC is committed to utilizing the Reclamation and Closure Planning tool to advance the design and closure measure aspects of the waste management facilities. This will be undertaken to support the advancement and refinement of the facility design, and will be a component of the more detailed Reclamation and Closure Plan that will be developed in accordance with YG's 2013 Guidance Document: Reclamation and Closure Planning for Quartz Mining Projects guide by Yukon Government and the Yukon Water Board.	The Reclamation and Closure Plan and the designs that have progressed since the environmental assessment have taken into account the FMEA (Appendix A)
YESAB R280	Detailed closure costing, following the 2013 guidance document, will be submitted in support of permit applications and for the determination of security in accordance with YG's Mine Closure Policy.	See Chapter 9 and Appendix E (Closure Cost Estimate) of the Reclamation and Closure Plan
YESAB R2-3	The FMEA for the Class A Storage Facility and the Risk Register were prepared at the request of YESAB, and will be updated and refined during the detailed Project design/planning including during the development of the detailed reclamation and closure plan (as described in response to R278, above).	See Appendix A (Failure Modes and Effects Assessment) of the Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
YESAB R2-9	The upper terrace of the Class A Storage Facility will be sloped at 2% towards the lower reclaimed slopes. The final surface will be shaped to direct runoff to multiple designed channels to safely convey surface runoff over the reclaimed facility and buttress. The surface runoff collection channels will be constructed during the mine life as the facility is progressively reclaimed.	See Chapter 5 and Section 7.4 of the Reclamation and Closure Plan
YESAB R2-10	The Class A Storage Facility will be constructed at an overall slope of 4H:1V, and will be progressively reclaimed with a low permeability cover, followed by approximately five meters of Class C waste rock material for frost protection and long-term stability. Topsoil and material from the overburden stockpile will be placed on the frost protection layer, and this will then be revegetated to mimic the current site conditions. Gullies that may develop due to erosion will be limited to the depth of the topsoil layer and are unlikely to erode through the five-metre thick frost protection waste rock layer. Benches will be added to the Class A and Class B facilities as an erosion mitigation measure. The benches will not include lateral drainage channels; rather the benches will be constructed to maintain a grade sloping towards the lower elevations and rely on gravity drainage, thereby eliminating the potential of ponding water on the benches. The Class B Storage Facility will be constructed at an overall slope of 3H:1V for long-term physical stability and to allow for re-contouring if required for reclamation and closure. Note that the recontouring will include benches with berms/ditches to control runoff. The benches will be similar to the existing natural slope of the area. The Class B Storage Facility will be progressively covered and reclaimed. A layer of topsoil and overburden material will be placed above a layer of Class C waste rock (providing frost protection). These layers overlie a low permeability layer to minimize infiltration of precipitation into the Class B Storage Facility, and any gullies that may develop due to erosion will be limited to the depth of the topsoil layer. The frost protection layer constructed of Class C waste rock will also mitigate potential erosion. The Class C Storage Facility is composed of potentially acid consuming waste rock and will have no infiltration restricting cover. The facility will have final overall face slopes of 3H: 1V while the top of the facility will have an overall flat gradient. The final facility bench crests will be rounded and the faces sloped to improve the long-term erosion stability of the facility. The recontouring will include benches with berms/ditches, constructed similar to the existing natural slope of the area, to control runoff. The placed waste rock will be compacted and a cap of growth medium will be placed on the facility and revegetation will take place up to a pre-determined elevation. The top of the facility will mimic a large flat valley and will be contoured to blend with the surrounding topography. Any gullies that may develop due to erosion will be limited to the depth of the topsoil layer, due to the Class C material below being resistant to erosion and this material will similarly allow precipitation to infiltrate and drain away rather than flow across the surface of the facility.	See Chapter 5 and Section 7.4 of the Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
YESAB R2-14	The Project Closure Plan is conceptual at this stage and will be further developed and finalized during permitting in consultation with EMR, Yukon Water Board, and RRDC. Independent of the details of the cover design, the following 'tools' have been identified for long term monitoring of cover system performance: • Lysimeters – to monitor seepage (if any) through the covers; • Physical inspections (looking for unusual occurrences, such as settlement or sloughing, abnormal seepage from any area on the slopes, isolated pockets of vegetation stress, and physical damage); and • Downgradient surface and groundwater quality stations. Water quality monitoring will occur downgradient of the facilities, which will be subject to a statistical review to monitor for any potential warning signs to determine if there is a problem with the cover. Additionally, there will be an Adaptive Management Plan (AMP), which will identify specific thresholds from the monitoring and inspection program. These thresholds are staged as early warning indicators, to increase monitoring and implement mitigative actions ranging from statistical analysis of monitoring, installation of instrumentation, maintenance activities, to review of the design performance by the engineer.	See Section 7.11 of the Reclamation and Closure Plan
YESAB R2-14	Inspections will be performed annually until the cover systems have been shown to have stabilized, which will be determined by the design engineers. Inspections will guide regular maintenance to ensure the cover systems are operating effectively. If it is indicated through inspections and monitoring that the cover is not meeting design objectives, alternatives will be assessed through the AMP. The Class A and B Facilities will have very low permeability liner cover systems, which will significantly reduce the seepage through each facility. However, one of the alternatives available, if the cover is not sufficiently reducing seepage as per the design basis, is to convert the collection ponds to bioreactors to treat the excess seepage.	See Section 7.11 of the Reclamation and Closure Plan for monitoring and See Section 2.5.4 for commitment to applying contingency measures.
YESAB R2-15	The Project Closure Plan outlined at this stage will be further developed and if required, optimized during the detailed engineering phase of the Project design and as part of final permitting in consultation with EMR, Yukon Water Board, and RRDC. Some of the performance measures that may be selected are: • Quality control measures during installation, such as inspecting seams after they have been welded, following specifications for drainage and bedding layers; • Monitoring of seepage quality and quantity into the collection ponds, as the facility is progressively reclaimed; • Field inspections looking for settling, sloughing, seeps, and erosion; and • Instrumentation and lysimeters will be installed during progressive reclamation within and under the cover system to monitor moisture, frost depths, and pressure.	See Section 7.11 of the Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
YESAB R2-17a	Phases 1b, 2 and 3 of the Constructed Wetland Treatment System Schedule and Execution Strategy will be undertaken in 2018 and 2019 using the updated model predictions that will be submitted during Water Licencing (i.e. pre-operational period). That being said, BMC has conducted an optimization assessment of the closure plan (including revised water quality modelling) to ensure receiving environment water quality meets the water quality objectives without the reliance on the proposed wetlands. This assessment confirms that the wetlands will function only to further improve water quality or “polishing” and is not needed nor is it intended to be the primary treatment mechanism.	See Section 2.5.4 of the Reclamation and Closure Plan
YESAB R2-17b	The RCP submitted during permitting will include alternative closure approaches for the Kudz Ze Kayah site, demonstrating long-term chemical and physical stability, as an alternative to CWTS.	Section 2.4 of the Reclamation and Closure Plan presents the closure alternatives that have been evaluated for the Project. Throughout the Environmental Assessment Process the designs were refined and the CWTS became the contingency measure if the objectives of the ABM lake treatment are not met (see Section 2.5.4 of the Reclamation and Closure Plan)
YESAB R2-17c	Closure costs will be further refined in accordance with the continual review and revision of the Plan required by the Quartz Mining Licence.	See Chapter 9 and Appendix E (Closure Cost Estimate) of the Reclamation and Closure Plan
YESAB R2-29	There will be no active pumping in perpetuity after closure of the site per Yukon Government’s Mine Closure Policy. All drainage and treatment will be passive.	No long term active pumping is proposed in the Reclamation and Closure Plan
YESAB R4-2	Soils at the site will be managed through all Project Phases to ensure that it does not have the potential to prevent the traditional land users from using the area in the post closure period.	Section 7.11 of the Reclamation and Closure Plan
YESAB R4-2	There will be no contamination of the land that will prevent the land users from returning to the KZK project area in post closure.	See Section 7.11 of the Reclamation and Closure Plan
YESAB R4-2	Vegetation at the site will be managed through all Project phases to ensure that it does not have the potential to prevent the traditional land users from using the area for harvesting vegetation in the post closure period.	See Sections 2.5.2, 7.1.2, and 7.11.3 of the Reclamation and Closure Plan
YESAB R4-2	Through the Project design; mitigation measures; monitoring programs; adaptive management; and the development of the final reclamation and closure plan, the LFN traditional land users should be able to resume harvesting vegetation from the Project area in the post closure period. It is anticipated that any additional land use information related to culturally important plants at KZK, that is made available by LFN in the future, will be incorporated into BMC’s management and operating plans at that time.	See Section 2.3.2 of the Reclamation and Closure Plan
YESAB R4-4	During the post closure phase all areas including the Project area will again be available and safe for use by the traditional land users.	The plan in its entirety provides details with respect to ensuring chemical stability of the site in the Closure and Post-closure phases of the Project
YESAB R4-4	Because the spills and all associated affected soils will be cleaned up, there is no potential for such spills to affect the land users in the post closure period. The quality of country foods (specifically vegetation and wildlife) are related (in part) to the quality of soil in the environment that they live. Because spills and all associated affected soils will be cleaned up, there is no potential for these foods to become impacted from exposure to a spill during construction, operations and active and transition closure.	See Section 7.8 of the Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
YESAB R4-4	BMC has proposed a BMC-Kaska Environmental, Cultural & Heritage Management Program for KZK. Through this co-management program it is anticipated that RRDC will collaboratively design, collect, report, manage and communicate the results of the air and soil quality monitoring programs to RRDC citizens (including the RRDC Elders Oversight Committee). This program would be active through all Project phases and would collaboratively ensure that the soil concentrations during all Project phases are not at levels that could potentially effect the quality of country foods. It would also collaboratively ensure that concentrations in the soils at closure are at levels which the traditional land users can safely use the land in the Geona Creek valley for traditional land use purposes. Through this co-management program, the risk of the traditional land users of avoiding the Project area will be reduced.	See Section 2.3.1 and Section 7.11.5 of the Reclamation and Closure Plan
YESAB R4-4	In the closure period, the only potential sources of COPs in vegetation from water sources will be the constructed wetlands. The water management program will control and treat any contact water prior to release to the environment during operations and closure. A soil and vegetation metal monitoring program will commence with installation of constructed wetlands to monitor the efficacy of the constructed wetland at treating water as well as to ensure that metals are not accumulating to any significant degree in the wetlands. For wetlands, soils will also be tested for nutrients, metals, and microbes. The wetlands are designed to create metal compounds in the soil and root systems that are not bioavailable. The monitoring program will be used to ensure that metals are not accumulating significantly in the vegetative matter as planned and expected. If there is significant increase in vegetation metal concentrations beyond background, then the wetland system will be modified to minimize wildlife access.	See Section 7.11 of the Reclamation and Closure Plan
YESAB R4-4	Terrestrial vegetation on Project facilities during the closure period will not be affected due to the thickness of the covers between the vegetation and waste rock/tailings.	See Section 7.11 of the Reclamation and Closure Plan
YESAB R4-4	The reclamation research program was initiated in 2017 (which will become a component of the Kaska Co-management program) will be ongoing through all Project phases. The program will ensure that the vegetation used in reclamation is culturally appropriate and/or is approved by RRDC. Through this co-management program, the risk of the traditional land users of avoiding the Project area (post reclamation) will be reduced.	See Section 2.5.2 of the Reclamation and Closure Plan and Appendix B of the Reclamation and Closure Plan (Revegetation Trial Study)
YESAB R4-4	The importance of reclaiming the Geona Creek system to its current state was described to BMC during a meeting with the RRDC Elders Committee in April of 2017. In this meeting the Elders indicated that they would not support a project that proposed slurry tailings due to water quality concerns. BMC subsequently re-assured the Elders that BMC had conducted an assessment of tailings disposal methods and that the filtered tailings method had been designed for the Project rather than slurry tailings in Geona Creek. It was also re-iterated that the closure plan (as proposed) will ensure that traditional land use activities can resume post closure.	See Sections 2.3.2 and 2.4.1 of the Reclamation and Closure Plan
YESAB R4-4	BMC's proposed reclamation plan to: "Return the mine site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with traditional land use activities" is presented in Appendix H of the Project Proposal. The implementation of the Reclamation and Closure Plan will ensure that the displaced animals return to the Project area such that the traditional activity of hunting/trapping can be resumed.	See Section 7.11 of the Reclamation and Closure Plan
RRDC Adequacy Review R-10	BMC commits to restoring the mined area after closure to a natural, thriving biodiverse environment which includes ensuring the quality of water. Continual water monitoring will provide assurance of the effectiveness of all mitigation and remedial measures.	See Section 7.11 of the Reclamation and Closure Plan
RRDC Adequacy Review R-10	In addition to aquatic ecosystem protection, the Health Canada drinking water guidelines will be met in the receiving environment for all parameters.	See Section 7.11.2 of the Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
RRDC Adequacy Review R-11	In situ treatment of the resulting ABM lake is proposed as a mitigation measure which will lower COPI concentrations (including uranium and arsenic) such that no long term effects to downstream water quality downstream are expected. The in situ treatment proposed will involve the addition of soluble organic carbon (such as molasses and/or alcohol) to stimulate native microorganisms in ABM lake, which will produce conditions under which COPIs will precipitate, therefore lowering their concentrations. If acidic conditions start to develop as the ABM pit fills (but before it discharges downstream), lime will also be added to return the ABM lake pH to circumneutral conditions.	See Section 7.2 of the Reclamation and Closure Plan
RRDC Adequacy Review R-11	The COPI concentrations in ABM lake will be monitored as part of the closure Monitoring, Surveillance, and Adaptive Management Plan, which will be developed in partnership with RRDC. Water quality triggers, informed by the water quality modelling, will be described in the plan which will prompt adaptive management measures such as additional treatment of ABM lake to ensure downstream water quality is maintained.	RRDC/Dena Cho reviewed and contributed to all management plans prior to them being finalized and submitted to EMR See Sections 7.2.1 and 7.11.2 of the Reclamation and Closure Plan
RRDC Adequacy Review R-11	The Monitoring, Surveillance, and Adaptive Management Plan, for closure will describe the monitoring and surveillance associated with the constructed wetland treatment systems (CWTS). It will also outline responses to be implemented if unacceptable conditions are observed in these monitoring programs (i.e. adaptive management).	The detailed Monitoring, Surveillance, and Adaptive Management Plan for the CWTS will be added to the Closure Plan once the detailed designs of the CWTS has been further progressed (i.e. sizing, exact location etc.)
RRDC Adequacy Review R-11	Regular sampling of the waters entering and leaving the CWTS will occur during post-closure to ensure the CWTS is functioning as expected. Regular monitoring will also indicate any required maintenance of the constructed wetland treatment systems to ensure it continues to adequately treat the influent waters. These requirements will be further developed and become more detailed as the CWTS design advances and as the proposed Project facility is constructed and commissioned, but could include: • Removal of debris and/or undesirable vegetation (i.e. willows, alder) that is blocking treatment or bypass channels, or is destabilizing embankments; • Removal of excess sedimentation to reduce channelization; and/or • Remedial activities related to liners/berm.	The detailed Monitoring, Surveillance, and Adaptive Management Plan for the CWTS will be added to the Closure Plan once the detailed designs of the CWTS has been further progressed (i.e. sizing, exact location etc.)
RRDC Adequacy Review R-13	Once mining operations are completed, BMC are committed to returning the land to viable and self-sustaining ecosystems that are compatible with a healthy environment and with traditional land use activities.	See Section 2.2 of the Reclamation and Closure Plan
RRDC Adequacy Review R-13	Soil amendments will be made to promote revegetation using baseline data and results from reclamation research. Additional detail on amendments will be provided in the final detailed Reclamation and Closure Plan that will be developed and submitted for approval during licensing prior to construction. Reclamation research results will subsequently be used for any updates to the soil amendment prescriptions and updates to the Reclamation and Closure Plan.	See Section 2.5.2 of the Reclamation and Closure Plan and Appendix B of the Reclamation and Closure Plan (Revegetation Trial Study)
RRDC Adequacy Review R-13	Continuous progressive reclamation techniques including progressive stripping and replacement are expected to partially offset the potential deconditioning of stripped soils, as the entire area is not stripped prior to mine operations.	Numerous sections of the Reclamation and Closure Plan commit BMC to conducting progressive reclamation
RRDC Adequacy Review R-13	On site research will help develop suitable strategies to re-establish the native soil structure and promote revegetation.	See Section 2.5.2 of the Reclamation and Closure Plan and Appendix B of the Reclamation and Closure Plan (Revegetation Trial Study)

Reference No.	Proponent Commitment / Mitigation	Where addressed
RRDC Adequacy Review R-14	Continuous progressive reclamation techniques are expected to partially offset the potential deconditioning of stripped soils, as the entire area is not stripped prior to mine operations. The following measures will be taken to retain nutrients in soils: • Topsoil will be immediately reused and placed on reclaimed areas as it is stripped (if reclaimed areas are available at the time of stripping), so as to maintain soil structure and viability; • If soil is stockpiled, it will be kept in low berms; and • Vegetation will be either stripped with (or prior to) the topsoil stripping and placed on final reclaimed areas, with or on top of the topsoil so that decomposition helps maintain soil nutrients and structure. Reclamation of the mine site is proposed as a progressive function of mine development, returning the natural environment to a pre-mining state as quickly as practicable to maintain soil structure and nutrients. BMC recognize that soil and seed viability are essential for revegetation success and propose working closely with RRDC in development of Environmental Management Plans that would include seed collection, seedling propagation, and seeding and seedling planting as part of reclamation activities to restore the KZK Project site.	See Section 2.4.4 and Section 2.5.2 of the Reclamation and Closure Plan
RRDC Adequacy Review R-15b and 16	The wetlands created along the pond edges as part of the Fisheries Offset Plan, the constructed wetland treatment system, and reclamation of water management ponds will initially not be natural wetlands, but will be designed and planted with native species to optimize water treatment for the constructed wetlands and to maximize biodiversity for the fish pond creation and the reclamation of other water management ponds. Studies have shown that biodiversity can be high in constructed and reclaimed wetlands at mine sites (Howie, 2006 and Lacki et al, 2004), and for these reasons, the reclaimed wetlands will be functionally similar (meaning the wetland will support similar wildlife populations).	See Section 7.11 of the Reclamation and Closure Plan
RRDC Screening Review (Surface Water)	The proposed wetlands are now considered to be a contingency measure (rather than relying on the efficacy of the wetlands to meet the WQOs in Post-Closure). Although the wetlands are now considered a contingency measure, BMC will undertake a comprehensive program to design, test, optimize, implement and maintain constructed wetlands in a site-specific manner the constructed wetlands for the Post-Closure phase.	See Section 2.5.4 of the Reclamation and Closure Plan and Appendix D of the Reclamation and Closure Plan (Off Site Constructed Wetland Treatment System Pilot)
RRDC Screening Review (Surface Water)	The stability of the precipitates generated during constructed wetland treatment will be monitored as part of the ongoing test work and once the CWTS is constructed and operated during the closure phase.	See Appendix D of the Reclamation and Closure Plan (Off Site Constructed Wetland Treatment System Pilot) and Section 7.11.3 of the Reclamation and Closure Plan
RRDC Screening Review (Surface Water)	Plants selected for the CWTS will be those that are not known to uptake large amounts of metals. This will be confirmed through the laboratory analysis of plants and moss to be conducted at the end of the pilot-scale tests, on-site test and once the CWTS is constructed and operated during the closure phase.	See Appendix D of the Reclamation and Closure Plan (Off Site Constructed Wetland Treatment System Pilot) and Section 7.11.3 of the Reclamation and Closure Plan
RRDC Screening Review (Surface Water)	Freeze-thaw tests and stagnation tests will be performed to confirm that there will be no release of metals under changing environmental conditions.	See Appendix D of the Reclamation and Closure Plan (Off Site Constructed Wetland Treatment System Pilot)

Reference No.	Proponent Commitment / Mitigation	Where addressed
RRDC Screening Review (Surface Water)	Freeze-thaw tests will mimic winter and spring thaw effects on the pilot system and to evaluate the benefit of additional sorption of metals by moss and AVS production to evaluate the robustness of the system during winter.	See Appendix D of the Reclamation and Closure Plan (Off Site Constructed Wetland Treatment System Pilot)
RRDC Screening Review (Surface Water)	All wildlife activity is discouraged in the constructed wetland, as typically the water entering the wetlands is still in the process of being treated, and wildlife may disturb the wetland and impact its efficacy. Wildlife may also disturb the wetland and impact its efficacy. The wetland is a secondary polishing step and the water entering the wetland is predicted to be safe for wildlife, due to initial treatment through the water treatment plant; wildlife activity will still be discouraged through the use of the following design features: uniform water depth (difficult to navigate by wildlife), plant monocultures (unappealing to wildlife), no open water (unappealing to waterfowl), and steep embankments armoured with riprap (difficult to access). These features also improve the performance of the treatment wetland.	The Implementation Plan as well as the Monitoring, Surveillance, and Adaptive Management Plan for the CWTS will be added to the Closure Plan once the detailed designs of the CWTS has been further progressed (i.e. sizing, exact location etc.). The implementation plan will include methods for discouraging wildlife to enter the CWTS
RRDC Screening Review (Surface Water)	The water treatment plant will remain in place during the Active and Transition Closure Phases and will not be decommissioned until the CWTS has been demonstrated in the field. This contingency measure will ensure that downstream water quality is not adversely affected during the implementation of the closure mitigation plans.	See Section 7.7 of the Reclamation and Closure Plan
RRDC Screening Review (Surface Water)	The water treatment plant will remain in place during the Active and Transition Closure Phases and will not be decommissioned until in situ treatment has been demonstrated in the field. This contingency measure will ensure that downstream water quality is not adversely affected during the implementation of the Closure mitigation plans.	See Section 7.7 of the Reclamation and Closure Plan
RRDC Screening Review (Fish and Wildlife)	BMC will be developing the adaptive management plans that will be submitted to the Waterboard and EMR as part of the Water Use Licence and Quartz Mining License Applications. This will include management strategies to reduce the effects from a reduction of flows and water levels in the receiving environment of South Lakes once Fault Creek is diverted back to its original path in the Active Closure phase BMC has committed to working with Dena Cho in the development of this and other management plans through the existing contractual agreements between the parties.	RRDC/Dena Cho reviewed and contributed to all management plans prior to them being finalized and submitted to EMR See Table 2-1 Section 7.11.2 of the Reclamation and Closure Plan
BMC Response to Public Comments on the DSR	The overall approach and modelling used to predict water quality in the ABM Pit at closure will be refined through the permitting processes and through various Project phases to provide “proof of concept prior to final closure”. Although there is no specific condition in the Draft Screening Report for additional studies or models, in 2018 BMC initiated pilot-scale test work to evaluate the dosage of organic carbon (molasses and glycerol), nitrogen, and phosphorus, and the effects of soil amendment and temperatures on the efficacy of the proposed in situ treatment. The results of this test work and the commitment for ongoing reclamation research will be a component of the Water Licence and Quartz Mining Licence applications. Note that this level of detail is required in the licence applications, based on Water Board guidance (Yukon Water Board, 2012) and guidance from Yukon Government’s Department of Energy, Mines and Resources (Yukon Energy, Mines and Resources, 2013). Further, the results of the ongoing studies will implicitly be considered in the final engineering design (which may be different than the conceptual design of adding “lime and carbon”) as the final design will need to achieve the water quality objectives in the receiving environment.	See Section 2.5.3 of the Reclamation and Closure Plan and Appendix C (ABM Pit Lake Treatment Study) of the Reclamation and Closure Plan
BMC Response to LFN Comments on DSR	The water treatment plant will remain on site during the closure phases as a contingency measure.	See Section 7.7 of the Reclamation and Closure Plan
BMC Response to LFN Comments on DSR	A Constructed Wetland Treatment System (CWTS) will be the contingency measure in the event that the ABM Lake treatments are not as efficient as predicted.	See Section 2.5.4 of the Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
BMC Response to LFN Comments on DSR	Additional confirmatory test work for the in situ ABM Lake treatments and constructed wetland treatment system(s) is underway and the results of this test work will be included as part of BMC's applications for a Type A Water Licence and Quartz Mining Licence.	See Appendix C (ABM Pit Lake Treatment Study) and Appendix D (Off Site Constructed Wetland Treatment System Pilot) of the Reclamation and Closure Plan
BMC Response to LFN Comments on DSR	BMC will continue to reach out to LFN to seek meetings with LFN's consultants to correct any misinterpretations with respect to the predicted water quality in closure and proposed contingency measures.	See Section 2.3.2 of the Reclamation and Closure Plan
BMC Response to LFN Comments on DSR	BMC remains committed to ongoing engagement with all parties interested in the Project, including LFN.	See Section 2.3 of the Reclamation and Closure Plan
BMC Response to LFN Comments on DSR	The off-site bench scale testing and optimization phase has been conducted and the results of this research will be submitted to the Yukon Water Board during licensing.	See Appendix C of the Reclamation and Closure Plan (ABM Pit Lake Treatment Study)
BMC Response to LFN Comments on the DSR	Off-site pilot-scale testing of the CWTS and in situ treatment has been undertaken and will form part of the WL application.	See Appendix C (ABM Pit Lake Treatment Study)
BMC Response to LFN Comments on the DSR	The overall approach and modelling used to predict water quality in the ABM pit at closure will be refined through the permitting processes and through various Project phases to provide "proof of concept prior to final closure".	See Appendix D of the Reclamation and Closure Plan (Off Site Constructed Wetland Treatment System Pilot)
BMC Response to LFN Comments on the DSR	The results of this test work and the commitment for ongoing reclamation research will be a component of the Water Licence and Quartz Mining Licence applications and conditions.	See Section 2.5 of the Reclamation and Closure Plan
BMC Response to LFN Comments on the DSR	It is anticipated that a demonstration-scale CWTS (Phase 4) will be undertaken at the Site during the Operations phase of the Project, while the full-scale CWTS (Phase 5 – the final stage) will be installed and commissioned during Transition Closure phase as the ABM pit fills.	See Section 2.5.4 of the Reclamation and Closure Plan
BMC Response to LFN Comments on the DSR	BMC's Reclamation and Closure Plan Goal is: "To return the mine site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with traditional land use activities." Although this goal is achievable, it doesn't preclude traditional land users from choosing not to use the land base due to perceived risks. BMC looks forward to working with LFN and RRDC Chiefs and Councils to educate about residual risks so that any potential future decision on land use by individuals is made with all the facts at hand.	See Section 2.3.2 of the Reclamation and Closure Plan
Project Proposal Chapter 6 (BMC, 2017a)	Re-vegetate waste rock storage areas final surfaces early where practicable.	See Sections 2.4.4, 2.5.1, 5.2.1.1 and 5.2.1.2 of the Reclamation and Closure Plan
Project Proposal Chapter 8 (BMC, 2017a) and BMC Response on Draft Screening Report (BMC, 2020)	Construction of Water Treatment Plant which will remain on site until the closure objectives are met in the receiving environment.	Section 7.7.2.5 of Reclamation and Closure Plan
Project Proposal Chapter 8 (BMC, 2017a)	ABM lake treatment with lime and carbon source as it fills (as required).	Sections 7.1 and 7.2 of Reclamation and Closure Plan
Project Proposal Chapter 8 (BMC, 2017a)	Constructed wetland treatment system at closure.	Section 2.5.4 and 7 of Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
Project Proposal Chapter 9 (BMC, 2017a)	Re-divert Fault Creek into Geona Creek watershed and the ABM lake to accelerate the filling of the ABM open pit during Closure.	Section 7.2 of Reclamation and Closure Plan
Project Proposal Chapter 11 (BMC, 2017a)	Reclamation methods that reduce equipment traffic during soil redistribution and placement will be utilized to lessen compaction of soil in stockpiles and reclaimed areas. For example, where practicable, instead of a dozer, a backhoe will be used to distribute topsoil cover in the reclaimed areas. Ripping will be used in areas where surficial soils are excessively compacted.	Section 7.1.1 of Reclamation and Closure Plan
Project Proposal Chapter 11 (BMC, 2017a)	During salvage operations, mitigation against soil degradation by having multiple topsoil storage areas, will focus on minimizing the number of times the soil is moved, reducing vehicle traffic over the stockpile surface, and avoiding handling soils when they are too dry or too wet.	Section 7.1.2 of Reclamation and Closure Plan
Response Report #1 (BMC, 2017a) (BMC, 2017b)	Risks associated with increased gully erosion of the Class A, B and C Waste Storage Facilities will be mitigated through the inclusion of benches to reduce the length of the overall slope. The benches will be sloped appropriately to minimize down slope flow, while the slopes will be contoured to minimize the potential for erosion. The upper terraces of the facilities will be graded to a slope of 2% to convey water at a reduced velocity and reduce ponding water. Concurrent reclamation and revegetation will minimize the areas susceptible to erosion during operations and the majority of the longer steeper slopes will be revegetated prior to the active closure phase. This design concept is commonly used for reducing the potential for gully erosion and has become accepted practice throughout the mining industry. If gully erosion is observed in areas on the storage facilities it will be remedied by a combination of some or all of: armoring, backfilling, recontouring, and revegetation.	Section 5.2 and Chapter 7 of Reclamation and Closure Plan
Project Proposal Chapter 13 (BMC, 2017a)	Install permanent wildlife barrier around ABM lake.	Section 7.2 of Reclamation and Closure Plan
Project Proposal Chapter 13 (BMC, 2017a)	At closure, the ABM lake will be batch treated to maintain water quality within acceptable guidelines for wildlife protection.	Section 7.2 of Reclamation and Closure Plan
Project Proposal Chapter 13 (BMC, 2017a)	Leave haul road in pit to provide egress from ABM lake.	Section 7.2 of the Reclamation and Closure Plan
Project Proposal Chapter 15 (BMC, 2017a)	BMC has committed to working with RRDC in identifying the species that will be used for the reclamation purposes and developing a seed collection program and seed bank in Ross River. Therefore, the potential effects on traditional medicines will be in part mitigated through this program.	Sections 2.5.2 and 7.1.2 of the Reclamation and Closure Plan
Response Report #4A (BMC, 2018b)	Wildlife and Wildlife Habitat – During one of the RRDC Elders Oversight Committee Meetings, one of the Elders indicated that wildlife (moose and caribou) could be at risk of falling in the ABM open pit at closure, based on this knowledge BMC committed to constructing a bund around the highwall edges of the open pit to prevent inadvertent access by wildlife and people (Section 7.2.1 Appendix H-1 of the Project Proposal). In more recent discussions with RRDC Elders it was determined that a second bund would reduce this risk even further. Subsequently, BMC has committed to construct a second bund to ensure protection of wildlife and people (i.e. traditional land users).	Table 7-1 of Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
Response Report #4A (BMC, 2018b)	Vegetation Cover and Composition - The RRDC Elders have had concerns that the vegetation that is planted or re-established on the Class A Facility will accumulate metals from the tailings below the cover and subsequently the vegetation would not be safe to use for food or medicines. BMC has "designed the covers (high-density polyethylene liner, 3 meters of clean waste rock, overburden and organic soil) to ensure that there is no possibility for the roots of any of the plants on the Class A Facility to encounter the tailings. The Class B facility has been designed the same. Therefore, in post closure the traditional use activities (i.e. berry picking, traditional medicine gathering, and hunting can safely resume). BMC has committed to monitoring the vegetation in collaboration with RRDC/LFN Kaska. Preliminary berry trigger levels are presented in response to YESAB's information request R3-27 (BMC, 2018a). Collaboration by both parties in monitoring, reporting and communicating will to help ensure that the community is re-assured that the design measures are in fact protecting vegetation and that is can safely be consumed by the traditional land users. This strategy is aimed at promoting traditional land use activities in post closure	Sections 7.4 and 7.11.5 of Reclamation and Closure Plan
Decision Document Term #1	The Proponent shall update the geochemical modelling and submit as part of regulatory applications to inform the detailed design of the cover systems and the Waste Rock Management Plan, with the aim of reducing acid production and Contaminants of Potential Interest (COPI) loadings from storage facilities.	Section 2.5.1 of the Reclamation and Closure Plan
Decision Document Term #3	The Proponent shall conduct pilot studies for in-situ pit treatment and the constructed wetland treatment system (CWTS) during operations to confirm their expected performance for all relevant Contaminants of Potential Interest (COPI), optimize their respective designs and ensure timely implementation.	Sections 2.5.3 and 2.5.4 of the Reclamation and Closure Plan
Decision Document Term #4	The Proponent shall implement additional treatment options if the proposed constructed wetland treatment system (CWTS) cannot be demonstrated to reduce Contaminants of Potential Interest (COPI) concentrations to levels that are consistently below the defined regulatory thresholds.	Section 2.5.4.1 of the Reclamation and Closure Plan
Decision Document Term #8	The Proponent shall commit to ongoing geochemical studies for tailings and waste rock storage areas, and studies to optimize the performance of all water treatment facilities and processes to address the potential for acidic conditions to develop in the future.	Sections 2.5.1 and 2.5.4 of the Reclamation and Closure Plan
Decision Document Term #9	The Proponent shall ensure the water treatment plant (WTP) remains operational until it has been demonstrated that surface water from the site meets water quality objectives (WQO) for the receiving environment in Geona Creek (KZ-37) and in Finlayson Creek (KZ-15).	Table 2-1 and Section 8.2 of the Reclamation and Closure Plan
Decision Document Term #12	The Proponent shall ensure that LFN and RRDC have opportunities to participate in and influence the development of environmental and socioeconomic management plans and closure objectives developed for the Project to ensure that Kaska can collaboratively design, collect, report, manage and communicate the results of the monitoring programs and adaptive management plans to their community members. The Proponent will make participant funding available to Kaska to support the incorporation of Kaska perspectives on Kaska laws as well as support the inclusion of Kaska members, including Elders and land stewards, in the regulatory process, the monitoring of impacts, the implementation of adaptive management and the Proponent's commitments for the life of the Project (regulatory to reclamation).	Sections 2.3.1, 2.3.2 and Table 7-1 of the Reclamation and Closure Plan
Decision Document Term #13	The Proponent shall ensure that LFN has the opportunity to be part of the Proponent-Kaska environmental, cultural and heritage management program.	Section 2.3.2 of the Reclamation and Closure Plan
Decision Document Term #19	The setting of security shall take into account the potential for care and maintenance costs required to maintain environmental protections over a period between a temporary closure and decommissioning.	Sections 9.2.14 and 9.3.1 of the Reclamation and Closure Plan
Decision Document Term #20	Security requirements shall take into consideration the potential for early unscheduled closure and the need for care and maintenance requirements to maintain environmental safeguards prior to decommissioning	Sections 9.2.14 and 9.3.1 of the Reclamation and Closure Plan

Reference No.	Proponent Commitment / Mitigation	Where addressed
Decision Document Term #31	The Proponent shall identify alternative/contingency measures for treatment of ABM pit water in their updated comprehensive Adaptive Management Plan (AMP), in regulatory applications. The AMP shall provide descriptions of the types of treatment alternatives and their implementation timelines, in regulatory applications. The Proponent shall identify modelling and monitoring approach including trigger values for when alternatives must be implemented and, if monitoring shows exceedances and alternative treatment is implemented, how discharges will be addressed until new water treatment becomes operational.	Section 7.2.1 of the Reclamation and Closure Plan
Decision Document Term #47	Financial security for the Project should be based upon the peak liabilities in a 5-year period from the point of determination and should not account for revenues generated during the closure period.	Section 9.3 and Appendix E of the Reclamation and Closure Plan