

Memorandum

To: Kevin Eppers, Hecla Yukon

From: Elizabeth Busby, Ensero Solutions Canada, Inc.

CC: Carolyn Johns, Ensero Solutions Canada, Inc.

Date: January 23, 2024

Re: Dust and Noise Monitoring Results Memo – October 2023

1 INTRODUCTION

This memo summarizes noise and dust monitoring levels recorded during October 2023, in accordance with the Variation Notice issued by the Government of Yukon Compliance Monitoring and Inspections (CMI) Branch on May 12, 2023 (YG, 2023). The Variation Notice was issued to Hecla Yukon (Hecla) for the Alexco Keno Hill Mining Corp. (AKHM) monitoring sites, and allows for a temporary variance to QML-0009 to permit the use of a portable crusher in lieu of the permanent crusher, while the permanent crusher is under repairs until September 30, 2023. The following sections outline results of dust and noise monitoring for October 2023 (Section 2 and 3, respectively) and comparison to adaptive management initiative (AMI) triggers.

2 DUST MONITORING RESULTS

Air quality monitoring is conducted at three stations within the Keno Hill Silver District (KHSD), with locations of each station summarized below:

TSP-1: Located on the west side of Keno City.

TSP-2: Located near the dry stack tailings facility phase 2 expansion area.

TSP-3: Located on the north side of Keno City, adjacent to the Onek 400 water treatment plant.

Dust monitoring results for October 2023 are summarized in Table 2, with three low triggers of AMI #14 observed in October. There were statistically significant increasing trends at TSP-1 of total particulates, at TSP-2 of total manganese, and at TSP-3 of copper; however, none of the trends are approaching Yukon Ambient Air Quality Standard (YAAQS) or Ontario Ambient Air Quality Criteria (OAAQC). All dust monitoring results remained below the YAAQS for total suspended particulates (TSP), fine particulate matter (PM_{2.5}), and coarse particulate matter (PM₁₀) and below the OAAQC for metals outlined in the Variation Notice (i.e., arsenic, cadmium, copper, lead, manganese, and silver; YG, 2023).

Table 2-1: Dust Monitoring Results for October 2023

Station	Parameter	TSP	PM _{2.5}	PM ₁₀	As	Cd	Cu	Pb	Mn	Ag
	Units	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
	Standard ¹	120	50	27	0.3	0.025	50	0.5	0.4	1
TSP-1	06-Oct-2023	2.8	-	-	0.00035	0.00007	0.01	0.00135	0.001	0.00014
TSP-1	07-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-1	08-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-1	10-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-1	12-Oct-2023	2.8	-	-	0.00035	0.00007	0.011	0.00075	0.004	0.00014
TSP-1	14-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-1	15-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-1	18-Oct-2023	2.8	-	-	0.00035	0.00007	0.011	0.00194	0.002	0.00014
TSP-1	21-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-1	23-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-1	25-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-2	06-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-2	07-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-2	08-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-2	10-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-2	12-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-2	14-Oct-2023	2.8	-	-	0.00035	0.00029	0.012	0.01819	0.008	0.00043
TSP-2	15-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-2	18-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-2	21-Oct-2023	5.7	-	-	0.00235	0.00035	0.012	0.03417	0.03	0.00075
TSP-2	23-Oct-2023	9.7	-	-	0.00365	0.00107	0.015	0.05097	0.049	0.00094
TSP-3	06-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-3	07-Oct-2023	2.8	-	-	0.00035	0.00007	0.011	0.00035	0.001	0.00014
TSP-3	08-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-3	10-Oct-2023	2.8	-	-	0.00035	0.00007	0.012	0.00035	0	0.00014
TSP-3	12-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-3	14-Oct-2023	-	-	2.8	-	-	-	-	-	-
TSP-3	15-Oct-2023	2.8	-	-	0.00035	0.00007	0.015	0.00074	0.001	0.00014
TSP-3	18-Oct-2023	-	2.8	-	-	-	-	-	-	-
TSP-3	21-Oct-2023	-	-	2.8	-	-	-	-	-	-

¹ Standards for total suspended particulates (TSP), fine particulate matter (PM_{2.5}), and coarse particulate matter (PM₁₀) are Yukon Ambient Air Quality Standards. Standards for metals are Ontario Ambient Air Quality Criteria.

3 NOISE MONITORING RESULTS

Noise monitoring is conducted at five stations within the KHSD, with locations of each station summarized below:

R01: Located in an east end residence, north side of Lightning Creek Road.

R02: Located at a residence on the east side of Sign Post Road.

R03: Located in the town center, north from the Snack Bar.

R04: Located at a residence on the west side of Wernecke Road.

R05: Located at a residence approximately 850 m from the District Mill.

Noise monitoring results were compared to baseline data to determine if an increase in noise from baseline was observed (15%, 20%, or 25% increase for low, moderate, high AMI action level triggers, respectively; Table 3-1). The baseline period for noise is defined as the period of time where active mining was not occurring (prior to May 2018, November 2018 to July 2020).

Table 3-1: Baseline Noise Data Thresholds (dB)

Station	R01	R02	R03	R04	R05
Average LAeq (dB) ¹	43.4	37.8	44.0	39.6	36.2
15% Increase from Baseline	49.9	43.4	50.5	45.5	41.6
20% Increase from Baseline	52.1	45.3	52.7	47.5	43.4
25% Increase from Baseline	54.2	47.2	54.9	49.5	45.2

¹ Average of noise data (LAeq, equivalent continuous noise level) prior to May 2018, November 2018 through July 2020.

Noise monitoring results for October 2023 are shown in Table 3-2. Due issues with the noise monitoring equipment batteries, there are only two observations reported during this month. New batteries have been ordered and are expected to be installed in November.

In October, baseline noise levels were exceeded at R05 (high action level trigger), while both R04 and R05 exceeded the high action level trigger for one sample exceeding 38 dB for at least one timepoint. Temperature in the KHSD in October was on average -3°C and ranged between -7 to 1°C. Though data for the same time of year in 2022 is unavailable at the District Mill weather station (weather station was disassembled between late May and November 2022), temperatures in October 2021 were on average higher than 2023 (average of -2°C in 2021, ranged between -4 and 1°C). It is unlikely that temperature had an influence on the noise measurements in October.

Table 3-2: Noise Monitoring Results for October 2023

Station	Date	LAeq (dB)	Action Level Trigger Exceeded
R04	11-Oct-23	39.3	High (1 sample exceeding 38 dB)
R05	7-Oct-23	50.3	High (25% over baseline noise data [45.2]; 1 sample exceeding 38 dB)

LAeq – equivalent continuous noise level.

4 REFERENCES

YG (Yukon Government, Compliance Monitoring & Inspections Branch). (2023). *Variation Notice, QML-0009*. May 12, 2023.