

Memorandum

To: Kevin Eppers, Hecla Yukon

From: Bryanna Gonari, Ensero Solutions Canada, Inc.

CC: Ryan Herbert, Ensero Solutions Canada, Inc.

Date: August 14, 2023

Re: Dust and Noise Monitoring Results Memo – June 2023

1 INTRODUCTION

This report summarizes noise and dust monitoring levels recorded during June 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 June 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 north side of Keno City, adjacent to the Onek 400 water treatment plant.
- TSP-2: Located near the dry stack tailings facility phase 2 expansion area.
- TSP-3: Located on the west side of Keno City.

Dust monitoring results for June 2023 are summarized in Table 2-1, with no trigger of the AMIs observed in June. Dust monitoring results at all stations remained below the Yukon Ambient Air Quality Standards (YAAQS) for total suspended particulates (TSP), fine particulate matter (PM_{2.5}), and coarse particulate matter (PM₁₀) and below the Ontario Ambient Air Quality Criteria (OAAQC) for metals outlined in the Variation Notice (i.e., arsenic, cadmium, copper, lead, manganese, and silver; YG, 2023). Additionally, an increasing trend towards YAAQS or OAAQC was not observed at any station.

Table 2-1: Dust Monitoring Results for June 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	04-Jun-2023	5.6	-	-	0.00035	0.00007	0.011	0.00387	0.004	0.00014
	06-Jun-2023	11.7	-	-	0.00035	0.00007	0.01	0.00147	0.003	0.00014
	09-Jun-2023	2.8	-	-	0.00099	0.00007	0.01	0.00739	0.005	0.00014
	11-Jun-2023	-	2.8	-	-	-	-	-	-	-
	12-Jun-2023	-	2.8	-	-	-	-	-	-	-
	16-Jun-2023	-	2.8	-	-	-	-	-	-	-
	17-Jun-2023	-	-	2.8	-	-	-	-	-	-
	18-Jun-2023	-	-	2.8	-	-	-	-	-	-
	19-Jun-2023	-	-	2.8	-	-	-	-	-	-
TSP-2	20-Jun-2023	-	-	2.8	-	-	-	-	-	-
	21-Jun-2023	-	-	2.8	-	-	-	-	-	-
	22-Jun-2023	-	-	2.8	-	-	-	-	-	-
	23-Jun-2023	-	2.8	-	-	-	-	-	-	-
	24-Jun-2023	-	2.8	-	-	-	-	-	-	-
	25-Jun-2023	-	2.8	-	-	-	-	-	-	-
	26-Jun-2023	-	-	-	0.00083	0.00018	0.003	0.00507	0.003	0.00014
	27-Jun-2023	-	-	-	0.00542	0.00093	0.005	0.06042	0.02	0.00162
	29-Jun-2023	-	-	-	0.00185	0.00032	0.006	0.01806	0.01	0.00057
TSP-3	04-Jun-2023	40.6	-	-	0.00453	0.00337	0.012	0.01681	0.04	0.00014
	06-Jun-2023	34.6	-	-	0.00196	0.00054	0.013	0.00465	0.008	0.00014
	09-Jun-2023	14.2	-	-	0.00342	0.00129	0.013	0.01875	0.025	0.00038
	11-Jun-2023	-	14.9	-	-	-	-	-	-	-
	12-Jun-2023	-	2.8	-	-	-	-	-	-	-
	15-Jun-2023	-	6.5	-	-	-	-	-	-	-
	17-Jun-2023	-	-	7.4	-	-	-	-	-	-
	18-Jun-2023	-	-	2.8	-	-	-	-	-	-
	19-Jun-2023	-	-	10.1	-	-	-	-	-	-

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 June 2023 are shown in Table 3-2. In June, baseline noise levels were exceeded at R01, R03, R04, and R05 (moderate or high action level triggers), with these stations also exceeding the high action level trigger for one sample exceeding 38 dB. Temperature in the KHSD in June was on average 11°C and ranged between 8-14°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 June 2021 were on average lower and more variable than 2023 (average 8°C in 2021, ranged between 3-13°C). As noise travels faster through warmer air (warmer air is less dense), the higher temperatures observed in the KHSD may have influenced higher noise measurements. Additionally, no noise complaints were received in June 2023.

A drum roller is utilized to compact the tailings on the dry stack tailings facility. The vibration function on the machine was identified as the potential cause of the elevated noise levels. The vibration function on the drum roller was disabled from the machine in July and noise levels will be evaluated in August to determine if that was the cause of the elevated noise levels.

Table 3-2: Noise Monitoring Results for June 2023

Station	Date	LAeq (dB)	Action Level Trigger Exceeded
R01	4-Jun-23	37.1	None
	15-Jun-23	53.7	Moderate (20% over baseline noise data; 52.1 dB) and high (1 sample exceeding 38 dB)
R03	12-Jun-23	56.3	High (25% over baseline noise data [54.9 dB]; 1 sample exceeding 38 dB)
	16-Jun-23	61.2	
	17-Jun-23	45.6	High (1 sample exceeding 38 dB)
R04	20-Jun-23	47.4	Moderate (20% over baseline noise data; 47.5 dB) and high (1 sample exceeding 38 dB)
R05	18-Jun-23	47.8	High (25% over baseline noise data [45.2 dB]; 1 sample exceeding 38 dB)

LAeq – equivalent continuous noise level. R02 was not monitored in June 2023.

4 REFERENCES

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