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February 28, 2018

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Re: January 2018 – Monthly Monitoring Report for Water Licence 2AM-DOH1323

This report is comprised of monitoring requirements as set out in Part J and Schedule J of water licence 2AM-DOH1323 Amendment 1, and additional requirements from INAC.

During the subject period of this report the focus of activities at Doris North was underground mining, construction, ore processing, water management and environmental compliance. Sampling locations monitored under this licence (seasonally or when facilities are operational) are provided in Figure 3 at the end of this report.

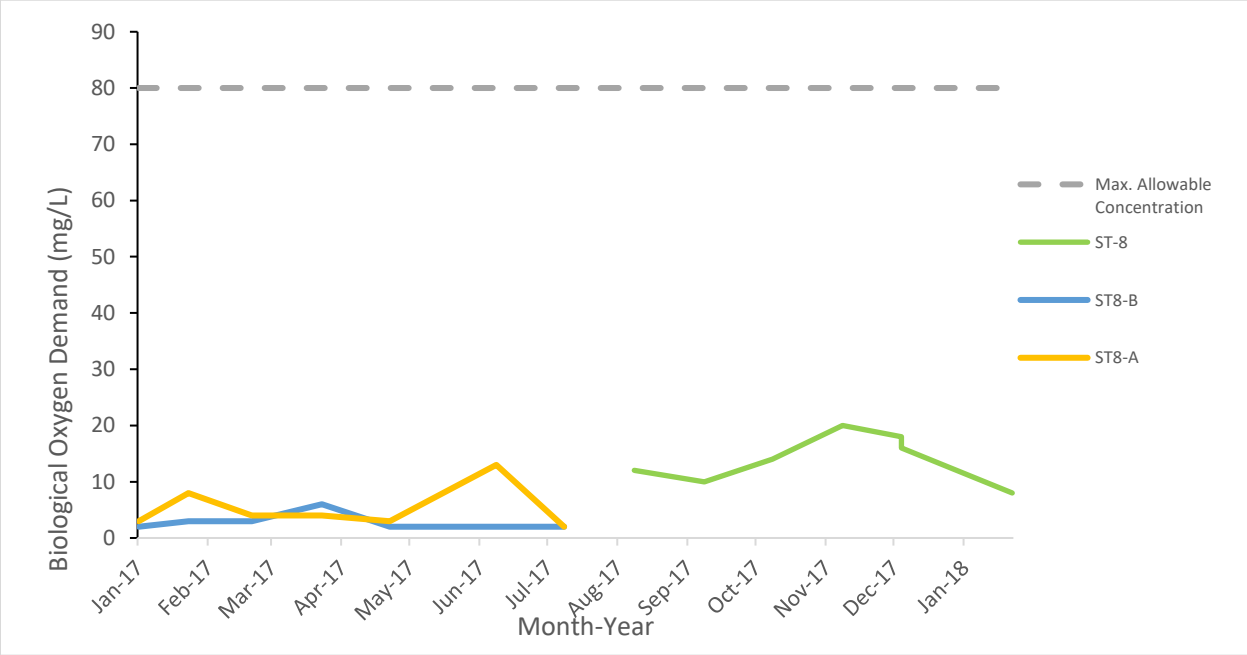
Site Wide Water Quality Monitoring Program (Part J Items 3, 8, and Schedule J)

Water quality sampling was conducted in January at monitoring stations identified in Schedule J of the licence (ST-1 through ST-13, TL-1 through TL-12). Water quality samples were not collected for monitoring stations that were inactive during the month being reported (e.g., facilities that had not yet been constructed, were frozen during the month, or were not operationally active). All parameters were compared to the applicable effluent quality limits outlined in Part G of the licence and no exceedances were observed. Results of this monitoring are attached to the report in Appendix A.

Figure 1 and 2 illustrates effluent quality characteristics for parameters of interest at select monitoring stations.

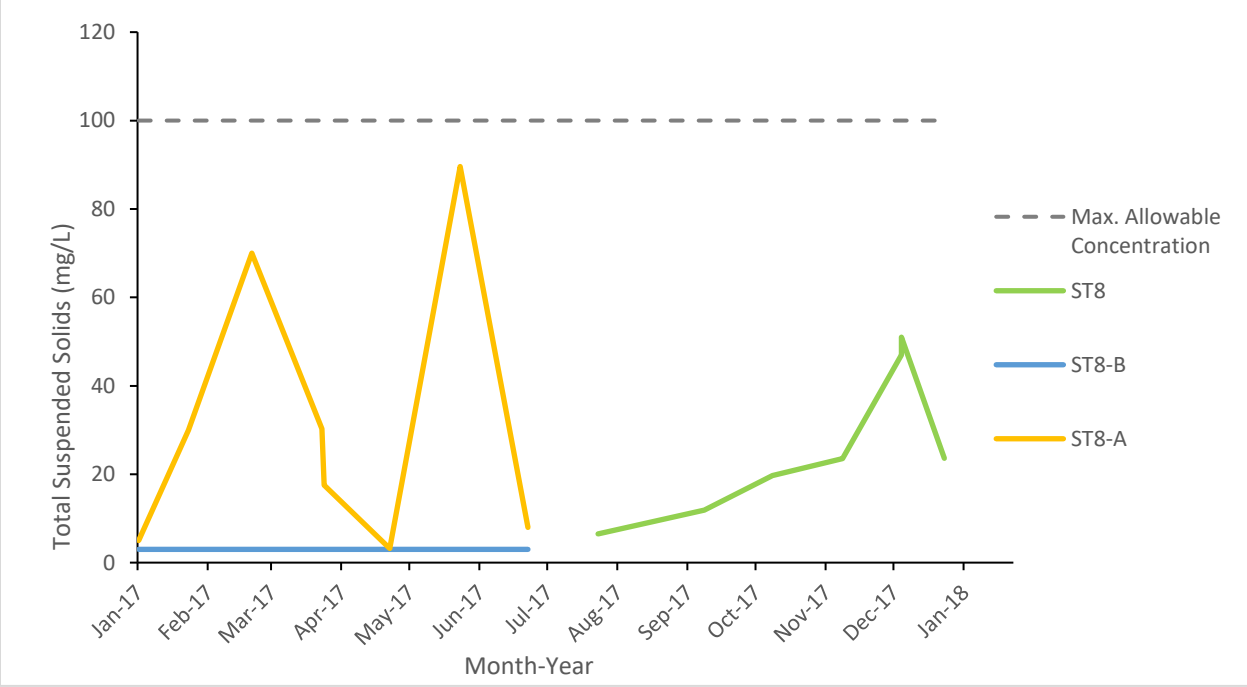
Repairs conducted by the wastewater treatment operator in December resulted in a subsequent improvement of results for Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) at monitoring station ST8 in January. Results for these parameters remain below the effluent quality limits outlined in Part G of the licence. As part of TMAC's adaptive management strategy, additional monitoring was continued on the wastewater treatment plant by the wastewater treatment operator throughout January. The elevations observed in December were attributed to degraded treatment performance in one of the two treatment units due to regular wear and tear on the filter membrane cassettes. The malfunctioning cassette was isolated and new cassettes have been sourced through the manufacturer for replacement.

Figure 1. Biological Oxygen Demand Results Consistently Below Discharge Criteria for Wastewater Treatment Plant (ST8, ST8A, ST8B)



Note: Maximum Average Concentration as per Part G Item 4(b).

Figure 2. Total Suspended Solids Results Consistently Below Discharge Criteria for Wastewater Treatment Plant (ST8, ST8A, ST8B)



Note: Maximum Average Concentration as per Part G Item 4(b).

Flow and Volume Measurements (Part J Items 11, 12, and Schedule J)

Table 1. Effluent discharge, January 2018

Facility	Station Code	Discharge Volume (m^3)	Exceedances of Discharge Criteria	Discharge Location	Licence Reference
Sedimentation Pond	ST-1	0	0	Tailings Impoundment Area	Part G Item 22
Pollution Control Pond #1	ST-2	0	N/A	Tailings Impoundment Area	Part G Item 22
Landfill Sump	ST-3	0	0	Facility not constructed	Part G Item 24 (a, b, g)
Landfarm Sump	ST-4	0	0	Tundra Discharge 13W 432450 7559600	Part G Item 24 (c, d, g)
Doris Tank Farm	ST-5	0	0	Tundra Discharge 13W 432960 7559270	Part G Item 24 (e, f, g)
Rob Bay 5ML Tank Farm	ST-6a	0	0	Tundra Discharge 13W 432973 7563440	Part G Item 24 (e, f, g)
Rob Bay Three 5ML Tank Farm	ST-6b	0	0	Tundra Discharge 13W 432730 7563200	Part G Item 24 (e, f, g)
Wastewater Treatment Plant, Effluent	ST-8	944	0	Tundra Discharge 13W 432933 7559057	Part G Item 23(b-d)
Wastewater Treatment Plant, Sewage Sludge	N/A	18.8	N/A	Tailings Impoundment Area	Part J Item 12 (g)
Reagent and Cyanide Storage Facility Sump	ST-11	0	0	Tailings Impoundment Area	Part G Item 23 (a)
Pollution Control Pond #2	ST-13	0	0	Facility not constructed	Part G Item 22
Mine Water Discharge	TL-12	0	N/A	Tailings Impoundment Area	Schedule J Table 2

Records of visual monitoring of discharge to tundra are maintained on file as per Part J Item 18.

Table 2. Discharge from TIA to Doris Creek, January 2018

Month	Number of days of discharge	Discharge Volume (m^3)	Exceedances of Discharge Criteria*
January	0	0	0
Annual Cumulative	**0**	**0**	**0**

* Discharge criteria outlined in Part G Items 29, 30, 31 and Part J Item 8.

A comparison of flows between TL-4 and TL-2 as per Part G Item 32 of the licence was not conducted as no water was discharged for the Tailings Impoundment Area to Doris Creek this month.

Table 3. Water usage, January 2018

Month	Windy Lake (ST-7A)	Doris Lake (ST-7)					Mine Inflow	Total Usage
	Domestic Water* (m^3)	Domestic Water* (m^3)	Surface Exploration (m^3)	Industrial Usage** (m^3)	Dust Suppression (m^3)	Winter Track (m^3)	Industrial Usage ^ (m^3)	
January	1,051	0	0	0	0	119	433	1,603
Annual Total	1,051	0	0	0	0	119	433	1,603
Annual Allowance	**22,995**							**480,000**

* As permitted by water licences 2BE-HOP1222 and 2AM-DOH1323

** Includes industrial uses such as underground drilling, core processing, concrete batching, etc.

^ Mine inflow of groundwater from development in the Doris Connector zone is currently being recycled into underground sumps for use in mining activities. These volumes have been calculated based on weekly flow measurements collected at the Doris Connector face and is reported as Industrial Usage. No mine inflow is being discharged to the Tailings Impoundment Area at this time.

Table 4. Volume of Reclaim Water from the TIA, January 2018

Month	Reclaim Water (m^3) *
January	82,576.9
Annual Cumulative	**82,576.9**

* As per Part J Item 11(d)

Table 5. Waste Rock and Process Volumes, January 2018

Month	Waste Rock Management					Underground Void Space			Ore Processing and Tailings Management		
	Produced from Mining Activity (tonnes)*	Backfilled Directly to Underground Stopes (tonnes)*	Returned Underground from Temporary Waste Rock Pile* (tonnes)	Moved to Temporary Waste Rock Pile (tonnes)*	Cumulative on Temporary Waste Rock Pile (tonnes)	Volume Created from Mining Activities (tonnes)	Cumulative Volume Available for Backfill (tonnes)	Cumulative Volume Available for Backfill (m^3)	Quantity of Ore Processed** (tonnes)	Total Dry Tailings Placed in TIA** (tonnes)	Total Dry Cyanide Leach Tailings Placed Underground** (tonnes)
December Balance	-	-	-	-	542,884	-	774,674	277,762	-	-	-
January	22,951	25,584	0	0	542,884	10,632	785,306	281,559	25,219	23,916	1,304
Cumulative Total	22,951	25,584	0	0	542,884	10,632	785,305	281,559	25,219	23,916	1,304

* As per Part J Item 11(e, f)

** As per Part J Item 12.

Note: Void space created from mining activities is determined as the sum of the initial void space as calculated in March 2017 and void space created each month from mining activities. A negative volume of void space created in a month indicates that a higher volume of waste rock and dry cyanide leach tailings was returned underground compared to the volume of void space created from new mining activities.

Table 7. Doris Lake Water Level (ST-12), January 2018

Month	Minimum Water Level (masl)	Maximum Water Level (masl)	Mean Water Level (masl)	Monthly Water Level Variation (masl)**	Comparison of Mean Water Level from Month to Month (masl)^	Low Action Level Trigger (masl)*
January	21.672	21.689	21.679	0.017	0.003	21.346

* Low action level trigger is relative to the average water level value (September 10-30, 2017) measured in Doris Lake. Low action level trigger (-0.42 m) outlined in Section 5.4 of the Doris Aquatic Effects Monitoring Plan, September 2016.

** Monthly Water Level Variation is calculated as the difference between the Maximum Water Level and the Minimum Water Level measured during the month.

^ Comparison of the change in water level from month to month. This value is calculated by subtracting the Mean Water Level of the current month from the Mean Water Level of the previous month (e.g February Mean Water level - January Mean Water level). A positive value from this calculation indicates a rise in water level since the previous month; a negative value from this calculation indicates a drop in water level since the previous month.

Summary of Assessments of Water Balance and Water Quality Model (Part G Item 34)

Average monthly water quality, hydrologic, and climatic monitoring data were collected while in operations during January. Data will contribute to the assessment of the water and load balance model, and will be compared to the predicted water quality and elevation within the TIA and will be reported in the annual report for 2018.

Thermal Monitoring (Part J Items 13 and 14)

Thermal monitoring undertaken as per Part J Items 13, 14 and Schedule J is reported in the annual Geotechnical Report.

Doris North Camp Diversion Berm Effectiveness (Part J Item 19(d))

Visual monitoring was conducted during January to evaluate the diversion berm's efficacy of diverting runoff away from the camp pad. The diversion berm was observed to be functioning as per its design purpose.

Incident Reporting

Spill #18-010 – On January 11, 2018, a spill of 15,000L of propylene glycol was released to the camp pad on the north side of the Assay Lab building from the glycol heat loop system. A heater coil inside the compressor room of the Assay Lab cracked due to the failure of a fan located on the west wall of the compressor room. When the fan failed, a loss of air movement over the coils caused reduced flow within the coil, allowing it to freeze and crack. Glycol was released when the pressure of the glycol system overwhelmed the frozen coil. This fluid flowed out of the room via a door located on the north side of the room between the Assay Lab and the Process Plant and onto the engineered camp pad constructed of crushed quarry rock.

Prior to the spill, it had been determined that the properties of the propylene glycol contained within the system had been degraded increasing the freezing point. Jeffcool SCA, which is a concentrated, supplemental additive and corrosion inhibitor, was added to the system in order to extend the life of the propylene glycol and elevate the pH. The increased freezing point is also believed to have a contributing factor in the spill event.

The impacted area surrounding the compressor room has limited accessibility, only allowing for small equipment to enter the area for recovery of contaminated materials. Contaminated snow was collected and disposed of within the TIA. The saturated area froze shortly after the spill event limiting the recovery of contaminated crush. Some of the spilled material is believed to have flowed beneath the compressor room, which will also be a limiting factor in the recovery of the material.

TMAC consulted with SRK Consulting Inc. to establish a comprehensive sampling and analysis plan in order to determine the impact to the surrounding environment, and to predict how the contaminants may migrate from the spill source based on the camp pad media and potential pathways. A number of snow and crush samples were collected for analysis in order to understand the chemical characteristics and the spatial extent of the spill within the contacted area. Results were provided to SRK to assist with validation and interpretation of the data.

Initial corrective actions that resulted from the investigation were as follows:

- Assay Lab staff will inspect this area once during each 12 hour shift (2 inspections/day);
- Installation of rough neck heater – heater is self-contained and draws air from inside the room rather than outside reducing the chance of heating coils freezing;
- Propylene glycol within the heat loop system will be replaced with a product that does not degrade as readily under high temperatures; and
- TMAC is investigating a system that will alarm the mill control room if a decrease in volume or pressure is observed within the heat loop system.

Spill #18-024 – On January 22, 2018 a coolant leak was discovered from the jacket water radiator core of an inactive generator in the Doris Camp Powerhouse. Coolant leaked from the radiator core onto the roof of the generator module, flowed over the edge of the module and released 10-15L of coolant onto the concrete foundation below. The follow-up

investigation identified that a weld on the core had failed due to extreme temperatures. The core was drained of its residual coolant and contaminated materials were removed from the area for disposal.

Corrective actions that resulted from the investigation were as follows:

- Routine inspections are conducted by the powerhouse operators (approximately every 2 hours) to identify any issues with the coolant and heat-exchange systems;
- The unit has been taken out of service and will be replaced with a new jacket water radiator core.

Spill #18-024 – On January 31, 2018 a sewage leak was discovered from a 2" distribution line between a newly commissioned accommodations complex and the main line to the Doris Sewage Treatment Plant. Upon investigation the line was found to be cracked in several places caused by expansion due to freezing. At the time, only 4 individuals were occupying the accommodations and had been moved in the day prior to the spill event. It was found that the spill and the contents remaining in the lift station were primarily greywater from shower usage. The line was inspected and found to be inadequately insulated and heat traced, which contributed to the line failure. The spilled material froze in place and did not seep through the layer of packed snow and ice to the crush material below. Contaminated materials were scraped up with heavy equipment and removed from the area for disposal. The 2" line was replaced and a second heat trace cable was installed on the line with additional insulation added to the box housing of the distribution line.

Corrective actions that resulted from the investigation were as follows:

- Supervisors are to ensure all water/septic lines are properly insulated and heat traced to prevent freezing;
- Supervisors are to inspect and approve all new installations or modified lines prior to commissioning; Documentation will be provided to Superintendent to show Supervision sign off.

Should there be any questions regarding this monthly report, please contact Oliver Curran at Oliver.Curran@tmacresources.com.

Yours sincerely,

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Hope Bay Project
(416) 628-0216

cc. Eva Paul, Water Resources Officer, INAC

Figure 3. 2AM-DOH-1323 SNP Monitoring Locations