95 Wellington Street W
Suite 1010
P.O. Box 44
Toronto, Ontario
M5J 2N7
416-628-0216

Sent by Email

October 30, 2017

Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Re: September 2017 – 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.

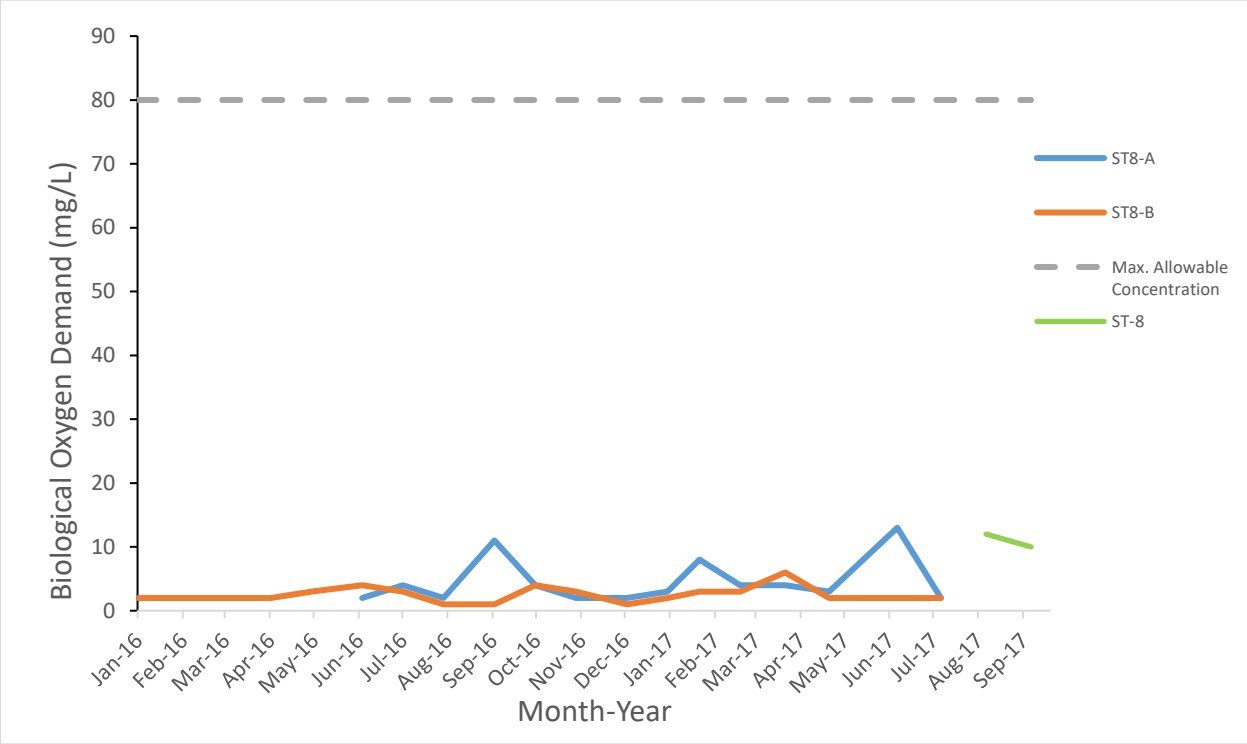
During the subject period of this report the focus of activities at Doris North was underground mining, construction, ore processing, water management and environmental compliance. Sampling locations monitored under this licence (seasonally or when facilities are operational) are provided in Figure 3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

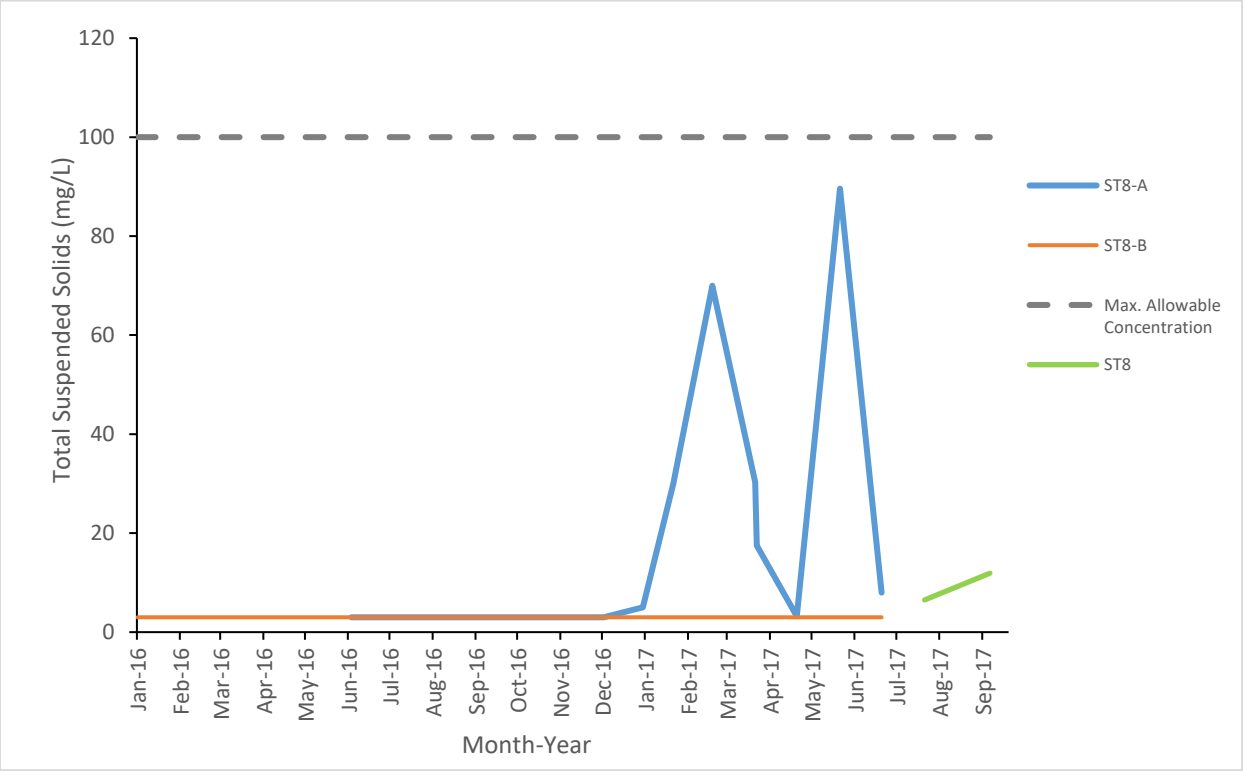
Figure 1 and 2 illustrates effluent quality characteristics for parameters of interest at select monitoring stations.

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, September 2017

Facility	Station Code	Discharge Volume (m^3)	Exceedances of Discharge Criteria	Discharge Location	Licence Reference
Sedimentation Pond	ST-1	4,657	0	Tailings Impoundment Area	Part G Item 22
Pollution Control Pond #1	ST-2	21	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	786	0	Tundra Discharge 13W 432933 7559057	Part G Item 23(b-d)
Wastewater Treatment Plant, Sewage Cake	N/A	26.4	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, September 2017

Month	Number of days of discharge	Discharge Volume (m^3)	Exceedances of Discharge Criteria*
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	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, September 2017

Month	Windy Lake (ST-7A)				Doris Lake (ST-7)				Total Usage
	Domestic Water* (m^3)	Surface Exploration (m^3)	Industrial Usage** (m^3)	Dust Suppression (m^3)	Domestic Water* (m^3)	Surface Exploration (m^3)	Industrial Usage** (m^3)	Dust Suppression (m^3)	
January	849	0	15	0	0	0	0	0	864
February	801	0	0	0	0	0	0	0	801
March	925	1	0	0	0	0	32	0	958
April	873	0	2	0	0	0	608	0	1,483
May	892	0	3	0	0	0	512	32	1,439
June	946	0	1	0	0	0	26	838	1,811
July	844	0	7	0	0	0	0	1,356	2,207
August	849	0	0	0	0	0	34	1,784	2,667
September	814	0	0	0	0	0	1	335	1,150
Annual Total	7,793	1	28	0	0	0	1,213	4,345	13,380
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.

September Ice Road Development: 0m^3. Cumulative total for Ice Road Development in 2017: 16m^3.

Table 4. Volume of Reclaim Water from the TIA, September 2017

Month	Reclaim Water (m^3) *
January	31,200
February	94,080
March	107,880
April	100,800
May	107,880
June	104,400
July	81,721
August	96,586
September	92,016
Annual Cumulative	**809,123**

* As per Part J Item 11(d)

Table 5. Waste Rock and Process Volumes, September 2017

Month	Waste Rock Stored on Temporary Waste Rock Pile (tonnes)*	Waste Rock Returned Underground* (tonnes)	Quantity of Ore Processed** (tonnes)	Dry Tailings Placed in TIA** (tonnes)	Dry Cyanide Leach Tailings Placed Underground** (tonnes)	Volume of Void Space Created Underground (tonnes)	Volume of Void Space Created Underground (m^3)
January	24,811	0	2,020	600	0	-	-
February	22,584	1,392	6,174	5,927	247	-	-
March	23,917	5,060	11,177	10,970	207	618,048	220,731
April	23,437	11,226	19,058	17,761	1,297	-162	-58
May	24,341	7,660	20,867	20,418	449	4,269	1,525
June	22,189	4,320	20,662	19,867	796	25,491	9,104
July	19,121	11,960	18,464	17,652	812	-5,711	-2,040
August	8,164	1,380	23,995	23,075	913	27,180	9,707
September	17,326	12,920	17,337	16,681	655	23,451	8,375
Cumulative Total	584,857	55,918	139,754	132,951	5,376	692,556	247,345

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

** As per Part J Item 12.

Note: The cumulative total of void space underground 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 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 6. Doris Lake Water Level (ST-12), September 2017

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	21.783	21.833	21.810	0.049	-	21.425
February	21.804	21.862	21.831	0.058	0.022	21.425
March	21.814	21.869	21.837	0.055	0.006	21.425
April	21.827	21.864	21.850	0.037	0.013	21.425
May	21.845	22.375	21.929	0.530	0.079	21.425
June	22.114	22.407	22.235	0.293	0.306	21.425
July	21.761	22.067	21.886	0.306	-0.349	21.425
August	21.708	21.757	21.732	0.049	-0.154	21.425
September	21.706	21.773	21.751	0.067	0.019	21.425

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

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 September 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 #17-371 – On September 30, 2017, the Nunavut Spill Line was notified via email (spills@gov.nt.ca) of a release of effluent from the Doris Camp Sedimentation Pond discharge line to tundra on the east side of Doris Creek. The volume of effluent released was estimated to be 200-300L.

Employees began the process of removing the in-line flow meter from the Sedimentation Pond discharge pipeline to prepare the line for winter shutdown. Cold temperatures over the previous night had caused ice to build up in the valve connection and the meter became stuck when the employees attempted to remove it from the valve. The employees attempted to re-tighten the flow meter back into the pipeline and then left the site to retrieve a torch to thaw the connection. It is believed that ice build-up within the valve blocked the connection and that when the employees left the site, the sun warmed the connection and effluent was released from the loose valve connection.

TMAC internally reviewed the incident to identify root cause and any corrective actions. Discharge was not actively occurring from the Sedimentation Pond at the time of the spill; effluent released was trapped in a low spot in this section of the discharge line. To remove the risk of a reoccurrence of the event in the future the in-line flow meter will be installed at a location at the end of the discharge pipeline within the Tailings Impoundment Area prior to discharge in 2018. A procedure will also be developed identifying steps to be completed prior to performing any maintenance or winterizing activities on the discharge line, which will include draining effluent from the pipeline prior to beginning any work.

Yours sincerely,

M. John Roberts
Vice President, Environmental Affairs
Hope Bay Project
(416) 628-0216

cc. Eva Paul, Water Resources Officer, INAC

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