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November 27, 2019

Licensing
Nunavut Water Board
P.O. Box 119
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Re: October 2019 – Monthly Monitoring Report for Water Licence 2AM-DOH1335

This report is comprised of the monitoring requirements set out in Part I and Schedule I of water licence 2AM-DOH1335 Amendment 2 (the licence), and additional requirements from CIRNAC.

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.

Construction of the Madrid North Portal laydowns and the Waste Rock Pile continued in October. Overburden stripping and blast activities continued in the Naartok East Crown Pillar Recovery Trench under this licence for the month. Figure 1 shows construction activities at the Madrid North Waste Rock Pile. Figure 2 shows progress of overburden stripping and mining activities at the Naartok East Crown Pillar Recovery Trench.

Monitoring locations associated with Madrid infrastructure (MMS) will be established with the Inspector as per Part I Item 3 as construction of Madrid facilities are completed. Sampling locations monitored under this licence (seasonally or when facilities are operational) are provided in Figure 6 and Figure 7 at the end of this report.

Figure 1. Madrid North Waste Rock Pile, October 2019

Figure 2. Naartok East Crown Pillar Recovery Trench, October 2019

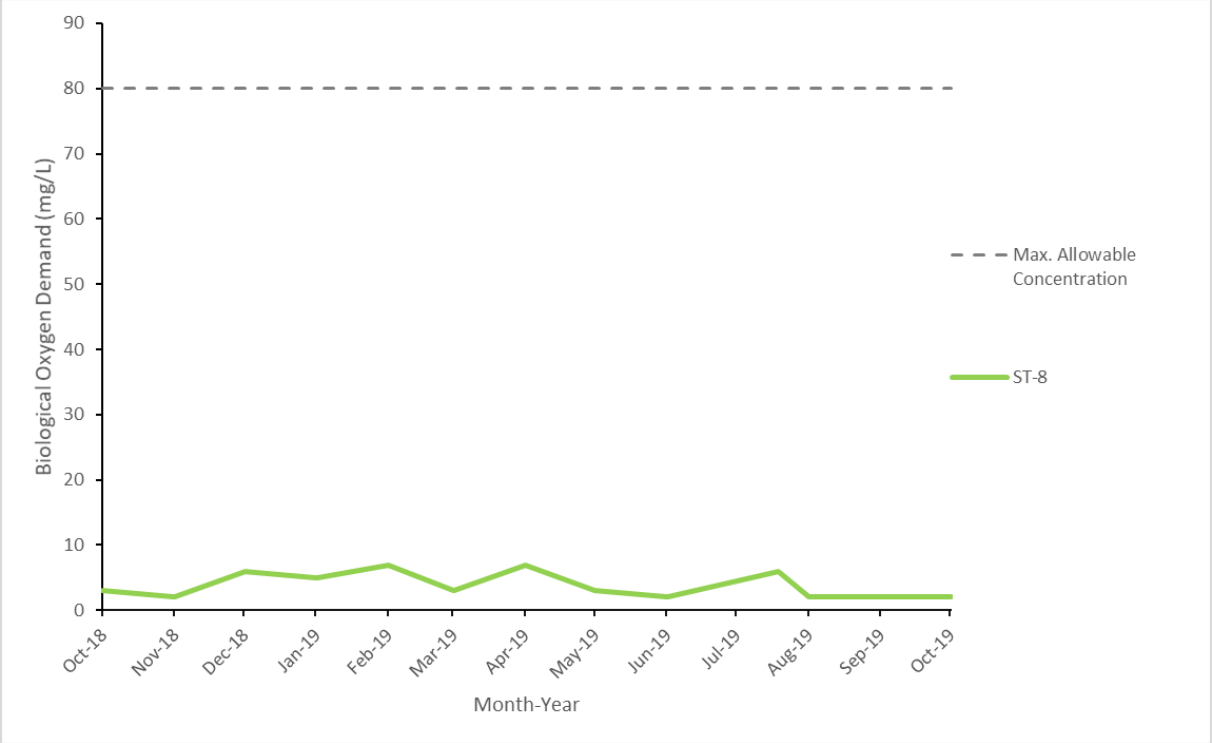
Site Wide Water Quality Monitoring Program (Part I Item 3 and Schedule I)

Water quality sampling was conducted in October at monitoring stations identified in Schedule I of the licence (ST-1 through ST-13, TL-1 through TL-12 and MMS-1 through MMS-10). 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 D and Part F of the licence. No exceedances of effluent quality limits were observed in any samples collected this month. Results of all water quality monitoring are provided in Appendix A attached to this report.

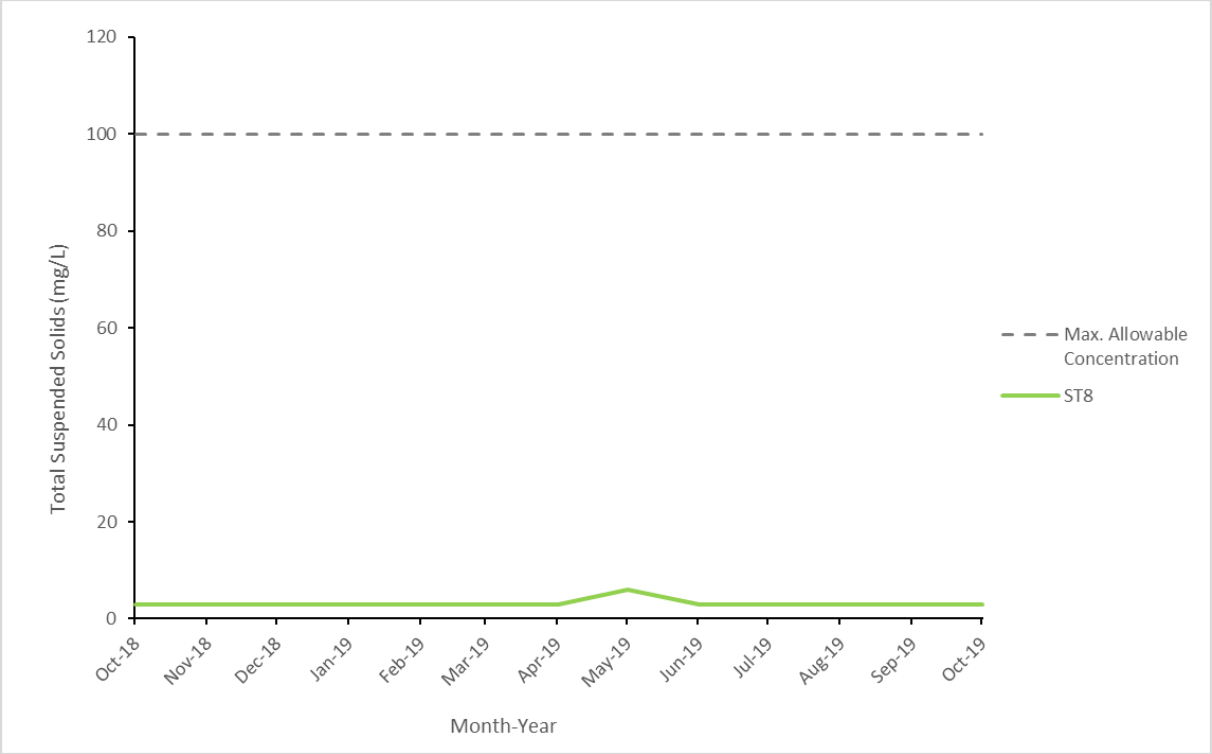
Figure 3 and 4 illustrates effluent quality characteristics for parameters of interest at select monitoring stations.

Figure 3. Biological Oxygen Demand Results Consistently Below Discharge Criteria for Wastewater Treatment Plant (ST8)



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

Figure 4. Total Suspended Solids Results Consistently Below Discharge Criteria for Wastewater Treatment Plant (ST8)



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

Flow and Volume Measurements (Part F, Part I and Schedule I)

Table 1. Effluent discharge, October 2019

Facility	Station Code	Discharge Volume (m^3)	Exceedances of Discharge Criteria	Discharge Location	Licence Reference
Doris Sedimentation Pond	ST-1	0	N/A	Tailings Impoundment Area	Part F Item 17
Doris Contact Water Pond #1	ST-2	0	N/A	Tailings Impoundment Area	Part F Item 17, 18(a)
Non-Hazardous Landfill Sump	ST-3	0	0	Facility not constructed	Part F Item 18(a)
Landfarm Sump	ST-4	0	0	Tailings Impoundment Area	Part F Item 18(b)
Doris Plant Site Fuel Storage Area	ST-5	0	0	Tailings Impoundment Area	Part F Item 18(b)
Rob Bay Single 5ML Fuel Storage Area	ST-6a	0	0	Tundra Discharge 13W 432904 7563494	Part F Item 18(b)
Rob Bay Fuel Storage and Containment Berm	ST-6b	0	0	Tailings Impoundment Area	Part F Item 18(b)
Doris Sewage Treatment Plant, Effluent	ST-8	1,398	0	Tundra Discharge 13W 432933 7559057	Part F Item 5(b-c)
Doris Sewage Treatment Plant, Sludge	N/A	24.2	N/A	Tailings Impoundment Area	Part I Item 5(f)
Doris Reagent and Cyanide Storage Facility Sump	ST-11	0	N/A	Tailings Impoundment Area	Part F Item 17
Doris Contact Water Pond #2	ST-13	0	N/A	Facility not constructed	Part F Item 17
Doris Mine Water Discharge	TL-12	31,493	N/A	Tailings Impoundment Area	
Madrid North Contact Water Pond	MMS-1	0	0	Tailings Impoundment Area	Part F Item 17, 18(a)
Madrid South Primary Contact Water Pond	MMS-2	0	N/A	Facility not constructed	Part F Item 17, 18(a)
Madrid South Secondary Contact Water Pond	MMS-3	0	N/A	Facility not constructed	Part F Item 17, 18(a)
Madrid South Fuel Storage Facility	MMS-5	0	0	Facility not constructed	Part F Item 18(b)
Madrid Brine Mixing Facility	MMS-6	0	N/A	Facility not constructed	
Madrid North Connector	MMS-7	0	N/A	No mining occurring at this time	
Madrid North Fuel Storage Facility	MMS-8	0	0	Facility not constructed	Part F Item 18(b)
Madrid Mine Water Discharge	MMS-10	0	N/A	Facility not constructed	

Records of visual monitoring of discharge to tundra are maintained on file as per Part I Item 11.

* Note: Volume reported includes effluent transferred the Doris Contact Water Pond #1, Landfarm Sump, Doris Plant Site Fuel Storage Area, Rob Bay Fuel Storage and Containment Berm and Doris Mine Water Discharge.

Table 2. Discharge from TIA, October 2019

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
October	0	0	0
Annual Cumulative	**0**	**0**	**0**

* Discharge criteria as outlined in *Metal and Diamond Mining Effluent Regulations*.
Acute Lethality testing conducted as outlined in Part F Item 22 and Part I Item 14

Table 3. Water usage, October 2019

Month	Windy Lake (ST-7A)	Doris Lake (ST-7)					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)	
January	1,438	0	0	16	0	432	1,886
February	1,341	0	0	48	0	275	1,664
March	1,403	0	0	77	0	0	1,480
April	1,422	0	0	20	0	2	1,444
May	1,513	0	0	51	0	0	1,564
June	1,374	0	0	30	96	0	1,500
July	1,340	0	0	33	0	0	1,373
August	1,294	0	0	78	48	0	1,420
September	1,274	0	0	68	81	0	1,422
October	1,418	0	0	36	0	0	1,454
Annual Total	13,817	0	0	489	224	709	15,239
Annual Allowance	**43,800**			**1,930,000**		**60,000**	**2,033,800**

As permitted by water licence 2AM-DOH1335 Part E Item 1 and Part I Item 5(a)(b).
* Includes industrial uses such as mining, core processing, concrete batching, etc. I

Table 4. Volume of Reclaim Water from the TIA for Process Water, October 2019

Month	Reclaim Water (m^3) *
January	64,572
February	57,207
March	69,824
April	60,913
May	61,908
June	57,603
July	69,389
August	79,005
September	84,230
October	82,918
Annual Cumulative	**687,570**

* As per Part E Item 5 and Part I Item 5(c)
Numbers rounded to the nearest cubic meter.

Table 5. Doris Waste Rock and Ore Volumes, October 2019

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 Detoxified Tailings Placed Underground** (tonnes)
December Balance	-	-	-	-	838,227	-	1,287,608	510,092	-	-	-
January	37,535	29,226	8,326	8,309	838,210	27,861	1,259,747	523,016	45,387	44,133	1,054
February	34,681	29,440	76,020	5,241	767,431	-27,625	1,287,372	540,300	47,479	46,178	1,261
March	35,005	22,895	82,592	12,110	696,949	-31,976	1,319,347	558,377	52,083	50,519	1,576
April	33,999	39,184	54,683	-5,185	637,081	-38,889	1,280,458	564,018	40,046	38,750	773
May	35,786	35,769	7,320	17	629,778	8,405	1,288,863	569,634	61,969	59,998	1,945
June	39,331	12,018	320	27,313	656,771	40,354	1,329,217	584,160	56,316	54,565	1,551
July	40,833	18,405	260	22,428	678,939	57,152	1,386,369	604,664	43,908	42,578	1,276
August	40,531	21,269	0	19,262	698,201	32,338	1,418,707	616,214	56,885	55,302	2,053
September	42,633	14,700	0	27,933	726,134	46,855	1,465,562	632,948	56,783	55,150	1,715
October	33,204	15,178	0	18,026	744,160	34,210	1,499,772	645,165	55,557	53,427	2,079
Cumulative Total	373,538	238,084	229,521	135,454	744,160	148,685	1,499,772	645,165	516,413	500,600	15,283

* As per Part I Item 5(d)(e)

** As per Part I Item 6

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 detoxified tailings was returned underground compared to the volume of void space created from new mining activities.

Table 6. Madrid North Waste Rock and Ore Volumes, October 2019

Month	Waste Rock Management						Underground Void Space			Ore Processing
	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)*	Used for Construction (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)
December Balance	-	-	-	-	-	-	-	-	-	-
January	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0
July	18,562	3,640	0	0	840	0	13,830	13,830	4,939	0
August	38,493	5,077	0	5,760	27,654	5,760	31,893	45,723	16,330	0
September	32,074	6,599	0	18,286	7,889	24,046	23,495	69,218	19,782	0
October	49,461	2,220	0	24,071	23,374	48,116	51,430	120,648	26,759	4,855
Cumulative Total	138,590	17,536	0	48,117	59,757	48,117	120,648	120,648	26,759	4,855

* As per Part I Item 5(d)(e)

** As per Part I Item 6

Note: Void space created from mining activities is determined as the sum of the initial 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 was returned underground compared to the volume of void space created from new mining activities.

Table 7. Doris Lake Water Level (ST-12), October 2019

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	21.726	21.747	21.739	0.011	0.019	21.347
February	21.725	21.743	21.736	0.018	-0.003	21.347
March	21.723	21.743	21.733	0.020	-0.003	21.347
April	21.735	21.757	21.751	0.022	0.018	21.347
May	21.748	21.756	21.752	0.008	0.001	21.347
June	21.758	22.659	22.176	0.901	0.424	21.347
July	22.040	22.449	22.236	0.409	0.060	21.347
August	21.965	22.030	21.983	0.065	-0.253	21.347
September	21.895	21.978	21.938	0.082	-0.045	21.926
October	21.831	21.889	21.866	0.058	-0.072	21.926

As per Part I Item 1 and outlined in the *Hope Bay Project Aquatic Effects Monitoring Plan*.

* Low action level trigger is relative to the average water level value (September 10-30, 2018/19) 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.

Waste Management (Part F Item 10 and 11)

Empty cargo aircraft were utilized in October for waste backhaul from the Doris Camp. Table 8 below summarizes the type and volume of waste shipped offsite during this month. All waste was transported to KBL Environmental in Yellowknife to arrange for final remediation and/or disposal.

Table 8. Waste Backhaul Summary, October 2019

Waste Type Shipped	Volume Shipped (m^3)
Waste Leachate (Used Oil)	15
Waste Leachate (Mixed)	5

Summary of Assessments of Water Balance and Water Quality Model (Part F Item 24 and Part I Item 12 c)

Average monthly water quality, hydrologic, and climatic monitoring data were collected while in operations during October. 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 2019.

Thermal Monitoring (Part I Items 7, 8 and Schedule I)

Thermal monitoring undertaken as per Part I Items 7, 8 and Schedule I is reported in the annual Geotechnical Report.

Site Freshet and Precipitation Conditions (Part I Item 12(d))

Visual monitoring was conducted during major rain events and periods of sustained precipitation in October.

The Diversion Berm and associated check dam were observed to be functioning as designed and diverting non-contact water around the Doris site infrastructure. Photos of this infrastructure are provided in Figures 5 and 6 below.

Inspections were completed of site culverts throughout the month of October. No issues were identified with these water management structures as they were observed to be frozen due to the onset of winter.

Figure 5. Diversion berm dry during October (left) towards culverts (right)

Incident Reporting

Spill # 19-445 - On October 29, 2019, an operator was completing commissioning work in a water treatment facility at the Doris camp. During this work, the operator inadvertently caused damage to a PVC valve on the treated effluent line. Treated effluent from the damaged valve spilled out of the door and onto the crushed aggregate pad the facility sits on. This is an unauthorized discharge point.

An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes:

- Unsupported and un-guarded PVC drain valves located 1" above floor;
- Flaw in design of spill containment capacity of building.

Although the mine site is not currently discharging the effluent being treated into to the environment, commissioning of the water treatment facility was and is on-going and samples of the treated effluent are collected at a regular basis to evaluate treatment performance. Based on samples taken at the time of the spill, results were below the Maximum Authorized Monthly Mean Concentration for a deleterious substance as outlined in Schedule 4 of the Metal and Diamond Mining Effluent Regulations (MDMER). Refer to Table 1 for analytical results for the released effluent.

Table 9. RBD1 Analytical Results with MDMER Effluent Discharge Criteria.

Sample ID		RBD1-TEST	MDMER Schedule 4	
ALS ID		L2373221		
Date Sampled		2019-10-28 10:15		
Parameter	**Units**	**Water**	**Maximum Authorized Monthly Mean Concentration**	**Maximum Authorized Concentration in a Grab Sample**
pH	pH	7.88	6.0-9.5	6.0-9.5
Total Suspended Solids	mg/L	10.3	15	30
Cyanide, Total	mg/L	0.0481	1	2
Arsenic (As)-Total	mg/L	0.0025	0.5	1
Copper (Cu)-Total	mg/L	0.0322	0.3	0.6
Lead (Pb)-Total	mg/L	<0.00050	0.2	0.4
Nickel (Ni)-Total	mg/L	0.0078	0.5	1
Zinc (Zn)-Total	mg/L	<0.030	0.5	1
Ra-226	Bq/L	0.038	0.37	1.11

The operator immediately isolated the line to prevent further spillage. Contaminated snow, ice, and crush was excavated and removed for disposal in the Tailings Impoundment Area. Refer to Photos 1 and 2 showing the spill location prior to, and after reclamation activities, respectively.

In order to reduce the likelihood of a reoccurrence, the incident investigation concluded with the following preventative actions for future work at this water treatment facility:

- Sump and sump pump will be relocated to more adequately capture any released effluent;
- Sump pump line will be insulated and/or heat traced to prevent freezing in winter months;
- Supports or protective guards will be placed on all PVC drain values located on or near floor level.

Spill # 19-448 - At the time of the spill event, TMAC was in the process of commissioning components of the Robert's Bay Discharge System (RBDS). The RBDS is designed to transport a single compliant effluent stream consisting of effluent from the Tailings Impoundment Area (TIA) and the underground mine workings.

Underground workings at the Doris-Madrid Project are dewatered to allow for continued mining activities. In this process, effluent is pumped from an underground sump to a tank in a water treatment pump house (Tank-001). Prior to the incident, a sump pump underground was replaced, resulting in an increase in effluent reporting to Tank-001 than previously observed. This additional effluent, and increased flow, exceeded the capacity of the pump that conveys effluent from Tank-001 to the TIA. Due to this exceedance in pumping capacity, the effluent level in Tank-001 increased above its holding capacity, and effluent began to flow through an overflow pipe on the tank to a sump on the facility floor. Concurrently to the overflow of Tank-001, an electrical fault caused the pump for the sump receiving the overflow to fail, and as a result, untreated mine effluent overflowed the floor sump and eventually over the doorsills and spilled onto the crushed aggregate pad outside of the pump house.

An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes:

- Inadequate communication between work groups;
- Failure to monitor the pump house building continually during commissioning;
- Undersized breaker for sump pump was not identified during dry-commissioning.
- Inadequate warning systems in place prior to wet-commissioning;

Upon discovery, the underground effluent pumping was ceased, stopping the active spill. Contaminated snow, ice, and crush was excavated and removed for disposal in the TIA. Refer to Photos 1 through 4 showing the spill location prior to, and after reclamation activities. A larger capacity electrical breaker was also installed to ensure that this

particular pump functions as required.

In order to reduce the likelihood of a reoccurrence, the incident investigation concluded with the following preventative actions for future work between these work groups, and for future work in the pump house facility:

- When conditions change underground, or when pumping activities are altered, notifications will be provided to Mill personnel;
- Continual physical monitoring of the pump house facility will occur until cameras and automatic controls are installed in the Mill Control Room;

A high-level alarm for Tank-001 has been installed to notify the control Mill Control Room in advance of a potential overflow situation.

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

Yours sincerely,

Kyle Conway
Environmental Superintendent
Hope Bay Project
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Cc:
Omer Pasalic, Water Resources Officer, CIRNAC
Oliver Curran, Vice President - Environmental Affairs, TMAC
Jerome Girard, Mine General Manager, TMAC

Figure 6. 2AM-DOH1335 SNP Monitoring Locations

Figure 7. 2AM-DOH1335 SNP Monitoring Locations