95 Wellington Street West
Suite 1010, P.O. Box 44
Toronto Dominion Centre
Toronto, Ontario M5J 2N7
416-628-021

Sent by Email

July 29, 2019

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

Re: June 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, 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 first kilometer of the Madrid All-Weather Road was completed in June. Construction of the Madrid North Contact Water Pond (MMS-1) continued and overburden stripping of the Naartok East Crown Pillar Recovery Trench began under this licence in June. Figure 1 below shows progress of construction of the Madrid North Contact Water Pond. Figure 2 below shows progress of overburden stripping 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 9 at the end of this report.

Figure 1. Construction Progress of Madrid North Contact Water Pond (MMS-1), June 2019

Figure 2. Overburden Stripping at Naartok East Crown Pillar Recovery Trench, June 2019

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

Water quality sampling was conducted in June 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.

Water quality samples were collected from the Landfarm (ST-4) on June 17 prior to discharge of water from this facility. Although this sample met the discharge criteria identified in Part F Item 18(b), a visible sheen was noted in this facility before dewatering was conducted. A second sample was collected on June 24 and exceeded the discharge criteria for Oil & Grease and Visible Sheen. No discharge to tundra occurred from this facility. Water was transferred from the Landfarm to the Tailings Impoundment Area in July; volumes of this dewatering will be included in the July SNP report.

Water quality sampling was also conducted at the Doris Tank Farm (ST-5), Robert's Bay Single 5ML Tank Farm (ST-6A) and the Robert's Bay Fuel Storage Area (ST-6B) facilities this month. No exceedances of discharge criteria outlined in Part F Item 18(b) were observed for the Doris Tank Farm or the Robert's Bay Single 5ML Tank Farm. Water from the Doris Tank Farm was transferred to the Tailings Impoundment Area. Water from the Robert's Bay Single 5ML Tank Farm was discharged to tundra or used as dust suppression for site roads as approved by the Inspector. Notification of discharge for this facility was provided to the Inspector on May 16. Water quality results for the Robert's Bay Fuel Storage Area (ST-6B) exceeded the discharge criteria for Total Suspended Solids (TSS), Oil & Grease and Visible Sheen. Water from this facility was transferred to the Tailings Impoundment Area.

Surface runoff from the reclaimed Doris Crown Pillar Recovery Trench (ST-10) was sampled and submitted for laboratory analysis. These samples were below the effluent quality limits identified in Part D Item 9 of the licence.

Sampling of surface runoff from the Madrid All-Weather Road, Madrid North Contact Water Pond and Naartok East Crown Pillar Recovery trench was completed in June (total of six locations). One sample (MMS9-C) collected from runoff at the Naartok East Crown Pillar trench on June 15 exceeded the allowable *Maximum Concentration of Any Grab Sample* for Total Suspended Solids identified in Part D Item 9 of the licence; all other samples were below this criteria and there was no exceedance of the *Maximum Average Concentration* for these samples.

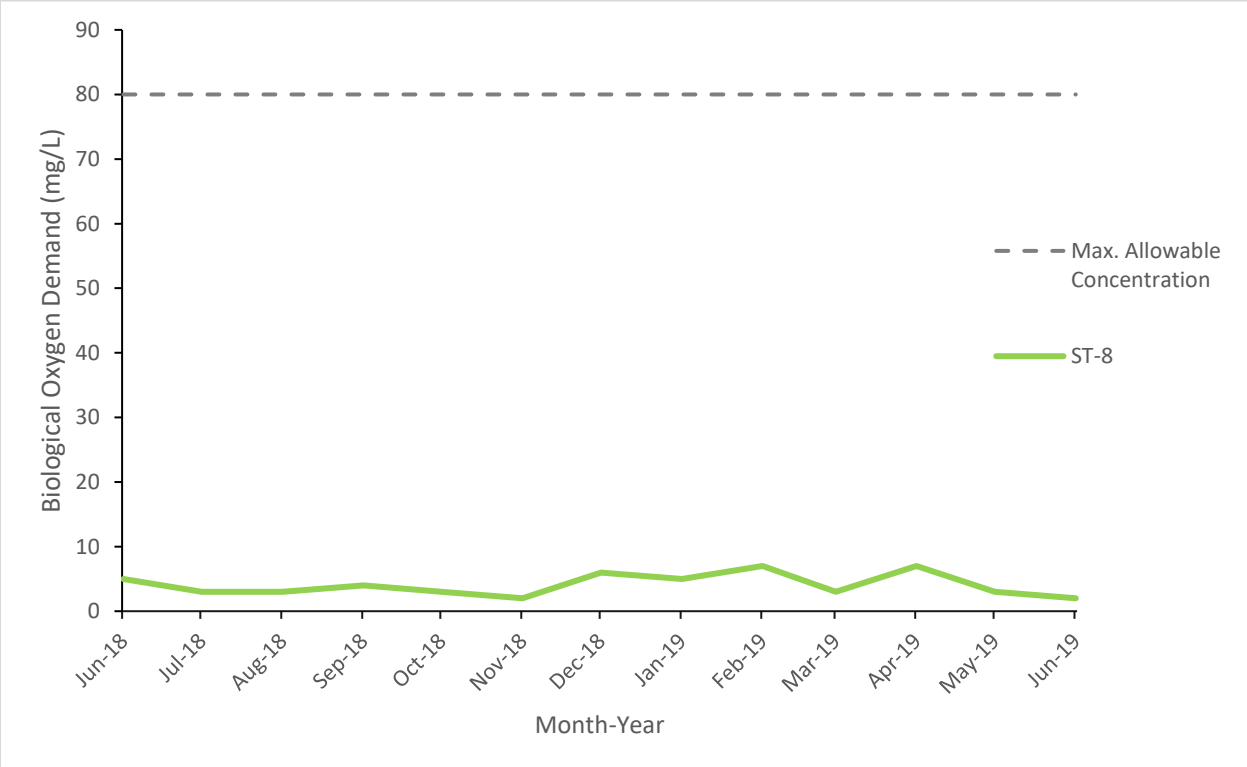
In response to the high Total Suspended Solids and turbidity observed on June 15, additional silt fence and coco-matting were placed on the tundra downstream of the runoff. A rock berm was also constructed to manage runoff from the construction area. An additional sample was collected on June 16 and was below the *Maximum*

Concentration of Any Grab Sample for Total Suspended Solids demonstrating that sediment control barriers were effective.

Results of all water quality monitoring are provided in Appendix A attached to this report.

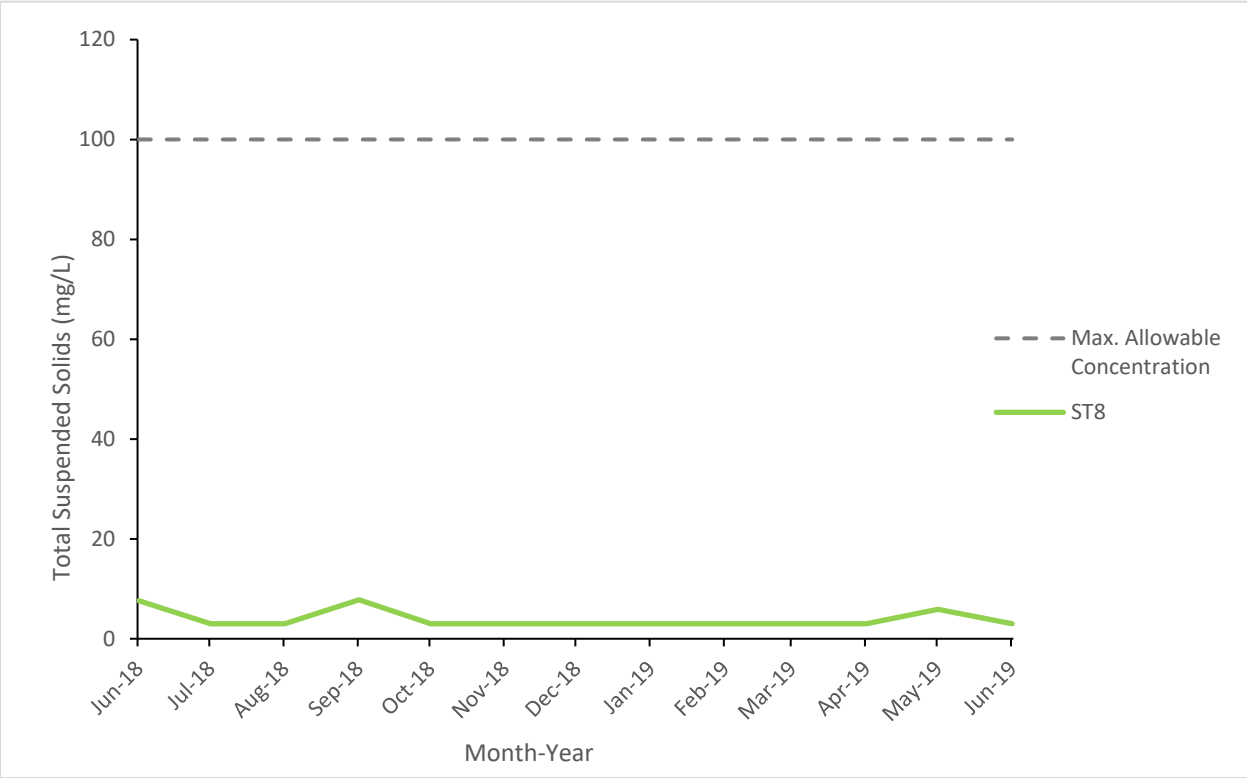
Figure 3 and 4 illustrates effluent quality characteristics for parameters of interest at select monitoring stations.

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, June 2019

Facility	Station Code	Discharge Volume (m^3)	Exceedances of Discharge Criteria	Discharge Location	Licence Reference
Doris Sedimentation Pond	ST-1	10,835	N/A	Tailings Impoundment Area	Part F Item 17
Doris Contact Water Pond #1	ST-2	2,515	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	2	No discharge from facility	Part F Item 18(b)
Doris Plant Site Fuel Storage Area	ST-5	624	0	Tailings Impoundment Area	Part F Item 18(b)
Rob Bay Single 5ML Fuel Storage Area	ST-6a	402	0	Tundra Discharge 13W 432904 7563494; used as dust suppression on site roads	Part F Item 18(b)
Rob Bay Fuel Storage and Containment Berm	ST-6b	1,365	5	Tailings Impoundment Area	Part F Item 18(b)
Doris Sewage Treatment Plant, Effluent	ST-8	1,325	0	Tundra Discharge 13W 432933 7559057	Part F Item 5(b-c)
Doris Sewage Treatment Plant, Sludge	N/A	20.4	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	27,370	N/A	Tailings Impoundment Area	
Madrid North Contact Water Pond	MMS-1	0	0	Facility under construction	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.

Table 2. Discharge from TIA, June 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
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, June 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
Annual Total	8,491	0	0	242	96	709	9,561
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.

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

Month	Reclaim Water (m^3) *
January	64,572
February	57,207
March	69,824
April	60,913
May	61,908
June	57,603
Annual Cumulative	**372,028**

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

Table 5. Waste Rock and Process Volumes, June 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
Cumulative Total	216,337	168,532	229261	47,805	656,771	-21,870	1,329,217	584,160	303,280	294,143	8,160

* 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 7. Doris Lake Water Level (ST-12), June 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

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) 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 June 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, June 2019

Waste Type Shipped	Volume Shipped (m^3)
Water contaminated with Hydrocarbons	15.0
Leachate Mix - Used Oil	19.5
Leachate Mix - Glycol	1.0
Leachate Mix - Oil/Glycol Mix	1.0
Flammable Liquid NOS (Fuel contaminated with water)	3.5
Incinerator Ash – Contaminated with Chromium	0.2
Burn Pan Ash – Contaminated with Arsenic & Chromium	0.4
Cutting Fluid	0.2
Non Regulated Liquid - Kitchen Grease	13.6

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 June. 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 freshet of site runoff in June.

The Diversion Berm and associated check dam were observed to be functioning as designed and diverting non-contact water around the Doris site infrastructure. The maximum flow observed during June was 0.6 m/s on June 13. Some turbidity was identified prior to the check dam in flow observed on June 13, however the check dam reduced flow and eliminated turbidity in downstream flow. Photos of this infrastructure are provided in Figures 5 and 6 below.

Inspections were completed of site culverts throughout the month of June. No issues were identified with these water management structures. Figure 7 and 8 below shows the upstream and downstream conditions of culverts located at the Doris Connector Vent Raise access road and the Madrid All-Weather road.

Figure 5. Diversion berm directing non-contact water (left) towards culverts (right)

Figure 6. Check dam upstream (left) and downstream (right). Check dam effective in slowing runoff and eliminating turbidity

Figure 7. Culvert at Doris Connector Vent Raise access road upstream (left) and downstream (right)

Figure 8. Culvert at Madrid All-Weather Road upstream (left) and downstream (right)

Incident Reporting

Spill #19-240 – On June 15, 2019, while stripping a surface layer of overburden for the development of the Naartok East - Crown Pillar Recovery Trench at Madrid North, surface runoff containing sediment within the footprint of the stripping area migrated overland through the active layer of tundra to the shoreline of Patch Lake. The runoff bypassed sediment control installations and entered Patch Lake approximately 100m downstream from the disturbed area.

Two separate overland flows, exhibiting visible turbidity, were observed flowing towards and to the shoreline of Patch Lake. The ice had not yet fully melted along the shoreline of the lake, and the sediment was confined to a pool above the ice between the two overland flows.

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

- Failure of sediment controls installed between stripping footprint and Patch Lake due to uncertainty of site drainage locations prior to work and under estimation of the volume and rate of water that would be released from the area.
- Failure to select the appropriate sedimentation control measures for the specific terrain and conditions.

A prompt response was initiated where by the equipment operator was directed to cease the stripping activities and to install multiple water diversion rows within the footprint of the land disturbance to reduce the flow of water and increase settling time. The existing sediment controls were enhanced, and additional measures were installed to reduce the amount of sediment entering Patch Lake. On-land sediment controls included silt fencing and coco-matting.

On June 16, two turbidity curtains were installed in areas where sediment was observed on the shoreline of Patch Lake. The installation of these curtains ensured that sediment was contained close to the shore, minimizing the potential migration into Patch Lake after the lake ice had melted. This additional measure was observed to be effective in containing much of the sediment between the curtain and the shore.

On June 17, a newly constructed rock berm was initiated around the perimeter of the stripping area to divert water around the work area and to keep water contained within the footprint prior to resuming stripping activities to reduce the likelihood of a reoccurrence.

The incident investigation concluded with the following preventative actions for future overburden stripping in order to reduce the likelihood of a reoccurrence:

- Assessment of sedimentation installations prior to commencing overburden stripping activities;

- Additional training for personnel on sedimentation control installations;
- Conduct thorough assessment of drainage locations (based on historic photos if necessary) to identify flow paths and areas of risk;
- Preinstall turbidity curtains where practical;
- Installation of rock berms in high-risk areas prior to stripping of overburden.

Representative samples of both flows were collected at the shore where turbidity was observed to be entering Patch Lake on the day of the incident and for two subsequent days after. This was done to quantify the impact of the mitigation measures and potential impacts to Patch Lake. Representative samples were also collected on the day the release was observed for acute lethality testing. A review of the analytical results showed both streams entering Patch Lake to be non-acutely lethal with a 100% survival rate for both Rainbow trout (96-hour LC50 test) and *Daphnia magna* (48-hour LC50 test).

Water quality results were compared to the MDMER Schedule 4 – Authorized Limits of Deleterious Substances. All parameters were below both the *Maximum Authorized Monthly Mean Concentration* and the *Maximum Authorized Concentration in a Grab Sample* with the exception of Total Suspended Solids (TSS). TSS results for NE-C were 93.7, 17.1, and 4.3 mg/L on June 15, 16 and 17 respectively. TSS results for NE-D were 29.3, 8.9, and 3.5 mg/L on June 15, 16 and 17 respectively. Water quality results of this sampling were provided in the incident follow-up report submitted to the NT-NU Spills Hotline and the Inspector on July 15, 2019.

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

Yours sincerely,

Sarah Warnock
Environmental Supervisor
Hope Bay Project
(867) 988-6882 ext. 102

Cc:
Candice Pederson, Water Resources Officer, CIRNAC
Oliver Curran, Vice President - Environmental Affairs, TMAC
Dan Gagnon, Mine General Manager, TMAC

Figure 9. 2AM-DOH1335 SNP Monitoring Locations