

February 29, 2016

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

## **Re: January 2016 – 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, and additional requirements from AANDC. Licence items include:

- Part E (Conditions applying to Water Use) Item 1;
- Part G (Conditions Applying to Waste Management and Waste Management Plans) Items 1, 3(b) and 23 (a), 24 (c, e), 28, 29, 30, 32;
- Part J (Conditions Applying to General and Aquatic Effects Monitoring) Items 4(a), 8, 12 (a, d, g), 14, 15, 16, 20 and 21(e, f).

Other monitoring requirements stipulated in the licence refer to facilities that have not been constructed. During the subject period of this report the focus of activities at Doris North was underground test work, construction, water management and environmental compliance. Sampling locations monitored under this licence (seasonally or when facilities are operational) are provided in Figure 1.

### **Part E: Conditions Applying to Water Use**

#### **Item 1: Water Usage and Part J, Item 12(a) Water Volume**

A total of 540 m<sup>3</sup> of water was extracted from Windy Lake for domestic use this month as permitted by water licences 2BE-HOP1222 and 2AM-DOH1323. No water was used under the 2AM-DOH1323 licence for surface drilling in support of the Doris North mine this month. 96 m<sup>3</sup> of water was used for underground drilling and other industrial purposes in support of the Doris North mine development. No water was used for dust suppression on site roads this month. Water usage is presented in Table 1.

Table 1: Water usage, in cubic meters, January 2016

Water Usage	Domestic Water Use from Windy Lake ST-7a (m <sup>3</sup> )	All Other Water Use* (m <sup>3</sup> )	Total (m <sup>3</sup> )
Monthly Total	540	96	636
Annual Cumulative	540	96	636

*\*Includes industrial uses such as surface and underground drilling, dust suppression, concrete batching, etc.*

A total of 251 m<sup>3</sup> of water was applied for ice road development during the month.

**Schedule J: Water Quality Monitoring at Water Intake**

Monthly water quality samples were taken from monitoring stations ST-7 (Doris Lake raw water) and ST-7a (Windy Lake raw water) in accordance with the Schedule J requirements of the licence. Water quality results are presented in Table 2 below.

Table 2: Monthly Compliance Sample Results for ST-7 and ST-7a, January 2016

Sample ID			ST7-19JAN16	ST7A-05JAN16
ALS ID			L1725139-1	L1720377-1
Date Sampled			1/19/2016 11:20:00 AM	1/5/2016 9:45:00 AM
Parameter	Units	Detection Limit	Water	Water
Hardness (as CaCO <sub>3</sub> )	mg/L	0.5	53.1	88.1
pH	pH	0.1	6.68	7.83
Total Suspended Solids	mg/L	3	4.4	<3.0
Ammonia, Total (as N)	mg/L	0.005	0.285	0.0091
Nitrate (as N)	mg/L	0.005	<0.0050	0.0054
Nitrite (as N)	mg/L	0.001	<0.0010	<0.0010
Orthophosphate-Dissolved (as P)	mg/L	0.001	0.003	0.0011
Phosphorus (P)-Total	mg/L	0.002	0.0198	0.0035
Cyanide, Total	mg/L	0.005	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050
Fecal Coliforms	CFU/100mL	1	<1	<1
Total cyanobacterial cell count	cells/mL	1	2960	-
Aluminum (Al)-Total	mg/L	0.005	0.0211	0.0185
Antimony (Sb)-Total	mg/L	0.0005	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.0005	<0.00050	<0.00050
Barium (Ba)-Total	mg/L	0.02	<0.020	<0.020
Beryllium (Be)-Total	mg/L	0.001	<0.0010	<0.0010
Boron (B)-Total	mg/L	0.1	<0.10	<0.10
Cadmium (Cd)-Total	mg/L	0.00001	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	0.1	9.48	15.2
Chromium (Cr)-Total	mg/L	0.001	<0.0010	<0.0010
Cobalt (Co)-Total	mg/L	0.0003	<0.00030	<0.00030
Copper (Cu)-Total	mg/L	0.001	0.0033	0.0016
Iron (Fe)-Total	mg/L	0.03	2.83	0.044
Lead (Pb)-Total	mg/L	0.0005	<0.00050	<0.00050
Lithium (Li)-Total	mg/L	0.005	0.0036	0.0037
Magnesium (Mg)-Total	mg/L	0.1	7.15	12.2
Manganese (Mn)-Total	mg/L	0.0003	0.138	0.00148
Mercury (Hg)-Total	mg/L	0.00001	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.001	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.001	0.0012	<0.0010
Potassium (K)-Total	mg/L	2	2.8	5.4
Selenium (Se)-Total	mg/L	0.0001	<0.000050	<0.000050
Silver (Ag)-Total	mg/L	0.00002	<0.000020	<0.000020
Sodium (Na)-Total	mg/L	2	36	68.8
Thallium (Tl)-Total	mg/L	0.0002	<0.00020	<0.00020
Tin (Sn)-Total	mg/L	0.0005	<0.00050	<0.00050
Titanium (Ti)-Total	mg/L	0.01	<0.010	<0.010
Uranium (U)-Total	mg/L	0.0002	<0.00020	0.00021
Vanadium (V)-Total	mg/L	0.001	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	0.005	<0.0050	0.008
Biochemical Oxygen Demand	mg/L	2	2	2
Oil and Grease	mg/L	5	<5.0	<5.0
Oil And Grease (Visible Sheen)		n/a	no	no

**Part G: Conditions Applying to Waste Management and Waste Management Plans.****Item 1: Condition to Provide Notice of a Planned Discharge**

No planned discharges requiring notification occurred this month.

**Item 3(b): Conditions Applying to Sewage Effluent Quality and Schedule J, Table 2 Monitoring Requirements: Discharge from Wastewater Treatment Plant in cubic metres.**

Monthly compliance samples were taken from monitoring station ST-8 (Wastewater Treatment Plant Effluent) in accordance with the Schedule J requirements of the licence (Table 3). All parameters were in compliance with discharge criteria.

Table 3: Monthly Compliance Sample Results for ST-8B, January 2016

Sample ID			ST8B-12JAN16A	ST8B-12JAN16B	Part G Item 3(b)	
ALS ID			L1722546-1	L1722546-2	Maximum Average Concentration (mg/L)	Maximum Concentration in any Grab Sample (mg/L)
Date Sampled			1/12/2016 8:15:00 AM	1/12/2016 8:15:00 AM		
Parameter	Units	Detection Limit	Water	Water		
pH	pH	0.1	7.74	7.84	6.0 - 9.0	9.0
Total Suspended Solids	mg/L	3	<3.0	<3.0	100	100
Fecal Coliforms	CFU/ 100mL	1	<1	<1	10,000	10,000
Biochemical Oxygen Demand (BOD <sub>5</sub> )	mg/L	2	2	<2.0	80	80
Oil and Grease	mg/L	5	<5.0	<5.0	5	10
Oil And Grease (Visible Sheen)		n/a	no	no	No Visible Sheen	No Visible Sheen

**Bold/shading** indicates exceedance of Part G Item 3(b) Maximum Concentration in a Grab Sample.

This month, 460 m<sup>3</sup> of treated effluent was discharged from the sewage treatment plant.

**Schedule J, Table 2 Monitoring Requirements: Runoff from Waste Water Treatment Plant Discharge (ST-9)**

No water was available for sampling at location ST-9 (prior to entry into Glenn Lake) due to freezing conditions.

**Item 23(a): Water Discharged from the Sedimentation Pond (ST-1) and Reagent and Cyanide Storage Facility Sumps (ST-11) and Schedule J, Table 2 Monitoring Requirements**

No water was discharged from ST-1 this month, and no water was pumped from the Pollution Control Pond (ST-2) to ST-1. No water quality sampling was undertaken at ST-1 or ST-2 due to freezing conditions.

The Reagent and Cyanide Storage Facility Sumps (ST-11) is not constructed.

**Items 24(c): Landfarm Sump (ST-4) and Schedule J, Table 2 Monitoring Requirements**

No water was discharged from the Landfarm (ST-4) this month and no sampling was conducted.

**Items 24(e): Fuel Storage and Containment Facility Sumps (ST-5, ST-6a and ST-6b) and Schedule J, Table 2 Monitoring Requirements**

Compliance monitoring samples were not collected at the Doris Tank Farm (ST-5) and Roberts Bay tank farms (ST-6a and ST-6b) this month. These facilities are frozen and no discharge occurred.

**Item 28, 29, 30 and Part J Item 8: Water Quality Discharged from Tailings Impoundment Area (TL-1, TL-2, TL-3 or TL-4.)**

Dewatering of the Tailings Impoundment Area ended September 23, 2015 and has not yet re-commenced for 2016. No monitoring was conducted.

**Item 32: Tailings Impoundment Area Discharge Volume – Comparison of Flows at TL-4 and TL-2**

No water was discharged from the TIA to Doris Creek this month; a comparison of flows was not conducted.

**Schedule J: Tailings Impoundment Area Water Quality (TL-10)**

Monitoring at TL-10 is conducted annually prior to the deposition of tailings into the Tailings Impoundment Area. This monitoring will be conducted during the open water season in 2016.

**Part J: Conditions Applying to General and Aquatics Effects Monitoring**

**Item 4(a): TIA Discharge Quality – Water Quality Comparison/Deviations**

No water was discharged from the TIA this month and no water quality comparisons were made.

**Item 8 and Schedule J, Monitoring Requirements: Acute Lethality Testing (TL-1 and TL-4)**

No water was discharged from the TIA this month and no water was sampled.

**Item 12d: Tonnages of Waste Rock Stored on the Temporary Waste Rock Pad**

Underground test mining restarted in April 2015. The waste rock produced from the test mining program was stored underground until October 2015 when waste rock began to be hauled to surface and stored on the temporary waste rock pad. In January the construction of Pad T was completed and waste rock is now being stored in this location. The volume of waste rock brought to surface in January was 16,375 tonnes. The current total volume of waste rock on Pad T and the temporary waste rock pad is 236,937 tonnes.

**Item 12g: Tail Lake Ice Thickness**

Ice thickness measurement on the TIA is only required following deposition of tailings.

**Item 14, 15, 16 and Schedule J, Monitoring Requirements: Thermal Monitoring**

Thermal monitoring undertaken under this part is reported in the annual Geotechnical Inspection Report.

**Item 20: Daily Visual Monitoring of Discharges to Tundra**

No discharges to tundra occurred during this period. During periods of discharge monitoring observations will be documented.

**Item 21 (e) Daily Visual Assessment of Suspended Sediment at TIA**

The TIA was frozen during this month. No visual assessments were conducted.

**Item 21 (f) Doris North Camp Diversion Berm Effectiveness**

An assessment of effectiveness was not conducted on the Diversion Berm this month due to freezing conditions

**Under-Ice Drilling Samples**

Pre-drilling water quality samples were collected from Doris Lake on January 25 prior to the commencement of the 2016 winter ice drilling program. Water quality results are presented in Table 4 below.

Table 4: Doris Lake Pre-drilling Water Quality Samples, January 2016

Sample ID			DL-25JAN16A	DL-25JAN16B	DL-25JAN16C	DL-25JAN16D	DL-25JAN16E	DL-25JAN16F
ALS ID			L1727530-1	L1727530-2	L1727530-3	L1727530-4	L1727530-5	L1727530-6
Date Sampled			1/25/2016 9:15:00 AM	1/25/2016 9:40:00 AM	1/25/2016 11:25:00 AM	1/25/2016 11:10:00 AM	1/25/2016 10:40:00 AM	1/25/2016 10:15:00 AM
Parameter	Units	Detection Limit	Water	Water	Water	Water	Water	Water
Conductivity	uS/cm	2	356	341	329	319	324	316
Hardness (as CaCO3)	mg/L	0.5	64.3	59.7	58.5	56.3	58.2	55.6
pH	pH	0.1	7.46	7.64	7.54	7.54	7.5	7.56
Total Suspended Solids	mg/L	3	4.7	8	3.7	3.8	3.9	3.1
Aluminum (Al)-Total	mg/L	0.005	0.0248	0.0137	0.0129	0.013	0.0123	0.0152
Antimony (Sb)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Barium (Ba)-Total	mg/L	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Beryllium (Be)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Boron (B)-Total	mg/L	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium (Cd)-Total	mg/L	0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	0.1	11.3	10.5	10.2	9.93	10.2	9.71
Chromium (Cr)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)-Total	mg/L	0.0003	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Copper (Cu)-Total	mg/L	0.001	0.0019	0.0017	0.0017	0.0017	0.0018	0.0017
Iron (Fe)-Total	mg/L	0.03	0.05	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium (Li)-Total	mg/L	0.001	0.0044	0.0041	0.004	0.0039	0.0042	0.004
Magnesium (Mg)-Total	mg/L	0.1	8.78	8.15	7.99	7.65	7.91	7.6
Manganese (Mn)-Total	mg/L	0.0003	0.003	0.00244	0.00219	0.0021	0.00204	0.00198
Mercury (Hg)-Total	mg/L	0.000005	0.0000086	<0.0000050	0.0000056	0.0000055	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Potassium (K)-Total	mg/L	2	3.9	3.6	3.5	3.3	3.4	3.2
Selenium (Se)-Total	mg/L	0.00005	0.000063	0.00006	0.000053	0.000053	<0.000050	<0.000050
Silver (Ag)-Total	mg/L	0.00002	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Sodium (Na)-Total	mg/L	2	47.2	42.4	43.1	41.1	41.6	39.2
Thallium (Tl)-Total	mg/L	0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tin (Sn)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Titanium (Ti)-Total	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Vanadium (V)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Oil and Grease	mg/L	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Oil And Grease (Visible Sheen)		n/a	NO	NO	NO	NO	NO	NO

**Incident Reporting**

No incidents pertaining to this licence occurred during this month.

Should there be any questions regarding this monthly report, please contact John Roberts at [John.Roberts@tmacresources.com](mailto:John.Roberts@tmacresources.com).

Yours sincerely,



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Figure 1. 2AM-DOH-1323 SNP Monitoring Locations

