

October 31, 2016

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

Re: September 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 INAC. 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 mining, 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 710 m³ 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 for surface exploration drilling in the month of September. A total of 244 m³ of water was used from Doris Lake for underground mining and other industrial purposes in support of the Doris North mine development. No water was used for dust suppression on the airstrip or site roads this month. Water usage is presented in Table 1.

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

Water Usage	Domestic Water Use from Windy Lake ST-7a (m ³)	Domestic Water Use from Doris Lake ST-7 (m ³)	Doris Surface Exploration Drilling (m ³)	All Other Industrial Water Use** (m ³)	Dust Suppression (m ³)	Total (m ³)
Monthly Total	710	0	0	244	0	954
Annual Cumulative	6,102	0	334	3,115	4,916	14,467

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

No water was applied for ice road development during the month. In total, 1,068 m³ of water has been applied in 2016 for ice road development. These quantities are not included in the usage indicated in Table 1.

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, September 2016

Sample ID			ST7-20SEP16	ST7A-06SEP16
ALS ID			L1831824-1	L1824152-1
Date Sampled			9/20/2016 8:25:00 AM	9/6/2016 9:05:00 AM
Parameter	Units	Detection Limit	Water	Water
Hardness (as CaCO ₃)	mg/L	0.5	48.2	70.4
pH	pH	0.1	7.77	7.92
Total Suspended Solids	mg/L	3	5.9	<3.0
Ammonia, Total (as N)	mg/L	0.005	<0.0050	<0.0050
Nitrate (as N)	mg/L	0.005	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.001	<0.0010	<0.0010
Orthophosphate-Dissolved (as P)	mg/L	0.001	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	0.002	0.0167	0.0035
Cyanide, Total	mg/L	0.005	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050
Fecal Coliforms ¹	MPN/100mL	1	1	<1*
Aluminum (Al)-Total	mg/L	0.005	0.0861	0.0537
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	0.000005	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	0.1	8.65	12.3
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	0.0021	0.0015
Iron (Fe)-Total	mg/L	0.03	0.231	0.055
Lead (Pb)-Total	mg/L	0.0005	<0.00050	<0.00050
Lithium (Li)-Total	mg/L	0.001	0.0029	0.003
Magnesium (Mg)-Total	mg/L	0.1	6.47	9.65
Manganese (Mn)-Total	mg/L	0.0003	0.0257	0.00434
Mercury (Hg)-Total	mg/L	0.000005	<0.0000050	0.0000069
Molybdenum (Mo)-Total	mg/L	0.001	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.001	<0.0010	<0.0010
Potassium (K)-Total	mg/L	2	2.5	3.7
Selenium (Se)-Total	mg/L	0.00005	<0.000050	0.000051
Silver (Ag)-Total	mg/L	0.00002	<0.000020	<0.000020
Sodium (Na)-Total	mg/L	2	32.5	52.6
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	<0.00020
Vanadium (V)-Total	mg/L	0.0005	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	0.005	<0.0050	<0.0050
Biochemical Oxygen Demand	mg/L	2	3	<2
Oil and Grease	mg/L	5	<5.0	<5.0
Oil And Grease (Visible Sheen)		n/a	NO	NO

* results on Lab Work Order L1824147-1 for Potable Water Station PDC10 (same location as ST-7a)

¹ Analytical methodology used by laboratory to determine Fecal coliform concentrations has changed. Results now presented as Most Probable Number per 100mL (MPN/100mL).

Part G: Conditions Applying to Waste Management and Waste Management Plans.

Item 1: Condition to Provide Notice of a Planned Discharge

Notification of planned discharges from facilities under this licence was provided to the Inspector on May 3, 2016.

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

Monthly compliance samples were taken from monitoring stations associated with the Wastewater Treatment Plant effluent (ST-8a and ST8-b) in accordance with Schedule J requirements of the licence (Table 3). All parameters were in compliance with discharge criteria.

A total of 749 m³ of treated effluent was discharged from ST8-a and ST8-b (353 m³ and 396 m³ respectively) this month.

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

Sample ID			ST8A-13SEP16	ST8B-13SEP16	Part G Item 3(b)	
ALS ID			L1827917-1	L1827917-2	Maximum Average Concentration (mg/L)	Maximum Concentration in any Grab Sample (mg/L)
Date Sampled			9/13/2016 8:20:00 AM	9/13/2016 8:30:00 AM		
Parameter	Units	Detection Limit	Water	Water		
pH	pH	0.1	7.96	8.03	6.0 - 9.0	9.0
Total Suspended Solids	mg/L	3	<3.0	<3.0	100	100
Fecal Coliforms ¹	MPN/ 100mL	1	<1	<1	10,000	10,000
Biochemical Oxygen Demand (BOD ₅)	mg/L	2	11	<2	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; however, no exceedances observed.

¹ Analytical methodology used by laboratory to determine Fecal coliform concentrations has changed. Results now presented as Most Probable Number per 100mL (MPN/100mL).

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

Monthly water quality samples were taken from monitoring station ST-9 (Runoff from Wastewater Treatment Plant Effluent) in accordance with Schedule J requirements of the licence. Water quality results are presented in Table 4 below.

Table 4: Monthly Compliance Sample Results for ST-9, September 2016

Sample ID			ST9-13SEP16
ALS ID			L1827917-3
Date Sampled			9/13/2016 8:27:00 AM
Parameter	Units	Detection Limit	Water
pH	pH	0.10	8.01
Total Suspended Solids	mg/L	3.00	5.9
Fecal Coliforms ¹	MPN/ 100mL	1.00	1
Biochemical Oxygen Demand (BOD ₅)	mg/L	1.00	2
Oil and Grease	mg/L	5.00	<5.0
Oil And Grease (Visible Sheen)		n/a	NO

¹ Analytical methodology used by laboratory to determine Fecal coliform concentrations has changed. Results now presented as Most Probable Number per 100mL (MPN/100mL).

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

Water quality samples were collected from monitoring station ST-1 in accordance with Schedule J of the licence. Results are provided in Table 5 below. Levels of ammonia and zinc exceeded the criteria for discharge to tundra in Part G Item 23(a). No water was discharged to tundra. 3,163 m³ of water was discharged from the Sedimentation Pond (ST-1) to the Tailings Impoundment Area (TIA) this month in accordance with Part G Item 23(d) of the licence. Monitoring was undertaken at the Pollution Control Pond (ST-2) this month in accordance with the requirements of Schedule J, Table 2 of the licence. Results are presented in Table 6 below. In September, 2,535 m³ of water was pumped from the Pollution Control Pond (ST-2) to ST-1.

Table 5: Monthly Compliance Sample Results for ST-1, September 2016

Sample ID			ST1-16SEP16	Part G Item 23(a)	
ALS ID			L1830345-1	Maximum Average Concentration (mg/L)	Maximum Concentration in any Grab Sample (mg/L)
Date Sampled			9/16/2016 8:40:00 AM		
Parameter	Units	Detection Limit	Water		
Hardness (as CaCO ₃)	mg/L	0.5	1970 ^a		
pH	pH	0.1	7.79	6.0 - 9.0	9.0
Total Suspended Solids	mg/L	3	<3.0	15.0	30.0
Alkalinity, Total (as CaCO ₃)	mg/L	1	112		
Ammonia, Total (as N)	mg/L	0.005	29.8	2.0	4.0
Bromide (Br)	mg/L	0.05	<2.5 ^b		
Chloride (Cl)	mg/L	0.5	1900		
Fluoride (F)	mg/L	0.02	<1.0 ^b		
Nitrate (as N)	mg/L	0.005	91.1		
Nitrite (as N)	mg/L	0.001	1.01		
Sulfate (SO ₄)	mg/L	0.3	136		
Cyanide, Total	mg/L	0.005	0.0076 ^c	1.0	2.0
Aluminum (Al)-Total	mg/L	0.005	0.023	1.0	2.0
Antimony (Sb)-Total	mg/L	0.0005	<0.00050		
Arsenic (As)-Total	mg/L	0.0005	0.00092	0.05	0.10
Barium (Ba)-Total	mg/L	0.02	0.123		
Beryllium (Be)-Total	mg/L	0.001	<0.0010		
Boron (B)-Total	mg/L	0.1	0.27		
Cadmium (Cd)-Total	mg/L	0.000005	0.000382		
Calcium (Ca)-Total	mg/L	0.1	638		
Chromium (Cr)-Total	mg/L	0.001	0.0029		
Cobalt (Co)-Total	mg/L	0.0003	0.00431		
Copper (Cu)-Total	mg/L	0.001	0.0106	0.02	0.30
Iron (Fe)-Total	mg/L	0.03	0.086	0.30	0.60
Lead (Pb)-Total	mg/L	0.0005	<0.00050	0.01	0.02
Lithium (Li)-Total	mg/L	0.001	0.034		
Magnesium (Mg)-Total	mg/L	0.1	90.4		
Manganese (Mn)-Total	mg/L	0.0003	1.5		
Molybdenum (Mo)-Total	mg/L	0.001	0.0076		
Nickel (Ni)-Total	mg/L	0.001	0.007	0.05	0.10
Potassium (K)-Total	mg/L	2	39.9		
Selenium (Se)-Total	mg/L	0.00005	0.0017		
Silver (Ag)-Total	mg/L	0.00002	<0.000050 ^d		
Sodium (Na)-Total	mg/L	2	482		

Thallium (Tl)-Total	mg/L	0.0002	<0.00020		
Tin (Sn)-Total	mg/L	0.0005	<0.00050		
Titanium (Ti)-Total	mg/L	0.01	<0.010		
Uranium (U)-Total	mg/L	0.0002	0.00153		
Vanadium (V)-Total	mg/L	0.0005	<0.0025 ^d		
Zinc (Zn)-Total	mg/L	0.005	0.0615	0.01	0.02
Oil and Grease	mg/L	5	<5.0	5	10
Oil And Grease (Visible Sheen)		n/a	NO	No Visible Sheen	No Visible Sheen

Bold/shading indicates exceedance of Part G Item 23(a) Maximum Average Concentration and/or Maximum Concentration in a Grab Sample for discharge to tundra.

^a Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).

^b Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.

^c Test result for Total Cyanide may be biased high due to interference from high nitrite in this sample. Nitrite can cause false positives for T-CN at up to ~ 0.8% of the nitrite concentration. Interpret result as a maximum possible value.

^d Detection Limit adjusted for required dilution.

Table 6: Monthly Compliance Sample Results for ST-2, September 2016

Sample ID			ST2-16SEP16
ALS ID			L1830345-2
Date Sampled			9/16/2016 8:30:00 AM
Parameter	Units	Detection Limit	Water
Hardness (as CaCO ₃)	mg/L	0.5	1960 ^a
pH	pH	0.1	7.64
Total Suspended Solids	mg/L	3	3.7
Alkalinity, Total (as CaCO ₃)	mg/L	1	110
Ammonia, Total (as N)	mg/L	0.005	29
Bromide (Br)	mg/L	0.05	<2.5 ^b
Chloride (Cl)	mg/L	0.5	1780
Fluoride (F)	mg/L	0.02	<1.0 ^b
Nitrate (as N)	mg/L	0.005	85.4
Nitrite (as N)	mg/L	0.001	0.65
Sulfate (SO ₄)	mg/L	0.3	146
Cyanide, Total	mg/L	0.005	0.0099 ^c
Aluminum (Al)-Total	mg/L	0.005	<0.015 ^d
Antimony (Sb)-Total	mg/L	0.0005	<0.00050
Arsenic (As)-Total	mg/L	0.0005	0.00099
Barium (Ba)-Total	mg/L	0.02	0.124
Beryllium (Be)-Total	mg/L	0.001	<0.0010
Boron (B)-Total	mg/L	0.1	0.25
Cadmium (Cd)-Total	mg/L	0.000005	0.000349
Calcium (Ca)-Total	mg/L	0.1	631
Chromium (Cr)-Total	mg/L	0.001	0.0043
Cobalt (Co)-Total	mg/L	0.0003	0.00457
Copper (Cu)-Total	mg/L	0.001	0.0082
Iron (Fe)-Total	mg/L	0.03	0.033
Lead (Pb)-Total	mg/L	0.0005	<0.00050
Lithium (Li)-Total	mg/L	0.001	0.0329
Magnesium (Mg)-Total	mg/L	0.1	93
Manganese (Mn)-Total	mg/L	0.0003	1.54
Molybdenum (Mo)-Total	mg/L	0.001	0.0086
Nickel (Ni)-Total	mg/L	0.001	0.007
Potassium (K)-Total	mg/L	2	41.8
Selenium (Se)-Total	mg/L	0.00005	0.00161
Silver (Ag)-Total	mg/L	0.00002	<0.000050 ^d
Sodium (Na)-Total	mg/L	2	470
Thallium (Tl)-Total	mg/L	0.0002	<0.00020
Tin (Sn)-Total	mg/L	0.0005	<0.00050
Titanium (Ti)-Total	mg/L	0.01	<0.010

Uranium (U)-Total	mg/L	0.0002	0.00168
Vanadium (V)-Total	mg/L	0.0005	<0.0025 ^d
Zinc (Zn)-Total	mg/L	0.005	<0.0050
Oil and Grease	mg/L	5	<5.0
Oil And Grease (Visible Sheen)		n/a	NO

^a Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).

^b Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.

^c Test result for Total Cyanide may be biased high due to interference from high nitrite in this sample.

Nitrite can cause false positives for T-CN at up to ~ 0.8% of the nitrite concentration. Interpret result as a maximum possible value.

^d Detection Limit adjusted for required dilution.

The Reagent and Cyanide Storage Facility Sumps (ST-11) are 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 water quality samples were collected.

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

Beginning on June 15, 2016, all water accumulating at the Doris tank farm (ST-5) and Roberts Bay tank farms (ST-6a and ST-6b) was redirected to the Sedimentation Control Pond for transfer to the TIA. No compliance monitoring samples were collected this month for stations ST-5, ST-6a or ST-6b.

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.)

No discharge from the TIA to Doris Creek occurred in September and no water quality sampling was conducted this month at stations associated with the TIA discharge (TL-1 through TL-3).

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)

No discharge from the TIA to Doris Creek occurred in September and no water quality sampling was conducted this month at station TL-10.

Part J: Conditions Applying to General and Aquatics Effects Monitoring

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

No discharge from the TIA to Doris Creek occurred in September and no water quality sampling was conducted.

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

Acute lethality testing was not conducted this month at sample station TL-1 (TIA intake) as no water was discharged from the Tailings Impoundment Area.

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

The volume of waste rock brought to surface in September was 18,876 tonnes. The current total volume of waste rock on Pad T and the temporary waste rock pad is 345,873 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 this month.

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

No suspended sediment was noted during the month.

Item 21 (f) Doris North Camp Diversion Berm Effectiveness

During spring melt and after heavy rainfall events, visual observations were made of runoff associated with the diversion berm. No sedimentation was noted and water is effectively routed away from camp facilities.

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.

Yours sincerely,



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cc. Eva Paul, Water Resources Officer, AANDC

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

