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September 30, 2016

Licensing
Nunavut Water Board
P.O. Box 119
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Re: August 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 759 m^3 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 August. A total of 373 m^3 of water was used from Doris Lake for underground mining and other industrial purposes in support of the Doris North mine development. A total of 1,840 m^3 of water was used from Doris Lake for dust suppression on the airstrip and site roads this month. Water usage is presented in Table 1.

Table 1: Water usage, in cubic meters, August 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	759	0	0	373	1,840	2,972
Annual Cumulative	5,392	0	334	2,871	4,916	13,513

*** 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 m^3 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, August 2016

		Sample ID	ST7-16AUG16	ST7A-02AUG16
		ALS ID	L1814224-1	L1806907-1
		Date Sampled	8/16/2016 7:45:00 AM	8/2/2016 8:15:00 AM
Parameter	**Units**	**Detection Limit**	**Water**	**Water**
Hardness (as CaCO3)	mg/L	0.5	45.7	70.7
pH	pH	0.1	7.84	7.59
Total Suspended Solids	mg/L	3	3.1	<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	0.0082	0.0032
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	0.0293	0.0618
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	8.16	12.2
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	0.0021	0.0011
Iron (Fe)-Total	mg/L	0.03	0.156	0.048
Lead (Pb)-Total	mg/L	0.0005	<0.00050	<0.00050
Lithium (Li)-Total	mg/L	0.001	0.0034	0.0037
Magnesium (Mg)-Total	mg/L	0.1	6.15	9.77
Manganese (Mn)-Total	mg/L	0.0003	0.00777	0.00193
Mercury (Hg)-Total	mg/L	0.000005	<0.0000050	<0.0000050
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	2.2	4
Selenium (Se)-Total	mg/L	0.00005	<0.000050	<0.000050
Silver (Ag)-Total	mg/L	0.00002	<0.000020	<0.000020
Sodium (Na)-Total	mg/L	2	29.8	53.7
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	< 2	<2.0
Oil and Grease	mg/L	5	<5.0	<5.0
Oil And Grease (Visible Sheen)		n/a	NO	NO

** results on Lab Work Order L1806915-1 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 760 m^3 of treated effluent was discharged from ST8-a and ST8-b (377 m^3 and 383 m^3 respectively) this month.

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

			Sample ID	ST8A-09AUG16	ST8B-09AUG16	Part G Item 3(b)	
			ALS ID	L1810688-1	L1810688-2	Maximum Average Concentration (mg/L)	Maximum Concentration in any Grab Sample (mg/L)
			Date Sampled	8/9/2016 9:15:00 AM	8/9/2016 9:25:00 AM		
Parameter	**Units**	**Detection Limit**		**Water**	**Water**		
pH	pH	0.1		7.35	7.53	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		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; 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, August 2016

			Sample ID	ST9-09AUG16
			ALS ID	L1810688-3
			Date Sampled	8/9/2016 9:35:00 AM
Parameter	**Units**	**Detection Limit**		**Water**
pH	pH	0.10		7.65
Total Suspended Solids	mg/L	3.00		25.9
Fecal Coliforms [1]	MPN/ 100mL	1.00		<1
Biochemical Oxygen Demand (BOD_5)	mg/L	1.00		<2.0
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. 3,776 m^3 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 August, 3,824 m^3 of water was pumped from the Pollution Control Pond (ST-2) to ST-1.

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

		Sample ID	ST1-25AUG16	Part G Item 23(a)	
		ALS ID	L1819897-1	Maximum Average Concentration (mg/L)	Maximum Concentration in any Grab Sample (mg/L)
		Date Sampled	8/25/2016 12:35:00 PM		
Parameter	Units	Detection Limit	Water		
Hardness (as CaCO3)	mg/L	0.5	2490 *		
pH	pH	0.1	7.81	6.0 - 9.0	9.0
Total Suspended Solids	mg/L	3	11.8	15.0	30.0
Alkalinity, Total (as CaCO3)	mg/L	1	105		
Ammonia, Total (as N)	mg/L	0.005	**45.3**	2.0	4.0
Bromide (Br)	mg/L	0.05	3		
Chloride (Cl)	mg/L	0.5	2430		
Fluoride (F)	mg/L	0.02	<1.0 **		
Nitrate (as N)	mg/L	0.005	116		
Nitrite (as N)	mg/L	0.001	1.97		
Sulfate (SO4)	mg/L	0.3	143		
Cyanide, Total	mg/L	0.005	0.0113 ^	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	0.00105	0.05	0.10
Barium (Ba)-Total	mg/L	0.02	0.206		
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	0.000635		
Calcium (Ca)-Total	mg/L	0.1	820		
Chromium (Cr)-Total	mg/L	0.001	0.0042		
Cobalt (Co)-Total	mg/L	0.0003	0.00489		
Copper (Cu)-Total	mg/L	0.001	0.0096	0.02	0.30
Iron (Fe)-Total	mg/L	0.03	0.079	0.30	0.60
Lead (Pb)-Total	mg/L	0.0005	<0.00050	0.01	0.02
Lithium (Li)-Total	mg/L	0.001	0.0371		
Magnesium (Mg)-Total	mg/L	0.1	108		
Manganese (Mn)-Total	mg/L	0.0003	1.72		
Molybdenum (Mo)-Total	mg/L	0.001	0.0109		
Nickel (Ni)-Total	mg/L	0.001	0.0087	0.05	0.10
Potassium (K)-Total	mg/L	2	52.7		
Selenium (Se)-Total	mg/L	0.00005	0.00244		
Silver (Ag)-Total	mg/L	0.00002	<0.000050 **		
Sodium (Na)-Total	mg/L	2	608		
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	0.00186		
Vanadium (V)-Total	mg/L	0.0005	<0.0025 **		
Zinc (Zn)-Total	mg/L	0.005	**0.0724**	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.

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

** Detection limit raised.

^ 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.

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

		Sample ID	ST2-25AUG16
		ALS ID	L1819897-2
		Date Sampled	8/25/2016 12:40:00 PM
Parameter	**Units**	**Detection Limit**	**Water**
Hardness (as CaCO3)	mg/L	0.5	2620 *
pH	pH	0.1	7.6
Total Suspended Solids	mg/L	3	6.3
Alkalinity, Total (as CaCO3)	mg/L	1	105
Ammonia, Total (as N)	mg/L	0.005	53.1
Bromide (Br)	mg/L	0.05	3.3
Chloride (Cl)	mg/L	0.5	2760
Fluoride (F)	mg/L	0.02	<1.0 **
Nitrate (as N)	mg/L	0.005	132
Nitrite (as N)	mg/L	0.001	2.26
Sulfate (SO4)	mg/L	0.3	157
Cyanide, Total	mg/L	0.005	0.0225 ^
Aluminum (Al)-Total	mg/L	0.005	0.129
Antimony (Sb)-Total	mg/L	0.0005	<0.00050
Arsenic (As)-Total	mg/L	0.0005	0.00108
Barium (Ba)-Total	mg/L	0.02	0.198
Beryllium (Be)-Total	mg/L	0.001	<0.0010
Boron (B)-Total	mg/L	0.1	0.26
Cadmium (Cd)-Total	mg/L	0.000005	0.000693
Calcium (Ca)-Total	mg/L	0.1	867
Chromium (Cr)-Total	mg/L	0.001	0.0036
Cobalt (Co)-Total	mg/L	0.0003	0.00595
Copper (Cu)-Total	mg/L	0.001	0.0089
Iron (Fe)-Total	mg/L	0.03	0.221
Lead (Pb)-Total	mg/L	0.0005	<0.00050
Lithium (Li)-Total	mg/L	0.001	0.0418
Magnesium (Mg)-Total	mg/L	0.1	111
Manganese (Mn)-Total	mg/L	0.0003	1.98
Molybdenum (Mo)-Total	mg/L	0.001	0.0097
Nickel (Ni)-Total	mg/L	0.001	0.0095
Potassium (K)-Total	mg/L	2	53.6
Selenium (Se)-Total	mg/L	0.00005	0.00244
Silver (Ag)-Total	mg/L	0.00002	<0.000050 **
Sodium (Na)-Total	mg/L	2	642
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	0.013
Uranium (U)-Total	mg/L	0.0002	0.00192
Vanadium (V)-Total	mg/L	0.0005	<0.0025 **
Zinc (Zn)-Total	mg/L	0.005	0.0059
Oil and Grease	mg/L	5	<5.0
Oil And Grease (Visible Sheen)		n/a	NO

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

** Detection Limit Raised

^ 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.

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 August 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 August 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 August 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

Waste rock produced from the underground mining program is hauled to surface. The volume of waste rock brought to surface in August was 16,583 tonnes. The current total volume of waste rock on Pad T and the temporary waste rock pad is 326,997 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

August 13/16 – Spill #16-293. On August 13, an operator was pumping sewage collected from the various site portable washrooms/washcars into the main camp lift station using the vacuum truck. The sewage breached the lid joint and approximately 5L was discharged to the camp pad. Immediately following the spill, lime was sprinkled to inhibit bacterial/pathogen growth and to reduce odours. Contaminated gravel crush was promptly excavated, placed into buckets and deposited in the overburden pile. Further investigation identified that the pump on the vacuum truck operates at too high a pressure. Operators were reminded to tilt the truck tank and use gravity to discharge sewage from the vacuum truck to the lift station.

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