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Re: October 2014 – 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. Doris Camp is currently operating in a care and maintenance phase with water management, drill exploration, and environmental compliance being the focus of current activities. 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

353m^3 of water was extracted from Windy Lake for Doris Camp domestic use this month as permitted by water licences 2BE-HOP1222 and 2AM-DOH1323. Water was also used for drilling from Doris and Windy Lakes in support of the Doris North mine. No water was used for dust suppression on site roads in October. Water usage is presented in Table 1.

Table 1: Water usage, in cubic meters, October 2014

Water Usage	Domestic Water Use from Windy Lake ST-7a (m^3)	Monthly Drill Water Use – Doris and Windy Lakes (m^3)	Dust Suppression (m^3)	Annual Cumulative (m^3)
Monthly Total	353	354	0	5222*

** The Annual Cumulative volume shown above includes all water used from all sources under 2AM-DOH1323 to date, with the exception of water used during Jan – Apr for ice road development.*

Schedule J: Water Quality Monitoring at Water Intake

Monthly water quality samples were taken from monitoring station ST-7A (Windy Lake raw water) in accordance with the Schedule J requirements of the licence (Sample ST7A-07OCT14A and ST7A-07OCT14B are internal QA/QC replicates; Sample BLANKF-07OCT14 is an internal QA/QC field blank). Water quality results are presented in Table 2 below. Water was not sampled at ST-7 (Doris Lake raw water) as the Doris Lake Pumphouse is not operating.

Table 2: Monthly Compliance Sample Results for ST-7a, October 2014

		Sample ID	ST7A-07OCT14A*	ST7A-07OCT14B *	BLANKF-07OCT14^
		ALS ID	L1529155-1	L1529155-2	L1529155-3
		Date Sampled	10/7/2014 10:55:00 AM	10/7/2014 10:55:00 AM	10/7/2014 10:55:00 AM
Parameter	Units	Detection Limit	Water	Water	Water
Hardness (as CaCO3)	mg/L	0.5	78.7	77.9	<0.50
pH	pH	0.1	7.99	7.98	5.69
Total Suspended Solids	mg/L	3	<3.0	<3.0	<3.0
Ammonia, Total (as N)	mg/L	0.005	<0.0050	<0.0050	<0.0050
Nitrate (as N)	mg/L	0.005	0.0127	0.014	<0.0050
Nitrite (as N)	mg/L	0.001	<0.0010	<0.0010	<0.0010
Orthophosphate-Dissolved (as P)	mg/L	0.001	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	0.002	0.0056	0.0056	<0.0020
Cyanide, Total	mg/L	0.005	<0.0050	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050	<0.0050
Fecal Coliforms	CFU/100mL	1	<1	<1	<1
Aphanizomenon (Cyanophyceae)	cells/mL	1	4	-	-
Total cyanobacterial cell count	cells/mL	1	16	6	<1
Pseudoanabaena (Cyanophyceae)	cells/mL	1	12	6	-
Aluminum (Al)-Total	mg/L	0.005	0.094	0.06	<0.0050
Antimony (Sb)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050
Barium (Ba)-Total	mg/L	0.02	<0.020	<0.020	<0.020
Beryllium (Be)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010
Boron (B)-Total	mg/L	0.1	<0.10	<0.10	<0.10
Cadmium (Cd)-Total	mg/L	0.00001	0.000019	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	0.1	13.6	13.5	<0.10
Chromium (Cr)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010
Cobalt (Co)-Total	mg/L	0.0003	<0.00030	<0.00030	<0.00030
Copper (Cu)-Total	mg/L	0.001	0.0011	0.0013	<0.0010
Iron (Fe)-Total	mg/L	0.03	0.112	0.056	<0.030
Lead (Pb)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050
Lithium (Li)-Total	mg/L	0.005	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	mg/L	0.1	10.9	10.7	<0.10
Manganese (Mn)-Total	mg/L	0.0003	0.00306	0.00193	<0.00030
Mercury (Hg)-Total	mg/L	0.00001	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010
Nickel (Ni)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010
Potassium (K)-Total	mg/L	2	4.2	4.2	<2.0
Selenium (Se)-Total	mg/L	0.0001	<0.00010	<0.00010	<0.00010
Silver (Ag)-Total	mg/L	0.00002	<0.000020	<0.000020	<0.000020
Sodium (Na)-Total	mg/L	2	60.1	59.5	<2.0
Thallium (Tl)-Total	mg/L	0.0002	<0.00020	<0.00020	<0.00020
Tin (Sn)-Total	mg/L	0.0005	<0.00050	<0.00050	<0.00050
Titanium (Ti)-Total	mg/L	0.01	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.0002	<0.00020	<0.00020	<0.00020
Vanadium (V)-Total	mg/L	0.001	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.005	<0.0050	<0.0050	<0.0050

Biochemical Oxygen Demand	mg/L	2	<2.0	<2.0	<2.0
Oil and Grease	mg/L	5	<5.0	8	<5.0
Oil And Grease (Visible Sheen)		n/a	No	No	No
Microcystin	ug/L	0.2	<0.20	<0.20	<0.20

* Internal QA/QC replicate samples.
^ Internal QA/QC field blank samples.

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 May 24, 2014.

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). The reported pH was below criteria at the beginning of the month (ST8B-14OCT14) and an investigation was undertaken to determine the cause. The treatment plant operators determined the most likely cause was the addition of septic sewage collected from the helipad washcar and introduced to the plant. This is believed to have upset the biological processes and caused the plant to malfunction resulting in the low pH measurement. Adjustments were made to the plant operation to neutralize the pH of the wastewater effluent. A second sample collected during the month (ST8B-22OCT14) indicated the plant effluent pH had returned to compliance with the discharge criteria. An aeration system will be put in place in the washcar to prevent septic conditions in future and the frequency of wastewater transfer from the washcar been increased to reduce impacts to the wastewater treatment plant.

Table 3: Monthly Compliance Sample Results for ST-8B, October 2014

			Sample ID	ST8B-14OCT14	ST8B-22OCT14	Part G Item 3(b)	
			ALS ID	L1532512-1	L1536877-1	Maximum Average Concentration (mg/L)	Maximum Concentration in any Grab Sample (mg/L)
			Date Sampled	10/14/2014 9:55:00 AM	10/22/2014 10:10:00 AM		
Parameter	**Units**	**Detection Limit**		**Water**	**Water**		
pH	pH	0.1		**4.99**	7.23	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_5)	CFU/100mL	1		5	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 Average Concentration range (no minimum concentration is specified for a Grab Sample).

This month, 372 m^3 of sewage 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

As described in the 2012 Interim Water Management Plan, the Sedimentation Pond (ST-1) is being used as a collection pond for the water that accumulates in the Pollution Control Pond (ST-2), the two Underflow Sumps (ST2S1 and ST2S2), and occasionally from various berms and containments in the project area. In addition, brine water generated during the drilling process is being consolidated within the Pollution Control Pond/Sedimentation Pond. The water in ST-1 is transferred to the Tailings Impoundment Area (TIA) when there is enough accumulated water for the pumps to operate effectively. At this time, no ST-1 water is being discharged to the tundra. Transfer of water from ST-1 to the TIA was initiated May 30, 2014 and concluded September 25, 2014. Volumes discharged during the month and the cumulative volume for the year are presented in Table 4; no water was discharged from ST-1 to the TIA this month. Due to freezing conditions, water quality samples could not be collected from the Sedimentation Pond (ST-1) in October.

Table 4: Water in cubic meters (m^3) transferred from ST-1 to the TIA, October 2014

Parameters	Water volume transferred from ST-1 to TIA (m^3)
Monthly Cumulative	0
Annual Cumulative	16467

The Reagent and Cyanide Storage Facility Sumps (ST-11) is not constructed. Due to freezing conditions, monitoring could not be undertaken at the Pollution Control Pond (ST-2) this month. The pumping of water from the Pollution Control Pond (ST-2) to the Sedimentation Pond (ST-1) was concluded on September 26, 2014.

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

Compliance samples were not required from monitoring station ST-4 (Landfarm Sump) in accordance with the Schedule J requirements of the licence; no water was discharged from the facility during the month.

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 empty and no discharges 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.)

Due to freezing conditions all discharge from the TIA to Doris Creek was concluded on September 25, 2014. Compliance water sampling was not conducted this month at the four stations associated with the TIA discharge (TL-1 through TL-4) as no water was discharged from this facility.

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

Water was discharged from the TIA starting June 19, 2014 and continued to September 25, 2014 at which time freezing conditions prevented ongoing pumping. 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 not required during Care and Maintenance.

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 acute lethality testing was conducted during the month. Acute lethality testing was conducted prior to the start of TIA dewatering and once during the discharge period earlier in the season.

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

Underground mining did not occur during the month. The total volume of rock on the temporary waste rock pad is 189,607 tonnes, as per the December 2011 survey.

Item 12g: Tail Lake Ice Thickness

Ice thickness measurement at Tail Lake is not required during Care and Maintenance.

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

Monitoring was not conducted on the Diversion Berm this month due to freezing conditions.

Environmental Incident Reporting

Oct 8/14 – Spill # 14-363. On October 7, 2014 at approximately 17:00 a hole developed under a surface drill rig operating on Doris Camp Pad G. On October 8, 2014 elevated conductivity measurements were detected at Sump #1 and in some non-frozen surface water on the tundra down gradient of Pad G. It is thought that high conductivity water migrated south from the drill site on Camp Pad G, through the rock pad and seeped onto the tundra in the proximity of Sump #1. The actual volume of water released is not known, but drill water use records for the hole indicate higher than normal average usage. Drilling activities on the camp pad were halted and an investigation was commenced. A spill report for this incident was filed with the NT-NU Hotline October 9, 2014 at 11:20am, and AANDC and KIA were notified October 10th and 12th respectively. Monitoring was increased in the area post-incident, and water was pumped from the drill hole and from Sump #1 and returned to the water management system. A 30-day follow-up report containing further proposed mitigation measures was submitted November 5/14.

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-DOH1323 SNP Monitoring Locations