



MEADOWBANK DIVISION

Monitoring Program Summary Report

April 2016

Type A Water License 2AM-MEA1525

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SECTION 1 • BACKGROUND

As required under Part I, Item 20 of Type A Water License 2AM-MEA1525, this report documents the water management and monitoring activities at the mine site for the month. This includes water usage, Vault Attenuation Pond discharge water quality, East Dike Seepage discharge water quality, RSF Seepage, Central Dike Seepage, Assay Road Seepage, and sewage treatment plant discharge water quality (which are directed to the onsite storm water management pond).

In addition, a summary of spills/actions for the month is reported.

SECTION 2 • WATER MANAGEMENT

2.1 WATER USAGE

Fresh and reclaim water usage for April 2016 is summarized in Table 2-1 below.

Table 2-1: Freshwater Usage (m³)

Water Location	Source	January	February	March	April	Total 2016
Camp	Third Portage Lake	3,181	3,061	3,418	3,297	
Mill (freshwater tank)	Third Portage Lake	35,397	44,255	80,836	81,012	
Emulsion plant	No-name Lake	135	125	119	138	
Total Freshwater Usage (m³)		38,713	47,441	84,373	84,447	254,974
Reclaim Water Usage (m³)	South Cell TSF	261,513	207,769	204,407	200,883	874,572

2.2 WASTE ROCK STORAGE FACILITY SEEPAGE

In April 2016 no water was pumped back to the North Cell TSF from the ST-16, WEP1, and WEP2 sumps as they were frozen.

AEM continues to complete weekly inspections at the Portage and Vault RSF, and NP-2 Lake. Open water monitoring required under the Freshet Action Plan will resume next spring. Sampling will commence next spring at sumps WEP1 (Station ST-30) and WEP2 (Station ST-31) as per NWB Water License 2AM-MEA1525. Under ice samples were collected at NP-2 in April 2016.

2.3 CENTRAL DIKE SEEPAGE

In April 2016, 324,633 m³ of water was pumped from the ST-S-5 sump back into the South Cell TSF. Total year to date is 1,213,831 m³.

Sampling was conducted monthly at ST-S-5 and the South Cell TSF (ST-21) as per the requirements of the NWB water license.

Daily visual inspections were also completed by the Engineering Department.

2.4 ASSAY ROAD SEEPAGE

In April 2016, no water was pumped or sampled from the well MW-203 back to the mill as there was very low flow. Weekly inspections of the area were conducted this month. Well monitoring for CN downstream of the trench, has also ceased as water in the wells was frozen. Open water monitoring required under the Freshet Action Plan will resume next spring.

2.5 SEEPAGE AND RUNOFF FROM THE LANDFILL

The landfill was inspected weekly and no seepage or runoff was observed.

2.6 SEEPAGE AT PIT WALL AND PIT WALL FREEZE/THAW AND PERMAFROST AGGRADATION

No ice buildup was observed in April during pit wall inspections in Vault and Portage pits as it had all melted. Moreover, it was not possible to distinguish between water seeping and snow melting on catch benches. No water was pumped out of Portage and Vault pits in April.

2.7 SEWAGE TREATMENT PLANT

One (1) effluent wastewater sample was collected at the onsite sewage treatment plant (STP) in April 2016.

The Seprotech STP results are shown in Table 2.7.1 below; the LJ-Mix STP results are shown in Table 2.7.2. The discharge results indicate the system is working well. The effluent is discharged to the Stormwater Management pond which is pumped to the TSF. This event happens twice per year. This water becomes part of the South Cell TSF. There is no discharge to the receiving environment.

Table 2.7.1: Seprotech Effluent Results

Parameters	Units	April 6, 2016
Ammonia (NH ₃)	mg N/L	0.63
Ammonia-Nitrogen (NH ₃ -NH ₄)	mg N/L	44.9
Total Kjeldahl Nitrogen	mg N/L	44.4
BOD-5	mg/L	22
COD	mg/L	77
Total Suspended Solids	mg/L	15
Nitrate	mg N/L	9.09
Nitrite	mg N/L	0.9
pH*	Units	6.3
Fecal Coliform	UFC/100 mL	30
Total Coliform	UFC/100 mL	5400

*Parameter measured by STP operators

Table 2.7.2: LJ-Mix Effluent Results

Parameters	Units	April 6, 2016
Ammonia	mg N/L	<0.01
Ammonia-Nitrogen	mg N/L	8.29
Total Kjeldahl Nitrogen	mg N/L	10

BOD-5	mg/L	5
COD	mg/L	57
Total Suspended Solids	mg/L	10
Nitrate	mg N/L	20.4
Nitrite	mg N/L	0.29
pH*	Units	6.7
Fecal Coliform	UFC/100 mL	92
Total Coliform	UFC/100 mL	< 1,000

*Parameter measured by STP operators

2.8 VAULT ATTENUATION POND EFFLUENT

There was no discharge from the Vault Attenuation Pond into Wally Lake in April 2016. Discharge will resume in spring.

2.9 EAST DIKE SEEPAGE EFFLUENT

Discharge from the East Dike Seepage occurred for the entire month of April. A total of 13,517 m³ of water was discharged into Second Portage Lake in April 2016. Total year to date is 54,192 m³.

Four (4) weekly effluent samples were collected at ST-8 in April 2016. TSS results did not exceed the maximum allowable grab sample concentration (30 mg/L) permitted by the Water License, Part F, Item 6. TSS monitoring results for April 2016 are shown in Table 2.9.1 below.

Table 2.9.1: April 2016 East Dike Seepage Discharge Results

Parameters	Units	5-Apr-16	11- Apr -16	19- Apr -16	26- Apr -16	Maximum Average Concentration
Total Suspended Solids	mg/L	<1	5	2	2	2.4

Regular sampling pursuant to MMER and the Water license was also conducted at this location. Results are shown in Table 2.9.2 below. There have been no exceedances of MMER or Water License criteria.

Table 2.9.2: April 2016 Monthly Monitoring Results

Parameters	Units	5-Apr-16
Aluminum	mg/L	0.026
Sulphate	mg/L	5.3
Arsenic	mg/L	0.0017
Copper	mg/L	0.0022

Nickel	mg/L	<0.0005
Lead	mg/L	<0.0003
Zinc	mg/L	<0.001
Radium 226	mg/L	<0.002
Total Cyanide	mg/L	<0.005

2.10 NON CONTACT WATER

In April 2016, there was no water discharged through the non-contact water diversion ditches as they were frozen. No samples were collected.

SECTION 3 • SPILL MANAGEMENT

AEM has developed a thorough internal system of tracking spills on-site. Figure 3.1 shows reported and non-reported spills for 2016 broken down per month and Table 3.1 summarizes AEM spill reports for April 2016. All spills reported internally and to regulators were managed appropriately on site according to AEM's spill contingency plan. Spills were contained and cleaned, contaminated material was disposed to the appropriate area (landfarm, TSF if required), and the clean-up actions were monitored closely by the Environment Department. There was no off site impact to any watercourses.

A team of personnel from the Maintenance, Mine operations, Environment, and Strategic Optimization Departments has initiated a series of actions to better understand the cause of this trend and to reduce the number of spills occurring on site. These actions include:

- Defective equipment is being tracked to ensure equipment presenting recurrent deficiencies is adequately taken care of;
- Defective equipment is being fixed more efficiently;
- Number of spills is being tracked and communicated monthly to relevant departments;
- Spill types and associated reporting/clean-up actions were better defined and communicated to departments involved with spill occurrences as well as to new employee through induction training.
- Containment was placed under all mobile equipment when not in operation to collect any potential leaks;
- Communication from equipment operators to maintenance dispatch, when equipment is defective, is currently being assessed to increase efficiency;
- Number and cause of spills are being benchmarked with similar northern projects.

Figure 3-1. 2016 Reported and Non-Reported Spills

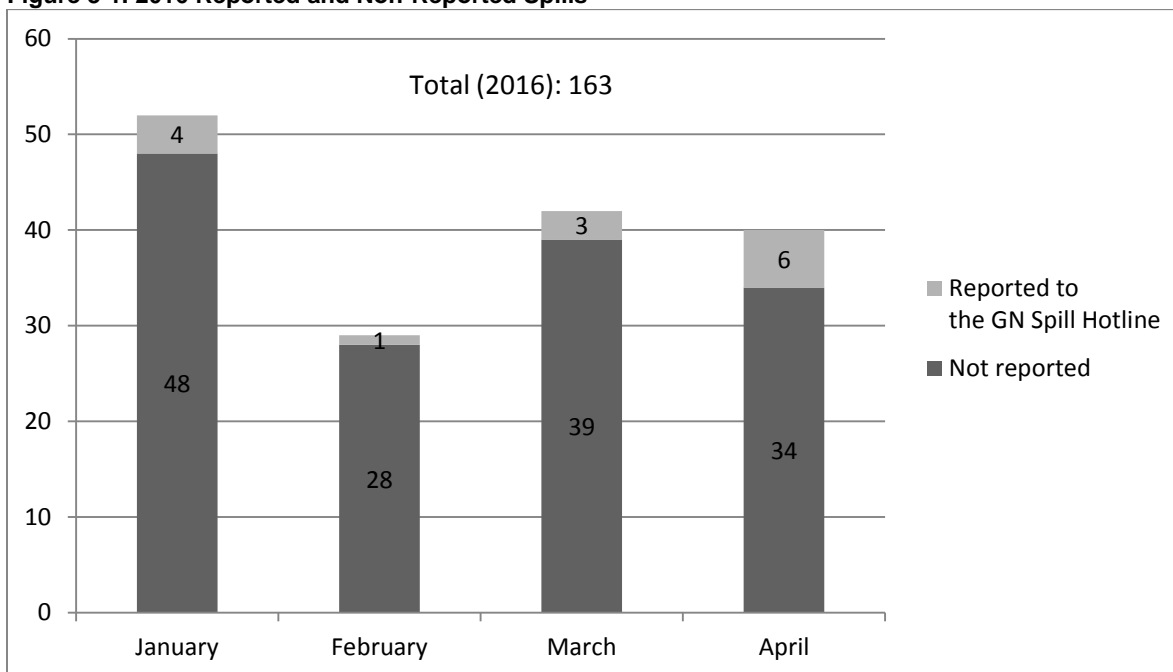


Table 3.1: Summary of AEM Internal Spill Reports

Date	Hazardous Material	Quantity (L/kg)	Location	Cause of spill	Clean-up action taken	Reported to Spill GN Hotline?
April 1, 2016	Engine oil	10	Parking area - Dome side	Mechanical failure	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	NO
April 1, 2016	Hydraulic Oil	180	Vault Pit	Hydraulic pump failure	Contaminated material was picked up and brought to the yellow roll off bin at Vault	YES
April 2, 2016	Hydraulic oil	250	Vault Pit	Broken hydraulic hose	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	YES
April 2, 2016	Hydraulic oil	10	Vault Pit	Broken hydraulic hose	Spill was contained with absorbent pads and spill kits. Oil soaked pads were	NO

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					removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	
April 3, 2016	Transmission oil	80	North cell capping	Broken transmission line	Contaminated material was picked up and brought to the yellow roll off bin at Vault	NO
April 3, 2016	Antifreeze	15	Vault refuge parking	Engine mechanical issue	Contaminated material was picked up and brought to the yellow roll off bin.	NO
April 4, 2016	Hydraulic oil	175	Vault Pit	Broken hydraulic hose	Contaminated material was picked up and brought to the yellow roll off bin.	YES
April 4, 2016	Hydraulic oil	80	Truck shop	Mechanical failure	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	NO
April 5, 2016	Coolant	15	Portage Pit	Broken coolant hose	Contaminated material was picked up and brought to the yellow roll off bin.	NO
April 5, 2016	Hydraulic oil	20	Vault coverall	Broken hydraulic hose	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	NO
April 7, 2016	Engine oil	4	Pushback parking	Engine oil leak	Contaminated soil was picked up and disposed of in a proper bin located at the incinerator	NO
April 8, 2016	Hydraulic oil	15	Vault pit	Broken hydraulic pump	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	NO
April 9, 2016	Coolant	10	Pushback parking	Coolant leaking from water pump.	Contaminated soil was picked up and disposed of adequately.	NO
April 9, 2016	Hydraulic oil	40	Portage Pit	Broken hydraulic hose.	Spill was contained with absorbent pads and spill kits. Oil soaked pads were	NO

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					removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	
April 10, 2016	Hydraulic oil	15	Vault Parking	Broken hydraulic hose.	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	NO
April 12, 2016	Hydraulic oil	220	Vault pit	Mechanical issue on hydraulic system	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	YES
April 12, 2016	Diesel fuel	350	Meadowbank tank farm	Tank over-filling during refueling operations	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	YES
April 13, 2016	Diesel fuel	20	Vault Fuel Farm	Tank over-filling during refueling operations	Contaminated soil was picked up and disposed of adequately.	NO
April 14, 2016	Diesel fuel	2	Vault Fuel Farm	Mechanical issue causing fuel spill during refueling operations	Contaminated soil was picked up and disposed of adequately.	NO
April 14, 2016	Hydraulic Oil	20	Vault Pit	Broken power steering hose	Contaminated soil was picked up and disposed of adequately.	NO
April 14, 2016	Hydraulic Oil	300	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	YES
April 15, 2016	Hydraulic Oil	30	Portage Pit	Loose oil filter causing oil pan to spill on the ground	Contaminated soil was picked up and disposed of adequately.	NO
April 15, 2016	Hydraulic Oil	40	Portage Pit	Hydraulic oil spilled during maintenance operations	Contaminated soil was picked up and disposed of adequately.	NO
April 16, 2016	Hydraulic Oil	10	Pushback parking	Hydraulic oil spilled during maintenance operations	Contaminated soil was picked up and disposed of adequately.	NO

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April 16, 2016	Diesel fuel	20	Vault Pit	Fuel tank leaking	Spill was contained with absorbent pads and spill kits. Oil soaked pads were removed and contaminated material soil/ground was picked up and disposed of in yellow contaminated soil roll off container.	NO
April 17, 2016	Compressor oil	5	Truck shop	Broken pressure gage	Contaminated soil was picked up and disposed of adequately.	NO
April 17, 2016	Hydraulic Oil	95	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	NO
April 17, 2016	Hydraulic Oil	90	Portage Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	NO
April 17, 2016	Coolant	25	Portage Pit	Loose fitting on the Radiator	Contaminated soil was picked up and disposed of adequately.	NO
April 18, 2016	Hydraulic Oil	2	Vault Pit	Hydraulic oil spilled during maintenance operations	Contaminated soil was picked up and disposed of adequately.	NO
April 21, 2016	Coolant	20	Vault Parking	Coolant leak	Contaminated soil was picked up and disposed of adequately.	NO
April 21, 2016	Diesel fuel	95	Vault Pit	Fuel filter cracked	Contaminated soil was picked up and disposed of adequately.	NO
April 21, 2016	Hydraulic Oil	15	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	NO
April 21, 2016	Diesel fuel	10	Primary Crusher Pad	Mechanical issue causing fuel spill during refueling operations	Contaminated soil was picked up and disposed of adequately.	NO
April 24, 2016	Hydraulic Oil	4	Vault Kitchen Parking	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	NO
April 22, 2016	Diesel fuel	5	Primary Crusher Pad	Mechanical issue causing fuel spill during refueling operations	Contaminated soil was picked up and disposed of adequately.	NO
April 24, 2016	Coolant	20	Vault Kitchen Parking	Broken coolant hose	Contaminated soil was picked up and disposed of adequately.	NO
April 24, 2016	Hydraulic Oil	50	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	NO
April 24, 2016	Hydraulic Oil	20	Vault Kitchen Parking	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	NO

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April 28, 2016	Hydraulic Oil	30	Portage Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	NO
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