



MEADOWBANK DIVISION

Monitoring Program Summary Report

March 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 March 2016 is summarized in Table 2-1 below.

Table 2-1: Freshwater Usage (m³)

Water Location	Source	January	February	March	Total 2016
Camp	Third Portage Lake	3,181	3,061	3,418	
Mill (freshwater tank)	Third Portage Lake	35,397	44,255	80,836	
Emulsion plant	No-name Lake	135	125	119	
Total Freshwater Usage (m³)		38,713	47,441	84,373	170,527
Reclaim Water Usage (m³)	South Cell TSF	261,513	207,769	204,407	673,689

2.2 WASTE ROCK STORAGE FACILITY SEEPAGE

In March 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 March 2016.

2.3 CENTRAL DIKE SEEPAGE

In March 2016, 306,839 m³ of water was pumped from the ST-S-5 sump back into the South Cell TSF. Total year to date is 889,198 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 March 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

Seepage was observed in Portage and Vault pits in March 2016. In Portage Pit A, one ice build-up area was observed along the southeast wall. In March, 16,320 m³ of water was pumped out of Pit A into the South Cell TSF. Ice build-up was present along the south and west walls of Pit E. The Engineering Department is currently working on draining water out of the south wall to ensure stability and safe mining operations. No water was collected and pumped out of Portage Pit E.

One (1) small area of ice build-up was observed in the Vault Pit along the southwest wall. No water was collected and pumped out of Vault Pit sump.

The Goose pit mining activities were completed in 2015. Therefore, the seepage in Goose Pit will not jeopardize any mining activity and will contribute to the re-flooding of the pit as per AEM's Water Management Plan. No inspection has been completed in Goose Pit due to health and safety concerns.

2.7 SEWAGE TREATMENT PLANT

One (1) effluent wastewater sample was collected at the onsite sewage treatment plant (STP) in March 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	March 8, 2016
Ammonia (NH ₃)	mg N/L	0.54
Ammonia-Nitrogen (NH ₃ -NH ₄)	mg N/L	39.1
Total Kjeldahl Nitrogen	mg N/L	40.9

BOD-5	mg/L	18
COD	mg/L	64
Total Suspended Solids	mg/L	26
Nitrate	mg N/L	6.79
Nitrite	mg N/L	1.1
pH*	Units	6.0
Fecal Coliform	UFC/100 mL	60
Total Coliform	UFC/100 mL	800

*Parameter measured by STP operators

Table 2.7.2: LJ-Mix Effluent Results

Parameters	Units	March 8, 2016
Ammonia	mg N/L	<0.01
Ammonia-Nitrogen	mg N/L	1.1
Total Kjeldahl Nitrogen	mg N/L	3.64
BOD-5	mg/L	4
COD	mg/L	56
Total Suspended Solids	mg/L	16
Nitrate	mg N/L	19.5
Nitrite	mg N/L	0.14
pH*	Units	6.6
Fecal Coliform	UFC/100 mL	<10
Total Coliform	UFC/100 mL	< 10,000

*Parameter measured by STP operators

2.8 VAULT ATTENUATION POND EFFLUENT

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

2.9 EAST DIKE SEEPAGE EFFLUENT

Discharge from the East Dike Seepage occurred for the entire month of March. A total of 12,720 m³ of water was discharged into Second Portage Lake in March 2016. Total year to date is 40,676 m³.

Five (5) weekly effluent samples were collected at ST-8 in March 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 March 2016 are shown in Table 2.9.1 below.

Table 2.9.1: March 2016 East Dike Seepage Discharge Results

Parameters	Units	3-Mar-16	8-Mar-16	14-Mar-16	21-Mar-16	29-Mar-16	Maximum Average Concentration
Total Suspended Solids	mg/L	1	11	6	7	<1	5.1

As per NWB 2AM-MEA1525, the maximum average concentration is the average concentration of any four consecutively collected samples taken from the identical sampling location and taken during any given timeframe. In March 2016, TSS results did not exceed the maximum average concentration (15 mg/L) permitted by the Water License, Part F, item 6. The maximum average concentration in March is 8.75 mg/L and is based on the results in Table 2.9.2 below.

Table 2.9.2: March 2016 Maximum Average Concentration

Parameters	Units	22-Feb-16	3-Mar-16	8-Mar-16	14-Mar-16	Maximum Average Concentration
Total Suspended Solids	mg/L	17	1	11	6	8.75

Regular sampling pursuant to MMER and the Water license is also conducted at this location. Results are shown in Table 2.9.3 below. There have been no exceedances of MMER or Water License criteria.

Table 2.9.3: March 2016 Monthly Monitoring Results

Parameters	Units	1-Mar-16
Aluminum	mg/L	0.088
Sulphate	mg/L	3.5
Arsenic	mg/L	<0.0005
Copper	mg/L	0.0006
Nickel	mg/L	0.0006
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 March 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 March 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;
- 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.

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

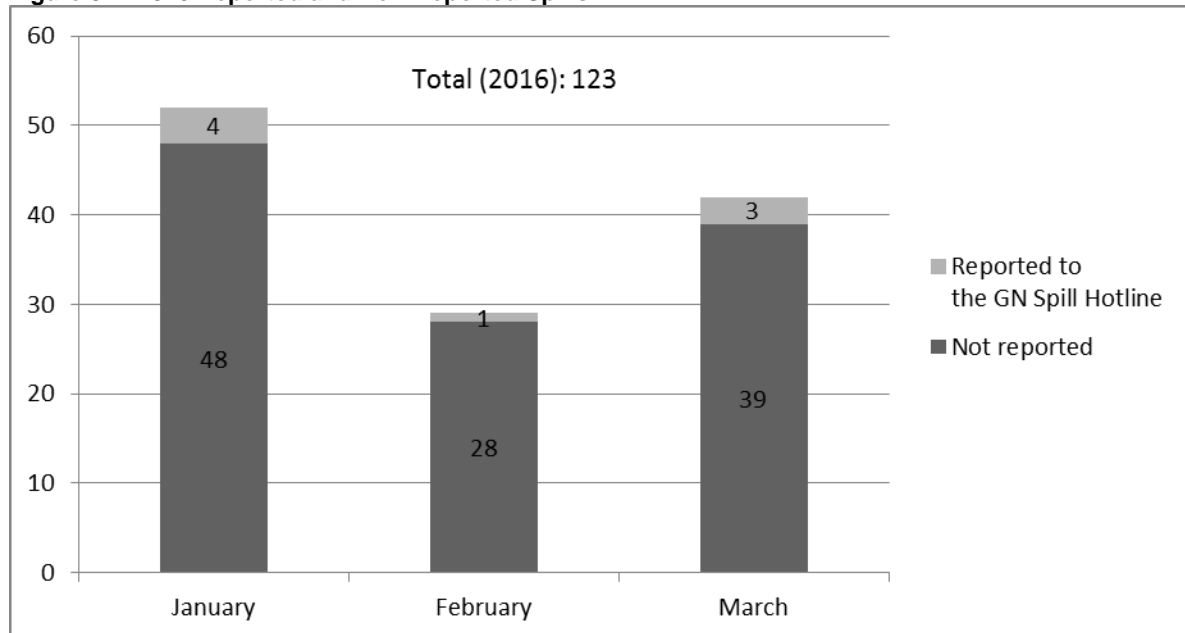


Table 3.1: Summary of AEM Internal Spill Reports

Date	Hazardous Material	Quantity (L/kg)	Location	Cause of spill	Clean-up action taken	Reported to Spill GN Hotline?
Mar 1, 2016	Engine oil	12	Vault Ramp	Hole in the engine oil filter.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin. Mechanical issue was fixed.	NO
Mar 2, 2016	Hydraulic oil	5	Portage Pit E	Broken hydraulic hose on drill.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin. Mechanical issue was fixed.	NO
Mar 3, 2016	Hydraulic oil	90	Vault Pit	Broken hydraulic hose.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Mar 5, 2016	Fuel	30	Vault Pit	Fuel tank overflowed due to fuel truck going down pit ramp with tank being full.	Contaminated soil was picked up and brought to the landfarm.	NO
Mar 5, 2016	Coolant	25	Vault Pit	Broken coolant hose.	Contaminated soil was picked up and adequately disposed of.	NO
Mar 6, 2016	Coolant	15	Vault parking	Coolant hose leaking.	Contaminated soil was picked up and adequately disposed of.	NO
Mar 7, 2016	Transmission fluid	40	Vault	Mechanical issue during maintenance operations.	Contaminated soil was picked up and adequately disposed of.	NO
Mar 9, 2016	Hydraulic Oil	15	Vault pit	Hydraulic oil leaked during maintenance operations.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Mar 9, 2016	Fuel	50	Vault camp parking	Cap was missing on fuel tank.	Contaminated soil was picked up and adequately disposed of.	NO
Mar 12, 2016	Sewage	625 m3	Stormwater Management Pond	Broken flange on piping system.	None. Spill occurred near Stormwater Management Pond where treated sewage is normally discharged during spring and fall. Environmental Department will monitor the area during spring.	YES
Mar 12, 2016	Hydraulic oil	85	Vault	Broken hydraulic hose on haul truck.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO

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Mar 13, 2016	Hydraulic oil	15	AWAR km 100	Mechanical failure on the parking brake. Broken hydraulic hose.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Mar 13, 2016	Hydraulic oil	30	Portage Pit	Broken hydraulic hose.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Mar 13, 2016	Hydraulic oil	10	Marginal Stock pile	Broken hydraulic hose.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Mar 13, 2016	Fuel	700	Baker Lake fuel farm	Tanker was overfilled during re-filling operations. Truck driver miscalculated the compartment capacity.	Contaminated snow was picked up and brought to the Meadowbank landfarm.	YES
Mar 14, 2016	Coolant	40	Vault	Broken hydraulic hose.	Contaminated soil was picked up and adequately disposed of. Mechanical issue was fixed.	NO
Mar 14, 2016	Fuel	4	Vault	Defective breather on dozer.	Contaminated soil picked up and disposed of adequately.	NO
Mar 16, 2016	Engine oil	1	Mill	Mechanical issue on skid steer.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Mar 16, 2016	Diesel fuel	3	Vault	Defective breather on dozer.	Contaminated soil picked up and disposed of adequately.	NO
Mar 17, 2016	Diesel fuel	4	Vault dump	Defective breather on dozer.	Contaminated soil picked up and disposed of adequately.	NO
Mar 18, 2016	Hydraulic oil	10	Vault pit	Broken hydraulic hose on piece of heavy equipment.	Contaminated soil picked up and disposed of adequately. Mechanical issue was fixed.	NO
Mar 18, 2016	Diesel fuel	2	Vault dump	Defective breather on dozer.	Contaminated soil picked up and disposed of adequately.	NO
Mar 19, 2016	Hydraulic	85	Vault Pit	Main hydraulic hose failure.	Contaminated soil picked up and disposed of adequately. Mechanical issue was fixed.	NO
Mar 20, 2016	Coolant	10	Winter Parking	Tank was overfilled.	Contaminated soil picked up and disposed of adequately.	NO
Mar 20, 2016	Fuel	5	Vault Parking	Fuel handle would not turn off at re-filling station.	Contaminated soil picked up and disposed of adequately.	NO

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Mar 21, 2016	Coolant	20	Portage Pit	Broken hydraulic hose.	Spill was contained and contaminated soil picked up and disposed of adequately.	NO
Mar 22, 2016	Hydraulic oil	5	Marginal pad waste dump	Broken hydraulic hose.	Spill was contained and contaminated soil picked up and disposed of adequately.	NO
Mar 23, 2016	Hydraulic oil	90	Vault Pit	Broken hydraulic hose.	Spill was contained and contaminated soil picked up and disposed of adequately. Mechanical issue was fixed.	NO
Mar 23, 2016	Hydraulic Oil	10	Vault Pit	Broken hydraulic hose.	Contaminated soil picked up and disposed of adequately.	NO
Mar 24, 2016	Fuel	20	Portage Pit	Breather plug on compressor failed.	Spill was contained using absorbent pads and contaminated soil picked up and disposed of adequately.	NO
Mar 24, 2016	Hydraulic Oil	10	Vault Sana Crusher	Broken hydraulic hose on backhoe.	Spill was contained using absorbent pads and contaminated soil picked up and disposed of adequately.	NO
Mar 25, 2016	Fuel	15	Central Dike	Mechanical issue during re-filling operations causing tank overflow.	Spill was contained using absorbent pads and contaminated soil picked up and disposed of adequately.	NO
Mar 25, 2016	Diesel fuel	20	Vault pit	Crack on top of fuel tank.	Tank is slowly leaking all around site. Maintenance Department notified.	NO
Mar 26, 2016	Diesel fuel	10	Vault pit	Crack on top of fuel tank.	Tank is slowly leaking all around site. Maintenance Department notified.	NO
Mar 26, 2016	Diesel fuel	10	Vault pit	Crack on top of fuel tank. Not same piece of equipment as two previous spills (March 25 and 26).	Tank is slowly leaking all around site. Maintenance Department notified.	NO
Mar 26, 2016	Hydraulic oil	80	Vault parking	Quadrex containing oil during mechanical operations was leaking.	Quadrex was picked up and soil was collected and adequately disposed of.	NO
Mar 27, 2016	Fuel	20	Vault pit	Crack on top of fuel tank.	Tank is slowly leaking all around site. Maintenance Department notified.	NO
Mar 28, 2016	Fuel	20	Vault pit	Crack on top of fuel tank.	Tank is slowly leaking all around site. Maintenance Department notified.	NO
Mar 28, 2016	Hydraulic oil	8	Truck shop	Improper cam lock installed on tote in lube truck.	Spill was contained and soil was picked up and adequately disposed of.	NO

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Mar 29, 2016	Hydraulic oil	250	Vault Pit	Failure on hydraulic oil gage causing oil leakage.	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
Mar 30, 2016	Hydraulic oil	80	Vault pit	Broken hydraulic hose.	Spill was contained using absorbent pads. Spill was cleaned up.	NO
Mar 31, 2016	Compressor oil	40	Vault pit	Mechanical issue on piece of heavy equipment. Oil coming out by air filter.	Spill was contained using absorbent pads. Spill was cleaned up.	NO