



MEADOWBANK DIVISION

Monitoring Program Summary Report

February 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 is directed to the onsite storm water management pond).

As requested in INAC's Inspection Report dated November 10th 2015, this report also documents the seepage monitoring conducted pursuant to Part I Item 6 and 13.

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

SECTION 2 • WATER MANAGEMENT

2.1 WATER USAGE

Freshwater usage for February 2016 is summarized in Table 2-1 below. The total freshwater consumption for the month was 47,441 m³. Total year to date is 86,154 m³. The amount of reclaim water used in the mill for February was 207,769 m³. Total year to date in 2016 is 469,282 m³. Reclaim water is supplied by the South Cell TSF.

Table 2-1: Freshwater Usage (m³)

	February
Freshwater Storage Tank	47,316
Emulsion Plant	125
Total (February)	47,441
Total (2016)	86,154

2.2 WASTE ROCK STORAGE FACILITY SEEPAGE

In February 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 February 2016.

2.3 CENTRAL DIKE SEEPAGE

In February 2016, 277,015 m³ of water was pumped from the ST-S-5 sump back into the South Cell TSF. Total year to date is 582,359 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 February 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 February 2016. Ice build-up was present along the south and west walls of Pit E. In Pit A, one ice build-up area was observed along the southeast wall. The seepage rate is low and the Engineering Department is currently working on drilling drainage holes in the Pit E south wall. One (1) water quality sample was collected in February 2016 from drilled holes. No water was collected and pumped out of Portage Pit sumps.

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 February 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 (2x/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	February 2, 2016
Ammonia (NH ₃)	mg N/L	0.34
Ammonia-Nitrogen (NH ₃ -NH ₄)	mg N/L	51
Total Kjeldahl Nitrogen	mg N/L	74.1
BOD-5	mg/L	12
COD	mg/L	55
Total Suspended Solids	mg/L	16
Nitrate	mg N/L	8.21
Nitrite	mg N/L	1.1
pH*	Units	6.8
Fecal Coliform	UFC/100 mL	110
Total Coliform	UFC/100 mL	6000

*Parameter measured by STP operators

Table 2.7.2: LJ-Mix Effluent Results

Parameters	Units	January 4, 2016
Ammonia	mg N/L	<0.01
Ammonia-Nitrogen	mg N/L	9.3
Total Kjeldahl Nitrogen	mg N/L	15.8
BOD-5	mg/L	13
COD	mg/L	78
Total Suspended Solids	mg/L	24
Nitrate	mg N/L	29.3
Nitrite	mg N/L	0.24
pH*	Units	6.8
Fecal Coliform	UFC/100 mL	36
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 February 2016. Discharge will resume in spring.

2.9 EAST DIKE SEEPAGE EFFLUENT

Discharge from the East Dike Seepage occurred for the whole month. A total of 13,445 m³ of water was discharged into Second Portage Lake in January 2016. Total year to date is 27,956 m³.

Four (4) weekly effluent samples were collected at ST-8 in February 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 February 2016 are shown in Table 2.9.1 below.

Table 2.9.1: February 2016 East Dike Seepage Discharge Results

Parameters	Units	1-Feb-16	9-Feb-16	16-Feb-16	22-Feb-16	Maximum Average Concentration
Total Suspended Solids	mg/L	10	11	5	17	10.75

As per NWB water license 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 February 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 February is 10.75 mg/L. Table 2.9.2 below is provided for information purposes only as TSS results were low and therefore not used in calculating the maximum average concentration in February.

Table 2.9.2: January 2016 Maximum Average Concentration

Parameters	Units	5-Jan-16	14-Jan-16	18-Jan-16	25-Jan-16
Total Suspended Solids	mg/L	1	9	1	2

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: February 2016 Monthly monitoring results

Parameters	Units	1-Feb-16
Aluminum	mg/L	0.024
Sulphate	mg/L	6.7
Arsenic	mg/L	<0.0005
Copper	mg/L	<0.0005
Nickel	mg/L	<0.0005
Lead	mg/L	<0.0003
Zinc	mg/L	0.006
Radium 226	mg/L	0.004
Total Cyanide	mg/L	<0.005

2.10 NON CONTACT WATER

In February 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. Table 3.1 summarizes AEM spill reports for February 2016. Twenty-nine (29) spills occurred on site and one (1) was reportable to the GN spill hotline. This corresponds to a decrease compared to previous months. Fifty-two (4 were reportable) and forty-six (5 were reportable) spills occurred in January 2016 and December 2015, respectively. All spills reported internally and to regulators are managed appropriately on site according to AEM's spill contingency plan. Spills are contained and cleaned, contaminated material is disposed to the appropriate area (landfarm, TSF if required), and the clean-up actions are monitored closely by the Environment Department. There was no off site impact to any watercourses. The recent spill increase is mainly due to mechanical issues with the equipment due to the cold weather, site conditions and possibly current maintenance procedures. Operators' awareness and pre-operational checking of equipment may also be contributing to the increase in spills. A team of personnel from the Maintenance, Mine operations, Environment, and Strategic Optimization Departments is investigating ways to address this issue. A second interdepartmental meeting was held on February 24, 2016. An action plan is currently being developed and will include a better tracking of equipment presenting deficiencies, definition of main causes and locations, review of current maintenance practices, operation of the equipment and any other relevant matters the investigation may reveal.

Table 3.1: Summary of AEM Internal Spill Reports

Date of Spill	Hazardous Material	Quantity (L)	Location	Cause of spill	Clean-up action taken	Reported to Spill Hot Line
Feb 1, 2016	Hydraulic oil	2	Vault Pit	Hydraulic hose leaking.	Contaminated soil was picked up and was adequately disposed of in yellow roll-off bin.	NO
Feb 2, 2016	Hydraulic oil	80	Vault Pit	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.	NO
Feb 2, 2016	Hydraulic oil	80	Vault Pit	Oil tank over filled during re-filling operations.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 4, 2016	Hydraulic oil and diesel fuel	150/80	Ring road	An incident involving a tow truck caused a spill due to a punctured fuel tank and broken hydraulic hose.	Absorbent pads and secondary containment were used to contain and collect the spill. Contaminated soil was scraped and brought to the landfarm.	YES
Feb 4, 2016	Hydraulic oil	50	Vault Pit	An engine failure caused the spill.	Contaminated soil was picked up and was adequately disposed of in	NO

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					yellow roll off bin.	
Feb 9, 2016	Hydraulic oil	15	Vault Pit	Hydraulic hose broken on piece of heavy equipment.	Contaminated soil was picked up and was adequately disposed of in yellow roll off bin.	NO
Feb 9, 2016	Steering fluid	90	Vault Pit	Broken steering fluid hose on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 9, 2016	Hydraulic oil	60	Vault Pit	Broken hydraulic hose in engine compartment.	Contaminated soil was picked up and was adequately disposed of in yellow roll off bin.	NO
Feb 10, 2016	Diesel Fuel	20	Pushback parking	Oil tank over filled due to mechanical issue.	Contaminated soil was picked up and was adequately disposed of in yellow roll off bin.	NO
Feb 13, 2016	Hydraulic Oil	90	Vault Parking	Broken hydraulic hose on piece of heavy equipment.	Contaminated soil was picked up and was adequately disposed of in yellow roll off bin.	NO
Feb 16, 2016	Hydraulic Oil	60	Vault Pit	Broken hydraulic hose on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 17, 2016	Diesel Fuel	80	Vault Ramp	Fuel leaked out of frozen air vent.	Contaminated soil was picked up and was adequately disposed of in yellow roll off bin.	NO
Feb 18, 2016	Hydraulic Oil	60	Vault Pit	Broken hydraulic hose.	Contaminated soil was picked up and was adequately disposed of in yellow roll off bin.	NO
Feb 18, 2016	Transmission Oil	90	Vault Dump	Transmission leak on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 18, 2016	Hydraulic Oil	10	Vault Pit	Broken fitting on piece of heavy equipment.	Contaminated soil was picked up and brought to the landfarm.	NO
Feb 18, 2016	Hydraulic Oil	90	Vault Pit	Broken hydraulic hose on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 18, 2016	Diesel fuel	80	Site Service Coverall	Loose plug underneath the fuel tank on Fuel 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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Feb 18, 2016	Hydraulic Oil	60	Vault Pit	Broken hydraulic hose on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 19, 2016	Coolant	40	Vault Pit	Coolant hose failure on piece of heavy equipment.	Contaminated soil was picked up and brought to the Tailings Storage Facility.	NO
Feb 21, 2016	Transmission Oil	10	Pushback parking	Transmission hoses rubbing together on piece of heavy equipment causing a leak.	Contaminated soil was picked up and brought to the landfarm.	NO
Feb 21, 2016	Hydraulic Oil	10	Pit E3	Broken hydraulic hose on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 21, 2016	Hydraulic Oil	40	Vault Pit	"O" ring failure causing a hydraulic oil spill on piece of heavy equipment.	Contaminated soil was picked up and was adequately disposed of in yellow roll off bin. Mechanical issue was fixed.	NO
Feb 22, 2016	Coolant	60	Vault Pit	Broken coolant hose.	Contaminated soil was picked up and brought to the Tailings Storage Facility.	NO
Feb 23, 2016	Hydraulic Oil	60	Vault Pit	Hydraulic pump failure on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 24, 2016	Hydraulic Oil	80	Marginal Stockpile	Broken hydraulic hose on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 24, 2016	Hydraulic Oil	80	Vault Pit	Broken hydraulic hose on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 27, 2016	Hydraulic oil	50	Winter Parking	Hydraulic Oil spill during maintenance operations.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 29, 2016	Coolant	90	Vault Pit	Broken coolant hose.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO
Feb 29, 2016	Hydraulic Oil	20	Vault Parking	Hydraulic hose leaking on piece of heavy equipment.	Absorbent pads were used to clean-up the spill. Pads were adequately disposed of in the yellow roll off bin.	NO