



MEADOWBANK DIVISION

## **Monitoring Program Summary Report**

**November 2015**

Type A Water License 2AM-MEA1525

Table of Contents

SECTION 1 • BACKGROUND..... 3

SECTION 2 • WATER MANAGEMENT ..... 4

2.1 WATER USAGE .....4

2.2 WASTE ROCK STORAGE FACILITY SEEPAGE .....4

2.3 CENTRAL DIKE SEEPAGE .....5

2.4 ASSAY ROAD SEEPAGE .....5

2.5 SEEPAGE AT PIT WALL AND PIT WALL FREEZE/THAW AND PERMAFROST AGGRADATION .....5

2.6 SEWAGE TREATMENT PLANT .....6

2.7 VAULT ATTENUATION POND EFFLUENT .....6

2.8 EAST DIKE SEEPAGE EFFLUENT.....7

2.9 NON CONTACT WATER.....7

SECTION 3 • SPILL MANAGEMENT ..... 8

## **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, Assay Road Seepage, Seepage at Pit Wall and Pit Wall Freeze/Thaw and Permafrost Aggradation 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 10<sup>th</sup> 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 November 2015 is summarized in Table 2-1 below. The total freshwater consumption for the month was 47,032 m<sup>3</sup>. The total amount of reclaim water used in the mill for November was 252,425 m<sup>3</sup>. Reclaim water is supplied by the TSF South Cell.

**Table 2-1: Freshwater Usage (m<sup>3</sup>)**

	<b>November</b>
Freshwater Storage Tank	46,904
Emulsion Plant	128
<b>Total</b>	<b>47,032</b>
<b>Year to date total</b>	<b>769,457</b>

### 2.2 WASTE ROCK STORAGE FACILITY SEEPAGE

In 2014, as per inspections conducted within the framework of the Freshet Action Plan, run off was noted at the northeast side of the NPAG waste rock extension pile in a natural depression (WEP). AEM contained it and pumped it back to the North Cell as a precaution and to prevent egress to the East Diversion non-contact ditch. In 2015 15,569 m<sup>3</sup> of water has been pumped from the WEP collection system back into the North Cell.

WEP1 and WEP2 sumps were constructed in September 2015 to manage better water around the northeast side of the RSF and to ensure that all water ponding behind the Portage Waste Dump is transferred back to the North Cell TSF. They are located at 638419E, 7216707N and 638625E, 7216557N, respectively. No water has been pumped in 2015 from the sumps as water was frozen after the sumps' construction. Sampling will commence in 2016 at sumps WEP1 and WEP2 as per NWB water license 2AM-MEA1525.

In November no water was pumped back to the North Cell TSF from the ST-16 sump as it was frozen. Total year to date is 20,029 m<sup>3</sup>.

AEM continues to complete weekly inspections at RSF and NP-2 Lake. The monitoring required under the Freshet Action Plan will resume next spring. NP-2 Lake and the RSF seepage (ST-16/WEP) areas are now frozen. As a result, no samples were collected.

### **2.3 CENTRAL DIKE SEEPAGE**

During October 2014, seepage was observed at the downstream toe of the Central dike. The seepage is located within the mining footprint, away from the receiving environment and is confined directly downstream of the dike. Monitoring conducted during the summer 2015 confirmed that the water originates from the South Cell TSF reclaim water. Currently, the seepage is being monitored by the Engineering Department. Water is collected into ST-S-5 and pumped back into the South Cell Tailings Storage Facility.

In November, 337,878 m<sup>3</sup> of water was pumped from the ST-S-5 sump back into the South Cell Tailings Storage Facility. Total year to date is 2,660,351 m<sup>3</sup>.

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

### **2.4 ASSAY ROAD SEEPAGE**

In November, water was pumped from the MW-203 back to the mill. The total volume pumped was 164 m<sup>3</sup>. Total year to date pumped from MW-203, the interception trench and containment is 30,544 m<sup>3</sup>. Weekly inspections of the area were conducted this month. Water was sampled at the well in November. Well monitoring for CN downstream of the trench, has also ceased as water in the wells was frozen.

### **2.5 SEEPAGE AT PIT WALL AND PIT WALL FREEZE/THAW AND PERMAFROST AGGRADATION**

Seepage was observed at five (5) locations in November 2015 at Portage Pit. Ice build-up was present along the south and south west walls of Pit E for a total of approximately 50 m<sup>3</sup> of ice. The seepage rate is low and the Engineering Department is currently working on installing horizontal holes in the walls to increase its drainage.

Two (2) small areas of ice build-up were observed in the Vault Pit for approximately 3.5 m<sup>3</sup> of ice along the south and northeast walls.

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 reflooding of the pit. No inspection has been completed in Goose Pit due to health and safety concerns.

The water in-flows observed in 2015 appear to be smaller than anticipated based on previous hydrogeological modeling.

## 2.6 SEWAGE TREATMENT PLANT

One (1) effluent wastewater sample was taken from the onsite sewage treatment plant (STP's) in November.

The Seprotech STP results are shown in Table 2.4.1 below; the LJ-Mix STP results are shown in Table 2.4.2. The results of the discharge indicate the system is working well. The effluent is discharged to the stormwater management pond and is pumped to the TSF (2x/year). This water becomes part of the reclaim pond. There is no discharge to the receiving environment.

**Table 2.4.1: Seprotech Effluent Results**

Parameters	Units	November 2, 2015
Ammonia	mg N/L	0.34
Ammonia-Nitrogen	mg N/L	34.3
Total Kjeldahl Nitrogen	mg N/L	42.8
BOD-5	mg/L	12
COD	mg/L	91
Total Suspended Solids	mg/L	19
Nitrate	mg N/L	5.31
Nitrite	mg N/L	1.05
pH*	Units	7.00
Fecal Coliform	UFC/100 mL	36
Total Coliform	UFC/100 mL	800

\*Parameter measured by STP operators

**Table 2.4.2: LJ-Mix Effluent Results**

Parameters	Units	November 2, 2015
Ammonia	mg N/L	<0.01
Ammonia-Nitrogen	mg N/L	0.7
Total Kjeldahl Nitrogen	mg N/L	4.52
BOD-5	mg/L	14
COD	mg/L	77
Total Suspended Solids	mg/L	23
Nitrate	mg N/L	17.5
Nitrite	mg N/L	0.06
pH*	Units	5.9
Fecal Coliform	UFC/100 mL	26
Total Coliform	UFC/100 mL	200

\*Parameter measured by STP operators

## 2.7 VAULT ATTENUATION POND EFFLUENT

Discharge from the Vault Attenuation Pond was stopped September 10<sup>th</sup>. Total year to date discharged is 1,065,433 m<sup>3</sup>. AEM does not plan to discharge water anymore from this location in 2015.

## 2.8 EAST DIKE SEEPAGE EFFLUENT

Discharge from the East Dike Seepage occurred for the whole month. A total of 15,917 m<sup>3</sup> was discharged into Second Portage Lake during the month. Total year to date discharged is 147,973 m<sup>3</sup>.

Four weekly effluent samples were collected at ST-8 in November. TSS results did not exceed the maximum average concentration (15 mg/L) and maximum allowable grab sample concentration (30 mg/L) permitted by the Water License, Part F, Item 6. Monitoring results are shown in Table 2.6.1 below. Regular sampling pursuant to MMER is also conducted at this location. There have been no exceedances of MMER criteria.

**Table 2.6.1: East Dike Seepage Discharge Results**

Parameters	Units	2-Nov-15	10-Nov-15	19-Nov-15	23-Nov-15	Average Concentration
Total Suspended Solids	mg/L	2	11	5	3	5.3

## 2.9 NON CONTACT WATER

In November, there was no water discharged through the non-contact water diversion ditches as they were frozen.

## SECTION 3 • SPILL MANAGEMENT

AEM has developed a thorough internal system of tracking spills on-site. Table 3-1 summarizes the AEM spill reports for the month. Ten (10) spills occurred on site and three (3) were reportable to the GN spill hotline. AEM contained, cleaned up and disposed of the spill material adequately. The majority of the clean-up material was taken to the AEM Landfarm. Absorbent pads are disposed of at the on-site incinerator.

**Table 3-1: Summary of AEM Internal Spill Reports**

Date of Spill	Hazardous Material	Quantity (L/Kg)	Location	Cause of spill	Clean-up action taken	Reported to Spill Hot Line
2015/11/05	Hydraulic Oil	80L	AWAR km 90	A truck went in the ditch causing a hydraulic leak.	Contaminated soil was picked up and adequately disposed of.	No
2015/11/06	Hydraulic Oil	20L	Truck Shop	A hydraulic hose broke causing the leak.	The contaminated soil was picked up and adequately disposed of in the yellow roll-off bin.	No
2015/11/24	Tanner Gas	15L	Inventory sea-can pad	The forks of a zoom boom punctured a tanner gas can.	Contaminated snow was picked up and disposed of in the yellow roll-off bin.	No
2015/11/26	Hydraulic Oil	90L	Pit E	A hydraulic hose broke on piece of heavy equipment.	Equipment was shut off. Spill was contained and collected. The contaminated soil was disposed of in the yellow roll-off bin.	No
2015/11/27	Hydraulic Oil	300L	Vault Pit	Mechanical issues were encountered during maintenance operations.	The contaminated soil was picked up and brought to the landfarm.	Yes
2015/11/27	Sewage	900L	Nova Camp Sewage Junction	Loose pipe fitting caused the leak.	A vacuum truck and a backhoe shovel were used to collect the sewage. The pipe fitting was fixed and the area was monitored in the following days.	Yes
2015/11/29	Hydraulic Oil	5L	Pushback Pit	Mechanical issues on a piece of heavy equipment caused the spill.	The spill was contained and absorbents pads were placed under the piece of equipment. The mechanical issue was fixed.	No
2015/11/29	Hydraulic Oil	5L	Vault parking	During maintenance operations on hydraulic hose of a haul truck a leak occurred.	The spill was cleaned up using rags. Contaminated soil was brought to the landfarm.	No
2015/11/29	Hydraulic Oil	10L	Winter parking	A leak occurred during maintenance operations on piece of heavy equipment.	Absorbent pads were placed to contain the spill. The contaminated soil was picked up and disposed of in the yellow roll-off bin.	No
2015/11/30	Hydraulic Oil	250L	PIT E	A hydraulic hose broke causing the leak.	The spill was cleaned up using rags and the soil was excavated. Contaminated soil was brought to the landfarm.	Yes