



MEADOWBANK DIVISION

## **Monitoring Program Summary Report**

**May 2016**

Type A Water License 2AM-MEA1525

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## **SECTION 1 • BACKGROUND**

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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

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### 2.1 WATER USAGE

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

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

Water Location	Source	January	February	March	April	May	Total 2016
Camp	Third Portage Lake	3,181	3,061	3,418	3,297	3,478	
Mill (freshwater tank)	Third Portage Lake	35,397	44,255	80,836	81,012	33,910	
Emulsion plant	No-name Lake	135	125	119	138	147	
<b>Total Freshwater Usage (m<sup>3</sup>)</b>		<b>38,713</b>	<b>47,441</b>	<b>84,373</b>	<b>84,447</b>	<b>37,535</b>	<b>292,509</b>
<b>Reclaim Water Usage (m<sup>3</sup>)</b>	South Cell TSF	261,513	207,769	204,407	200,883	268,825	1,143,397

### 2.2 WASTE ROCK STORAGE FACILITY SEEPAGE

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

Agnico Eagle completed daily pre-freshet inspections at the Portage and Vault RSF, and NP-2 Lake in May. Open water sampling required under the Freshet Action Plan will resume in June. Sampling will commence in June 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 May 2016.

### 2.3 CENTRAL DIKE SEEPAGE

In May 2016, 376,728 m<sup>3</sup> of water was pumped from the ST-S-5 sump back into the South Cell TSF. Total year to date is 1,590,559 m<sup>3</sup>.

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 May 2016, one (1) water quality sample was collected at MW-203 but no water was pumped 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 May 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. In May, 6715 m<sup>3</sup> and 5947 m<sup>3</sup> of water were pumped out of Portage Pit North and South to the South Cell TSF, respectively. 7705 m<sup>3</sup> of water was pumped out of Vault Pit to the Vault Attenuation Pond.

## 2.7 SEWAGE TREATMENT PLANT

One (1) effluent wastewater sample was collected at the onsite sewage treatment plant (STP) in May 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	May 2, 2016
Ammonia (NH <sub>3</sub> )	mg N/L	0.99
Ammonia-Nitrogen (NH <sub>3</sub> -NH <sub>4</sub> )	mg N/L	62.3
Total Kjeldahl Nitrogen	mg N/L	66.2
BOD-5	mg/L	61
COD	mg/L	82
Total Suspended Solids	mg/L	20
Nitrate	mg N/L	4.85
Nitrite	mg N/L	1.03
pH*	Units	6.3
Fecal Coliform	UFC/100 mL	<6000
Total Coliform	UFC/100 mL	470000

\*Parameter measured by STP operators

**Table 2.7.2: LJ-Mix Effluent Results**

Parameters	Units	May 2, 2016
Ammonia	mg N/L	0.16
Ammonia-Nitrogen	mg N/L	26

Total Kjeldahl Nitrogen	mg N/L	36.3
BOD-5	mg/L	67
COD	mg/L	206
Total Suspended Solids	mg/L	252
Nitrate	mg N/L	14.3
Nitrite	mg N/L	1.14
pH*	Units	6.5
Fecal Coliform	UFC/100 mL	600
Total Coliform	UFC/100 mL	10000

\*Parameter measured by STP operators

## 2.8 VAULT ATTENUATION POND EFFLUENT

There was no discharge from the Vault Attenuation Pond into Wally Lake in May 2016. Discharge will resume once ice is melted in Wally Lake.

## 2.9 EAST DIKE SEEPAGE EFFLUENT

Discharge from the East Dike Seepage occurred for the entire month of May. A total of 14,486 m<sup>3</sup> of water was discharged into Second Portage Lake in May 2016. Total year to date is 68,678 m<sup>3</sup>.

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

**Table 2.9.1: May 2016 East Dike Seepage Discharge Results**

Parameters	Units	6-May-16	13- May-16	20- May -16	24-May -16	31- May-16	Maximum Average Concentration
Total Suspended Solids	mg/L	1.6	0.2	3.6	<1	17	4.6

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: May 2016 Monthly Monitoring Results**

Parameters	Units	24-May-16
Aluminum	mg/L	0.059
Sulphate	mg/L	7.5
Arsenic	mg/L	0.0008
Copper	mg/L	<0.0005

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 May 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**

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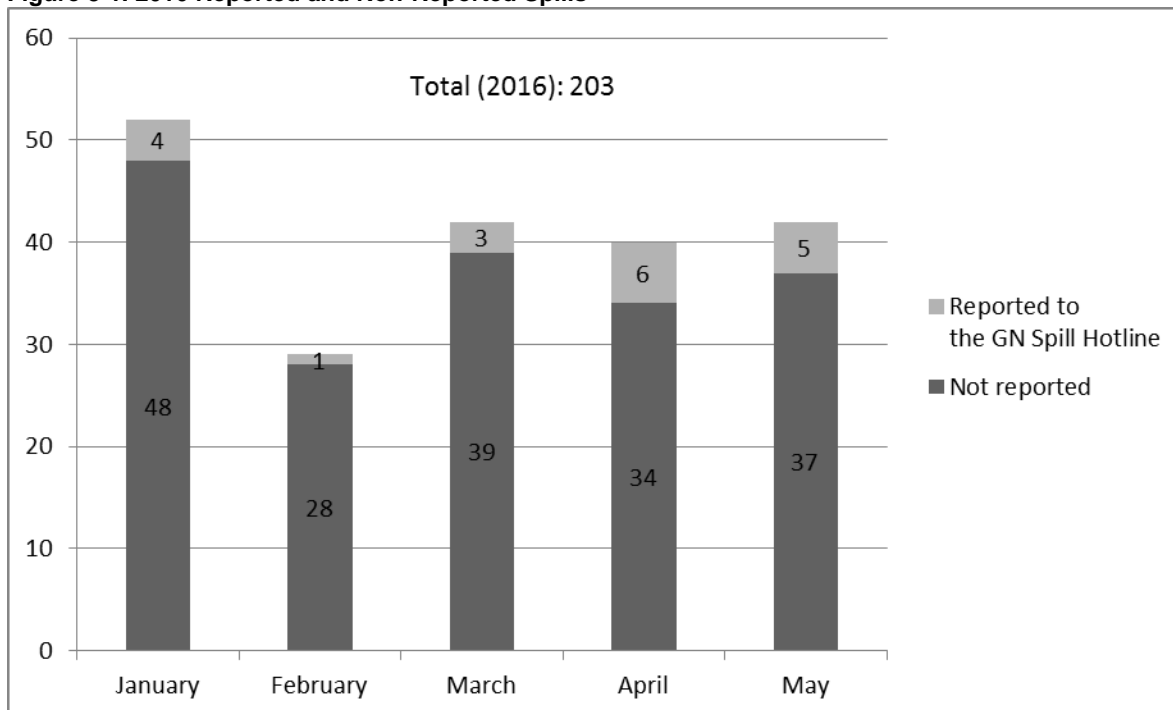
Figure 3.1 shows reported and non-reported spills for 2016 broken down per month and Table 3.1 summarizes AEM spill reports for May 2016. All spills reported internally and to regulators were managed appropriately on site according to AEM's spill contingency plan. Spills were contained and cleaned, contaminated 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?
May 1, 2016	Hydraulic oil	60	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 3, 2016	Hydraulic oil	20	Vault Parking	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 3, 2016	Hydraulic oil	250	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	Yes
May 5, 2016	Hydraulic oil	60	Vault pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 5, 2016	Hydraulic oil	35	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 5, 2016	Hydraulic oil	45	Vault Parking	Hydraulic oil spill during maintenance operations.	Contaminated soil was picked up and disposed of adequately.	No
May 6, 2016	Hydraulic oil	75	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	No

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May 7, 2016	Hydraulic oil	95	Vault	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	No
May 6, 2016	Hydraulic oil	35	Primary Crusher pad	Hydraulic hose leaking	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	No
May 7, 2016	Fuel	30	Vault Camp	Fuel leaking out of the breather	Contaminated soil was picked up and disposed of adequately.	No
May 7, 2016	Hydraulic oil	10	Vault Pit	Leak from secondary containment during maintenance operations	Contaminated soil was picked up and disposed of adequately.	No
May 8, 2016	Fuel	2	Primary crusher stockpile	Fuel leaking out of the breather	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	No
May 8, 2016	Fuel	2	Vault parking	Fuel leaking out of the breather	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	No
May 10, 2016	Hydraulic Oil	20	Pushback parking	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 11, 2016	Hydraulic Oil	200	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	Yes
May 13, 2016	Diesel fuel	38	Pushback parking	Connector when refueling not connected properly	Contaminated soil was picked up and disposed of adequately.	No
May 13, 2016	Coolant	4	Maintenance Shop	"O" ring failure on engine cooler	Contaminated soil was picked up and disposed of adequately.	No
May 14, 2016	Hydraulic Oil	150	Vault camp parking	Broken hydraulic pump	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	Yes
May 14, 2016	Hydraulic Oil	20	Vault Parking	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	No
May 14, 2016	Hydraulic Oil	50	Vault Parking	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	No
May 15, 2016	Hydraulic Oil	205	Vault Pit	Broken hydraulic pump	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	Yes

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May 15, 2016	Hydraulic Oil	2	Maintenance Shop	Leak on equipment stored during winter	Contaminated soil was picked up and disposed of adequately.	No
May 16, 2016	Hydraulic oil	95	Vault pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 16, 2016	Grease	10	Hazmat pad	Grease container fell when being moved by a loader on unlevelled ground	Contaminated soil was picked up and disposed of adequately.	No
May 16, 2016	Hydraulic Oil	50	Winter Parking	Oil spill during maintenance operations. Containment not efficient.	Contaminated soil was picked up and disposed of adequately.	No
May 16, 2016	Hydraulic Oil	20	Maintenance Shop	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 18, 2016	Coolant	80	Vault Haul Truck Parking	Mechanical issue on radiator	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	No
May 19, 2016	Hydraulic oil	200	Vault pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately. Mechanical issue was fixed.	Yes
May 19, 2016	Coolant	30	Maintenance Shop	Mechanical issue on radiator	Contaminated soil was picked up and disposed of adequately.	No
May 19 2016	Hydraulic Oil	75	Vault Dump	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 20 2016	Hydraulic Oil	7	Vault pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 21 2016	Hydraulic Oil	50	Portage Pit	Hydraulic pump leaking	Contaminated soil was picked up and disposed of adequately.	No
May 21 2016	Hydraulic Oil	65	Vault pit	Hydraulic pump leaking	Contaminated soil was picked up and disposed of adequately.	No
May 22 2016	Coolant	35	Vault parking	Broken coolant hose	Contaminated soil was picked up and disposed of adequately.	No
May 23 2016	Hydraulic Oil	5	Vault fuel farm	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 23 2016	Hydraulic Oil	30	Vault dump	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No

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May 24 2016	Hydraulic Oil	10	Vault Pit	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 24 2016	Hydraulic Oil	30	Marginal Stock pile	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No
May 26, 2016	Hydraulic Oil	10	Winter Parking	Oil spill during maintenance operations.	Contaminated soil was picked up and disposed of adequately.	No
May 27, 2016	Hydraulic Oil	40	Vault Pit	Mechanical issue on hydraulic tank	Contaminated soil was picked up and disposed of adequately.	No
May 27, 2016	Diesel fuel	60	Vault Pit	Cap on fuel tank was not clipped properly	Contaminated soil was picked up and disposed of adequately.	No
May 29, 2016	Hydraulic Oil	40	Vault Parking	Broken hydraulic hose	Contaminated soil was picked up and disposed of adequately.	No