

Appendix 11

Meadowbank and Whale Tail 2018 Geotechnical Implementation plan



AGNICO EAGLE

To: M. Richard Dwyer
Manager of Licensing
Nunavut Water Board

Contact information: P.O. Box 119
Gjoa Haven, NU
X0B 1J0
(867) 360-6338

From: Marie-Pier Marcil
Senior Compliance Technician

marie-pier.marcil@agnicoeagle.com
819-759-3700 x4605836

CC:

Date: March 21, 2019

Re: Meadowbank Water Licence 2AM-MEA1526 Part I, Item 11 – 2018 Annual Geotechnical Inspection Report

Dear M. Dwyer,

Agnico Eagle Mine Ltd. received the report “*2018 Annual Geotechnical Inspection Meadowbank Gold Mine, Nunavut*”. As required by Water licence 2AM-MEA1526 Part I, Item 11, please consider the following information as the implementation plan to address the recommendations in Table 5 of the report : Summary of Recommendations and priority level from the 2018 geotechnical inspection. The 2018 Annual Geotechnical Inspection Report will be submitted as an appendix of the 2018 Annual Report.

Should you have any question, please do not hesitate to contact me at the above.

Regards,

Agnico Eagle Mines Limited – Meadowbank Division



AGNICO EAGLE

Table of Contents

1. DEWATERING DIKES	3
1.1 South Camp Dike	3
1.2 Bay-Goose Dike	3
2. TAILINGS STORAGE FACILITY	5
2.1 Saddle Dam 2	5
2.2 Stormwater Dike	5
2.3 Stormwater Dike	5
2.4 North Cell Internal Structure	6
2.5 Central Dike	6
2.6 Saddle Dams 3, 4 and 5	6
3. ALL-WEATHER PRIVATE ROAD (AWPR).....	7
4. AMARUQ ROAD.....	8
5. QUARRIES AND ESKERS	8
6. BULK FUEL STORAGE FACILITIES.....	9
7. OTHER MEADOWBANK FACILITIES	11
7.1 Meadowbank Site Roads	11
7.2 Diversion Ditch and Sediment and Erosion Protection Structure	11
7.3 Landfill & Contaminated Soil Storage and Bioremedial Landfarm Facility	11
7.4 Stormwater Management Pond	12



AGNICO EAGLE

1. DEWATERING DIKES

Recommendation: The most current version of the Operation, Maintenance and Surveillance (OMS) Manual (AEM, 2018a) is dated February 2018 for the dewatering dikes. The most current version of the overall Emergency Response Plan (ERP) for the mine (AEM, 2017b) is dated January 2017. It is a good practice to keep these documents updated.

Action: AEM will continue to keep the Dewatering Dikes OMS Manual up to date. It is actually a requirement in the new governance for tailings and water management infrastructure to perform a review of the OMS manuals once a year. The ERP will also be review and updated if require. This exercises should take place during the first quarter of 2019, and presented with the Meadowbank Annual Report 2018.

Recommendation: The condition of the dewatering dikes is regularly inspected by the mine and this practice should continue.

Action: The inspection of the dewatering dikes is done on a regular basis and will continue.

Recommendation: Regular monitoring and assessment of the monitoring data in the dewatering dikes (piezometric, thermal, inclinometer, flow meter and seismograph including monitoring to control the reaction to blasting around E5) should continue. It is recommended to flag the piezometers that recorded data below 0°C in the past and be very careful when interpreting their data as they might be broken.

Action: Monitoring and data interpretation of the instrumentation in the dewatering dikes are done on a regular basis and will continue. A dewatering dike instrumentation report is prepared every quarter by the engineering department. Observations of broken or possibly frozen instruments are reported and recommendations are proposed for those instruments if deemed necessary.

1.1 South Camp Dike

Recommendation: Continue keeping the downstream toe of the dike clear to facilitate inspection. The nearby ultramafic rock dump should not obstruct the toe of the dike.

Action: The nearest NPAG material placed on the downstream side of the South Camp Dike is at a distance of 10 m from the toe of the dike, in order to keep the area clear to facilitate inspection.

1.2 Bay-Goose Dike

Recommendation: Water ponds were observed at the downstream toe during the inspection, like for the previous inspection. It is recommended to pump them periodically to allow for good visual inspection of the downstream toe. The pond flow formed by seepage should be monitored and recorded.

Action: The monitoring of the water ponds at the downstream toe of the dike will continue on a regular basis during the open water season. Pumping of the ponds is done as needed, normally 3-4 times during open water season depending on rain events. The seepage rate will continue to be monitored during open water season.



AGNICO EAGLE

Recommendation: Overall seepage is less than anticipated and is not a concern for now. The inflow of water from the pond at Central Channel should be monitored.

Action: The monitoring and flow measurement of the seepages along the downstream toe will continue as a part of our regular inspection and routine during open water season.

Recommendation: Limited evidence of seepage is observed at the downstream toe of the North Channel, Channel 1 and Channel 3. The instrumentation data and field observations seem to indicate that seepage occurs at these locations but reports directly to the Pits instead of the downstream toe area. A 4-m pore water pressure raise was observed in the vicinity of Channels 1 and 2 and this area need to be closely monitored in the following years. The designer must be advised in the event of significant variations in accordance with the OMS manual.

Action: As the mining activities have ceased in the Goose pit, the water from the Bay Goose Dike seepage and from the groundwater inflows (not associated to Bay Goose Dike) are directed to Goose Pit as pumping is no longer required. Flooding rate is evaluated by scanning the Goose pit and monthly water volume evaluated with reflooding curve. The monitoring of the instrumentation and visual inspection of Bay Goose Dike are done on a regular basis and will continue. As per OMS, designer will continue to be contacted if anomalies are detected.

Recommendation: The piezometers in the North Channel show a pressure build-up with the drilling operations associated with the freezing of the nearby pit wall, which needs to be closely monitored to verify the interpretation of the freeze-back. The designer must be advised in the event of significant variations in accordance with the OMS manual.

Action: Close monitoring of the North Channel will continue during mining of Portage pit. As mining progress in Portage pit and the pit walls becomes exposed to cold weather, permafrost aggradation occur resulting in freezing of seepage path. This leads to pressure build-up behind the pit walls. This phenomena is common to all open pits at Meadowbank and was accounted for in the stability analysis. As per OMS, designer will continue to be contacted if anomalies are detected.



AGNICO EAGLE

2. TAILINGS STORAGE FACILITY

Recommendation: Regular visual inspection as well as collection and regular review of instrument data should continue for all structures within the TSF.

Action: Inspection of the TSF structures are conducted on a monthly basis and will continue.

2.1 Saddle Dam 2

Recommendation: Water was observed on the downstream side ponding within the rockfill embankment between Sta. 20+275 to Sta. 20+475 and should be monitored. The water is probably run-off water but should be sampled for chemical testing to prove it.

Action: The water ponding at the downstream toe of the SD2 structure is result of the accumulation of runoff water from snow melt and precipitations. The pond is pumped periodically whenever needed. The results of the thermistors located in Saddle Dam 2 are reviewed on a regular basis to detect any change or anomaly in temperature trends within the structure. No trend indicating changes in the thermal regime of Saddle Dam 2 have been observed to date. Foundation temperature remains in permafrost all year long, varying from -6°C to -7°C. Review of the thermistors results will continue. The water will be tested, if possible, for characterisation of quality in 2019.

2.2 Stormwater Dike

Recommendation: In April 2018, oblique tension cracks (up to 5 cm wide) were observed similar to the previous years. The cracks have been filed with bentonite after stabilization in the summer of 2018. The evolution of the zone should be monitored. In case of new cracks, measures indicated in the OMS manual should be implemented

Action: AEM will continue the monitoring of the dike with extensometers and prisms. Weekly visual inspection will continue to be conducted by trained personnel. In case of new cracks, measures indicated in the OMS manual will be implemented

2.3 Stormwater Dike

Recommendation: An assessment should be conducted as to whether the design criteria will still be met with a different final tailings elevation on both side of the dike. This can be done by the EoR but needs to be reviewed by the design engineer.

Action: AEM will do an assessment on how the performance of Stormwater Dike will be impacted in the long term with a tailings elevation difference on both side.



AGNICO EAGLE

2.4 North Cell Internal Structure

Recommendation: This structure was built during the summer of 2018 and has only been in operation for a short time at the time of the inspection. The water is flowing well toward the west side of Stormwater Dike, where water is transferred into the South Cell. The early stages of the deposition seem satisfactory. The pumping stations on the downstream side of the dike are in place and working as needed. The capacity to store the inflow design flood must be ensured during tailings deposition.

Action: AEM will do additional verification to ensure that the design flood can be stored in the North Cell during tailings deposition.

2.5 Central Dike

Recommendation: The following recommendation are made as a results of seepage from the South Cell ponding on the downstream side of Central Dike

- *continue maintaining a tailing beach against Central Dike*
- *promote beach deposition to seal assumed fractured bedrock areas expected to control the seepage under Central Dike*
- *control the hydraulic gradient by proper management of South Cell water pond and dike downstream toe pond*
- *Closely monitoring the water quality*
- *Inspecting the structure for changing conditions*

Actions: All of these recommendations are practice currently done by AEM to manage the Central Dike situation. These practices will continue to be done.

Recommendation: *It is recommended to clean the angular granular material in direct contact with LLDPE liner along the deposition points at Sta.1+050 and 0+280 approximately before resuming the deposition activities within the South Cell, in order to avoid pushing the angular material into the LLDPE which could cause punctures. A procedure should be prepared communicated to all concerned workers and added in the OMS manual.*

Actions: AEM will carefully clean the angular material around the deposition points on Central Dike and put in place a procedure to perform the works. That procedure will be incorporated in the next revision of the OMS manual.

2.6 Saddle Dams 3, 4 and 5

Recommendation:



AGNICO EAGLE

During the inspection, water was observed ponding on the downstream side of Saddle Dam 3 and Saddle Dam 4. As the downstream toe is higher than the South Cell pond, this water does not come from the TSF. It is important to maintain the water level on the downstream side lower than the granular layer of the upstream toe liner tie-in granular material to prevent uplift of the geomembrane. As the elevation of the downstream side is lower than the elevation of the granular material, this should not be a problem if the downstream water level is managed. The management of this water could be simplified by the construction of a sump, as indicated in the construction drawings, to direct the water in a low point. This was done for SD3.

Action: The sump presented on the plans issued for construction was built before the winter 2017 onset at the downstream toe of the SD3 structure. Water in the SD3 sump, as well as at SD4 and SD5 downstream areas is managed, at spring freshet and during open ice season, by pumping it back to the tailings pond. AEM will evaluate specific water level for which downstream water would be in contact with the LLDPE membrane and use this as a pond management strategy.

3. ALL-WEATHER PRIVATE ROAD (AWPR)

Recommendation: Regular inspections and maintenance of the road by AEM should continue. Consideration should be given to expand AEM's monitoring program to include all culverts and bridges along the road in order to assess whether they are providing adequate capacity during the freshet and following large precipitation events.

Action: AWAR road crews remove ice and snow from all culverts and bridges before the freshet. Some culverts were added to prevent road washout. A weekly environmental inspection is conducted on the AWAR which includes all the bridges and the culverts. Additional inspections on the bridges and culverts are also performed during the freshet period. Also, regular and event based inspection on fish bearing water crossings will continue with the Environment Department.

Recommendation: The erosion of the culverts is stable. The progression of the erosion of culverts PC-17A (8+830), PC-11 (39+552), R14 (67+840), R18-B (82+500), R-20 (85+490), R-23 (93+600) and R24 (98+100) should be monitored at freshet for any signs of progression or washout, as signs of water flowing beneath the road were observed at these locations.

Action: A weekly environmental inspection is conducted on the AWAR to inspect the bridges and the culverts. Additional inspections of the bridges and culverts are also performed during the freshet period to monitor signs of erosion and turbidity in the water. The Meadowbank Energy and Infrastructures Department also conduct inspections, especially during freshet period. Following the inspections, if work such as material placement for erosion control is deemed required around the culverts (stated in the above recommendation or for other culverts); the work will be completed by AEM.



AGNICO EAGLE

Recommendation: For some culvert locations, monitoring is recommended to see if flow occurs through the culvert (i.e. during the freshet). If insufficient capacity to handle the flows is observed, or water circulates under the road, then it is recommended to clear the obstructions or repair the culverts. Particular attention should be paid to R-00A (2+550), PC-14 (4+260), the unnamed culvert at 5+700, and PC-16 (54+950).

Action: AWA road crew removes ice and snow from all culverts and bridges before the freshet to ensure water flow. Some culverts were added to prevent road washout from occurring. A weekly environmental inspection is conducted on the AWA to inspect the bridges and the culverts and additional inspections are also performed during the freshet period. Following the inspections, if work is deemed required such as culvert repair or replacement to prevent road washout, the work will be completed by AEM.

4. AMARUQ ROAD

Recommendation: Obstructed and damaged culverts were observed at some locations: two outlets of the set of culverts #7 (2+013), #13 (4+615), two outlets of the set of culverts #47 (11+101 to 11+107), #61 (1+050), #63 (13+390), #83 (20+300), #86 (20+740), #97 (22+436), #98 (22+482), #111 (26+461), #117 (27+173), #278 (61+870). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert.

Action: In the process of these earthworks, the location of some culverts might change and some other might not even be required anymore. AEM is waiting for the final design of the production road to complete the planning of the work to be conducted on the culverts. In the meantime, a weekly environmental inspection is conducted on the Amaruq road to inspect the bridges and the culverts and additional inspections are also performed during the freshet period. Following the inspections, if work is deemed required such as culvert repair or replacement to prevent road washout, the work will be completed by AEM.

5. QUARRIES AND ESKERS

Recommendation: Presence of unstable blocks and loose rocks along steep walls was observed in Quarries 3, 7, 9, 10, 12, 16, and 23, as well as all eskers and quarries along the Amaruq road except Esker #5. It is recommended that workers be cautious in these quarries and are aware of the potential hazard.

Action: If deemed necessary, additional correction work will be completed in 2019 on the quarry walls. The AWA road crew will clean up unstable blocks and loose rocks should operations resume in those quarries.



AGNICO EAGLE

Recommendation: The North access of Esker #3 is built on a steep slope that seems undercut at its toe. It is recommended to change the access, as this poses an important geotechnical risk.

Action: The North access of Esker #3 that showed geotechnical instability was restricted and is no longer accessible to vehicle.

6. BULK FUEL STORAGE FACILITIES

Recommendation: Ponded water within the secondary containment cell was observed at the Baker Lake and Meadowbank main camp fuel tank farm. Removal of water should be managed to keep the water accumulation at a minimum near the tank foundation.

Action: Each year, the accumulated water is pumped out in accordance with the Type A Water License 2AM-MEA1526 (particularly after freshet and as needed during the open water season). Effluent must meet criteria stated in the License. After the water is pumped, each tank foundation is inspected. The containments are emptied following AEM's procedure "Water Discharge for the Fuel Storage areas".

Recommendation: The granular fill material protecting the geomembrane was eroded at Baker Lake due to wave actions in some areas, exposing the geomembrane. This condition was observed all along the south side of Tanks 3 and 4 and on the west side of Tank 1. It is recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection. Liner is exposed on the northern side of Tank 5. As this condition appears above the elevation of the southern berm, it is considered that the protection of the liner with granular material is not as important as in other areas; however, it remains a good practice and provides protection against animal damage. At the Meadowbank main camp tank farm, a portion of liner is exposed in the eastern corner of the containment area. The granular protection layer over this section should be repaired.

Action: Repairs on the geomembrane close to tanks 3 and 4 were completed each year since summer 2015 by qualified contractors whenever required. The protection of the liner at Tank 5 and at the Meadowbank main camp tank farm will be renewed by adding granular material.

Recommendation: A hole in the exposed geomembrane (300 mm diameter hole) was observed at Baker Lake on the south southwestern corner of Tank 3 at the toe of the slope. The hole in the geomembrane should be repaired to ensure a good performance of the retention basin. It is also recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection.

Action: Repairs will be done in 2019 and fill material added to re-established the liner protection.



AGNICO EAGLE

Recommendation: Animal burrows were observed at Baker Lake near the southern corner of Tank 2. It is recommended to assess whether the geosynthetics have been damaged.

Action: A geosynthetics assessment will be planned during next freshet season and geosynthetics will be repaired if required.

Recommendation: The embankments around the Baker Lake tank farm containment areas were stable. Tension cracks observed in the past on the upper bench north of Tanks 3 and 4 and south of Tanks 5 and 6 are disappearing. There were signs of water flow in this area.

Action: This area will be inspected regularly to make sure that tension cracks don't appear again.

Recommendation: The bituminous geomembrane around the tanks of the 20 Jet A fuel tanks at Baker Lake is damaged by the Jet A fuel (melting). It is recommended to remain vigilant during the freshet and throughout the year to manage water accumulated within the bermed area. It is recommended that AEM sample the liner for performance testing by a geosynthetics laboratory and take appropriate measures to protect the environment.

Action: Water accumulation is monitored on a regular basis during freshet and pumped out in accordance with the Type A Water Licence 2AM-MEA1526. The geomembrane was repaired during summer 2015. The Jet A tank farm is inspected regularly by the Environment and Energy and Infrastructures departments. The containments are emptied following AEM's procedure "Water Discharge for the Fuel Storage areas". AEM will look at the possibility of having the liner performance tested in an external laboratory.



AGNICO EAGLE

7. OTHER MEADOWBANK FACILITIES

7.1 Meadowbank Site Roads

Recommendation: Three culverts were installed on Vault Road (coordinate 640964E/7217466N). As previously observed in past annual inspections, these three culverts were partially collapsed in the middle and showed signs of erosion at the inlet. This is currently not a significant issue, but it is recommended to monitor these culverts at freshet to ensure that they provide sufficient capacity and that erosion is not occurring.

Action: The area has been regularly monitored since the installation of the culverts in 2013 and no issues were identified at the location in regard to water flow, quality or erosion. The same inspections will be performed during the freshet 2019.

Recommendation: Two culverts are installed on Vault Road (coordinate 639214E/7216189N). It was observed that the inlet of one of the culvert was entirely obstructed by rockfill and that the outlet of one of the culvert was partially obstructed while the outlet of the other culvert was broken. It is recommended to observe this area at freshet and to clear the obstructions if insufficient capacity to handle the flow is observed.

Action: As part of the freshet action plan, the area for the culverts located on the Vault Road between the diversion ditches and Lake NP1 is closely monitored during freshet period. Some work was completed around the culverts during summer 2015 to ensure proper flow and to minimize erosion. The same inspections will be performed in freshet 2019. If required, additional work will be performed in 2019.

7.2 Diversion Ditch and Sediment and Erosion Protection Structure

Recommendation: It is important that the erosion protection structures and sediments barriers be inspected during freshet season.

Action: The Diversion ditches as well as all structures and sediment barriers will be inspected during the 2019 freshet season as a part of the Freshet Action Plan.

7.3 Landfill & Contaminated Soil Storage and Bioremedial Landfarm Facility

Recommendation: The landfarm lies over a natural steep slope covered by rockfill as a pad made to operate the landfarm. The slope is considered at risk for high deformation to slope failure. The risk will increase as the water level in the South Cell raises. Signs of superficial slope failure were observed during the inspection. It is recommended to watch out for signs of instability and be prepared to close off the area if need be. Workers who access the area should be informed of the potential risk and be trained to recognize signs of instability.



AGNICO EAGLE

Action: The sign of instability are located in an area where material is stockpile and which is not accessible to worker. The workers accessing the landfarm area will be informed of the potential risks and be trained to recognize signs of instability.

7.4 Stormwater Management Pond

Recommendation: The geotechnical stability of the crusher ramp should be regularly inspected by AEM due to its proximity with Stormwater management pond.

Action: Inspection and monitoring of all Meadowbank site roads is performed on regular basis and will continue. No geotechnical issues have been identified on the crusher ramp since the beginning of its operation.