March 30th, 2018

M. Karén Kharatyan
Technical Advisor
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
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(867) 360-6338

Re: Meadowbank Water Licence 2AM-MEA1525 Part I, Item 11 – 2017 Annual Geotechnical Inspection Report

Dear M. Kharatyan,

Agnico Eagle Mine Ltd. received the report "*2017 Annual Geotechnical Inspection Meadowbank Gold Mine, Nunavut*". An electronically and paper copy of this report will be sent to your office via Xpresspost, as required by Water licence 2AM-MEA1525 Part I, Item 11, as an Appendix of the 2017 Annual Report due on March 31st, 2017.

Please consider the following information as the implementation plan to address the recommendations in Section 10.0 of the report.

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

Regards,

Agnico Eagle Mines Limited – Meadowbank Division

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Environmental Compliance Technician

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1. DEWATERING DIKES

Recommendation: The current versions of the Operation, Maintenance and Surveillance (OMS) Manual (AEM, 2017a), including the Emergency Preparedness Plan (EPP), and of the overall Emergency Response Plan (ERP) for the mine (AEM, 2017c) are dated March 2017 and June 2017. It is a good practice to keep these documents up to date.

Action: AEM will continue to keep the Dewatering Dikes OMS Manual up to date. Both manuals will be updated in February / March 2018, and presented with the Meadowbank Annual Report 2017.

1.1 East Dike

Recommendation: Regular monitoring and assessment of the monitoring data (piezometric, thermal, inclinometer, flow meter and seismograph) 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: The monitoring and data interpretation of the instrumentation at East Dike is done on a regular basis and will continue. A dewatering dike instrumentation report is prepared every quarter by the engineering department. Observation of broken or possibly frozen instrument are reported and recommendations are proposed for those instruments if deemed necessary.

1.2 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.

1.3 Bay-Goose Dike

Recommendation: The tension cracks observed in 2013 and 2014 on the upstream side within the thermal cap were still visible but are no longer active. The settlement within the thermal cap was observed but did not show any additional sign of movement since 2013. The area should continue to be monitored to make sure there are no aggravating conditions developing.

Action: The monitoring of the entire dike will continue on a regular basis, emphasis will be put on the spring freshet period. Visual inspection is performed every week during that period.

Recommendation: Regular monitoring and assessment of the monitoring data (piezometric, flow, thermal, inclinometer, and seismograph) 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. Once a piezometer has frozen, it cannot be relied upon even if it thaws.

Action: The monitoring of the instrumentation at Bay Goose Dike is done on a regular basis and will continue. A register of all the broken instruments is filed on a monthly basis in the Dewatering dikes instrumentation report.

Recommendation: Water ponds were observed at the downstream toe during the inspection. It is recommended to continue monitoring the elevation of these ponds and pumping out the water to allow for good visual inspection of the dike's downstream toe. The flow of pond 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.

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 daily routine during open water season.

Recommendation: North Channel, Channel 1 and Channel 3 should be carefully monitored and inspected. Limited evidence of seepage is observed at the downstream toe of these channels. The instrumentation and field observations seem to indicate that seepage is occurring at these locations but is directly reported to Bay-Goose Pit instead of the downstream toe area. The seepage being reported to Bay-Goose Pit should be included in the statistics of Bay-Goose Dike seepage statistics.

Action: Water inflow from the bedrock formations in the Goose pit (not considered as seepage) is coming from various locations around the pit and is not always associated with the Bay-Goose Dike. During mining operations at Goose pit, all the water from Goose pit was pumped into a collection sump and a flowmeter was installed on the pipe

between this sump and the discharge in the Attenuation Pond. Therefore, it was not possible to differentiate the quantity of water coming from underneath the dike (seepage) with the water coming from the groundwater (talik). As the mining activities have ceased in the Goose pit, the water from some seepage and from the groundwater inflows 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.

1.4 Vault Dike

Recommendation: Vault Dike was in good condition at the time of the inspection. The settlement and cracks observed in 2013 and 2014 were not noticeable anymore.

Action: The hole observed during the 2013 inspection was plugged before winter 2013 and no further issues were observed since then in the area. The inspection and monitoring of the structure of the dike is done on a monthly basis and will continue.

Recommendation: Regular monitoring and assessment of the thermistor data should continue.

Action: The monitoring and data analysis of the instrumentation at Vault Dike is done on a weekly basis and will continue.

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2. TAILINGS STORAGE FACILITY

Recommendation: The most current versions of the Operation, Maintenance and Surveillance (OMS) Manual (AEM, 2017e), including the Emergency Preparedness Plan (EPP), and of the overall Emergency Response Plan (ERP) for the mine (AEM, 2016c) are dated March 2017 and August 2017. It is a good practice to keep these documents up to date.

Action: AEM will continue to keep the TSF OMS Manual up to date. It will be updated in February / March 2018 and presented with the Meadowbank Annual Report 2017.

Recommendation: At the time of the inspection, the peripheral structures of the TSF North Cell had an adequate tailings beach against them. An adequate tailings beach was observed against the entire length of Central Dike.

Action: Inspection of the TSF structures and tailings beaches are conducted on a monthly basis and will continue. If ever required, the deposition plan can be quickly adapted to adjust deposition to promote tailings beaches.

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 1

Recommendation: The environment department should continue monitoring the water quality and share this information with the engineering department.

Action: The water quality is monitored at the downstream toe of Saddle Dam 1 (monitoring station ST-S-2). The water sampling is conducted monthly at ST-S-2 during open water season, as required by the Water License 2AM-MEA1525. The sampling results are reviewed by the environment department and shared with the engineering department.

2.2 Saddle Dam 2

Recommendation: Water was observed on the downstream side ponding within the rockfill embankment between Sta. 20+275 to Sta. 20+475.

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. Review of the thermistors results will continue.

2.3 Stormwater Dike

Recommendation: ***Several tension cracks associated with movement were observed on the crest Sta. 10+425, between Sta. 10+550 and Sta. 10+650, between Sta. 10+800 and Sta. 10+950, and around Sta 11+050 approximatively. These movements appeared in July 2017 shortly after water from the South Cell reached this sector and stabilized. The observed movements are happening in a sector where the dike was built on frozen soft sediment and were probably caused by the water thawing this soft layer. In 2016 and 2017 following these observations, movement monitoring instruments were installed on the crest of the dike (total of 4 extensometers and 19 prisms). The winter 2017 investigation at SWD confirmed that the most probable mechanism was the thawing of the soft sediment upon ingress of water within SWD foundation. The stability assessment using updated stratigraphy and geotechnical parameters indicated that use of rockfill stabilization buttress of a foundation failure is not required as the obtained factor of safety is above 1.5.***

Action: AEM will continue the monitoring of the extensometers and the prisms. Weekly visual inspection will continue to be conducted by trained personnel.

2.4 Central Dike

Recommendation: ***It is recommended to decrease the hydraulic head by lowering the water elevation with the TSF South cell, deposit tailing over the entire basin floor, and direct the ponds maximum head of water to an area providing better control above the bedrock surface, where the maximum anticipated lakebed sediment and till thickness are present.***

Actions: AEM will build the deposition plan that will conjugate the above recommendations along with the standard requirement of protecting the geomembrane with a tailings beach and maintaining a minimal pond volume for reclaiming water.

2.5 Saddle Dams 3, 4 and 5

Recommendation:

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.*

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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, 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.

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 (km 2+550), the culvert at 5+700, PC-14 (km 4+260), and PC-16 (km 54+950).

Action: AWAR 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 AWAR 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.

<u>Recommendation:</u> The inspected bridges and their embankments were in good geotechnical condition. Signs of settlement were observed at Bridge 6, R15. The bridge was dipping toward the western side on both abutment. The bridge foundation did not show signs of adverse conditions. It is recommended to monitor the situation.

> *<u>Action</u>: A weekly environmental inspection is conducted on the AWAR to inspect the bridges and culverts and additional inspections are also performed during the freshet period. The Meadowbank Energy and Infrastructure Department also conducts inspections, especially during freshet period. Following the inspections, if work is deemed required on a bridge structure or on its foundation, the work will be completed by Agnico.*

4. AMARUQ ROAD

<u>Recommendation:</u> The culverts were generally in good condition at the time of the inspection. Most culverts were unobstructed with no signs of erosion and no signs of damage to the culverts. Many culverts seem to have been installed rather high.

No signs of erosion were observed during the inspection. It must be noted that he culverts are newly installed and location where erosion could occur may not be identified yet. At culvert #194, the lack of rockfill layer may pose a risk of washout in the future. Signs of water flowing beneath the road were observed at culvert #167 (41+843). The progression of culvert erosion should be monitored at freshet.

Obstructed and damaged culverts were observed at some locations: two outlets of the set of culverts #47 (11+101 to 11+107), #61 (1+050), #70 (17+837), #83 (20+300), #86 (20+740), #278 (278). 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.

The inspected bridges and their embankments were in good geotechnical condition.

> *<u>Action</u>: Amaruq exploration road will be widened to its final width during winter 2018. 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 Agnico.*

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5. QUARRIES AND ESKERS

Recommendation: Most quarries have been cleaned since the 2015 inspection. Loose blocks and granular material have also been removed from the quarry walls. Slope remediation is in progress, but none of them were totally reclaimed. It is understood that AEM is developing a plan to progressively close some of the quarries along the AWPR while maintaining others to produce and store material supplies for ongoing road maintenance.

Action: The quarry reclamation along the AWAR is part of the Meadowbank Closure Plan. Reclamation activities for the quarries may occur during operations. The remaining reclamation activities for the quarries will occur during the closure period. As the AWAR will remain open during the closure and part of the post closure period, some quarries will remain open to supply material for ongoing road maintenance.

Recommendation: Presence of unstable blocks and loose rocks along steep walls was observed in Quarries 3, 7, 9, 10, 12, 16, and 23. 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 2018 on the quarry walls. The AWAR road crew will clean up unstable blocks and loose rocks should operations resume in those quarries.

Recommendation: Quarries 4 and 14 are flooded. It is understood that AEM is evaluating how best to eliminate the ponding of water within these quarries.

Action: During the weekly environmental inspections AWAR, the quarries are inspected. If actions are required for mitigation measures to control the water or to promote drainage, the Environmental department would advise the Energy and Infrastructures Department of actions to be taken. The water ponding at freshet or during the summer period in the quarries does not drain to any nearby watercourse. During previous summer periods (2014, 2015, 2016, 2017) no mitigation was deemed necessary as no significant amounts of water were observed in the quarries. During winter, the snow is also removed from the quarries to minimize water runoff at freshet within the quarry areas.

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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. Ongoing 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-MEA1525 (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, precipitations or other physical factors, thus 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.

Action: Repairs on the geomembrane close to tanks 3 and 4 were completed each year since summer 2015 by qualified contractors whenever required.

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.

Action: Repair has been done in 2016 by the dewatering crew, as mentioned in the AEM responses to the 2016 Annual Geotechnical Inspection.

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. Tension cracks were observed on the crest of the northern slope of the containment area of Tanks 5 and 6. Sloughing of the granular cover material occurred and exposed the geomembrane. The geotextile was torn and fallen down the slope. A 300 mm deep depression was also observed on the crest above the exposed geomembrane. There were signs of water flows in this area. Several holes of approximately 10 cm x 10 cm were present near the top of the slope. It is recommended that this area be reworked so that the degradation does not worsen.

Action: In the spring period when the area will be cleared of snow and the ground will be thawed the E&I department will evaluate the above mentioned deficiencies and take the corrective measures needed to address the degradation observed. Environment department will be advised to ensure that the work completed meets the expectations requested in this inspection report.

Recommendation: The geomembrane remains uncovered around the tanks of the twenty Jet A fuel tanks at Baker Lake. It is recommended to remain vigilant during the freshet and throughout the year to manage water accumulated within the bermed area.

Action: Water accumulation is monitored on a regular basis during freshet and pumped out in accordance with the Type A Water Licence 2AM-MEA1525. 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".

Recommendation: A 3 m long tension crack was observed at the Meadowbank Main Camp tank farm on top of the subexcavated area behind the fuelling station. It is recommended to monitor this area for changing conditions.

Action: Monitoring of the tension crack will continue to be observed. Corrective work will be completed if deemed necessary from the results of the inspections.

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7. OTHER MEADOWBANK FACILITIES

7.1 Meadowbank Site Roads

<u>Recommendation</u>: 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.

> *<u>Action:</u> 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 2018.*

<u>Recommendation</u>: 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.

> *<u>Action:</u> 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 2018. If required, additional work will be performed in 2018.*

7.2 Diversion Ditch and Sediment and Erosion Protection Structure

<u>Recommendation</u>: No geotechnical concerns were observed with this structure.**It is important that the erosion protection structures and sediments barriers be inspected during freshet season.**

> *<u>Action:</u> The Diversion ditches as well as all structures and sediment barriers will be inspected during the 2018 freshet season as a part of the Freshet Action Plan.*

7.3 RSF Till Plug

No geotechnical issues were observed with the RSF till plug.

7.4 Diffuser

In 2017 the diffuser at Wally lake (Vault) was relocated in a deeper part of the lake and is functioning normally.

7.5 Landfill & Contaminated Soil Storage and Bioremedial Landfarm Facility

Another Landfarm Facility is now located north of Central Dike, within the South Cell. This structure was developed in 2017.

No geotechnical concerns related to the landfill or the landfarms were identified at the time of the inspection.

7.6 Stormwater Management Pond

Recommendation: No geotechnical concerns were identified regarding the Stormwater Management Pond, or the crusher ramp located nearby. 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.*

7.7 Airstrip

No geotechnical concerns were identified with the airstrip.