Technical Memorandum

Date: **May 15, 2017**

To: **NIR, NWB, AEM**

From: **Luis Manzo P.Ag**

Re: **J170047 – Meliadine Annual Report Review – 2BE-MEP1318 +2BB MEL1424**

---

1. Introduction

Kivalliq Inuit Association Requested GeoVector Management Inc. and Hutchinson Environmental Sciences Ltd. (HESL) review the 2016 Meliadine Annual Report required under Agnico Eagle Mine Ltd.'s 2BB-MEL1424 Water Licence on behalf of the Kivalliq Inuit Association (KIA). This Annual Report was provided to the Nunavut Water Board on March 25, 2017 and included the following appendices:

- Appendix A: 2016 Daily Freshwater Usage
- Appendix B: 2016 Volumes of Mine Water Pumped from Underground
- Appendix C: 2016 Monitoring Data Tables
- Appendix D: Letter to KWB/KIA – Meliadine Portal Area – Water Quality Monitoring in Lake A54
- Appendix E: Updated Management Plans
    - Landfill Design and Management Plan Water Licence 2BB-MEL1424
        - Appendix A: Government of Nunavut Environmental Guidelines
            - Environmental Guideline for Waste Asbestos
                - Environmental Protection Act
            - Safety Act: Asbestos Safety Regulations
            - Asbestos Containing Materials
            - Government and Industry Contacts
        - Environmental Guideline for Ozone Depleting Substances
            - Environmental Protection Act
        - Government and Industry Contacts
- Appendix F: 2016 Consultation Log IIBA Project Effects Report

Our comments and recommendations are presented in Section 2 of this memo, and our conclusions are presented in Section 3.

2. Review of Annual Report and Recommendations

AEM is required to file an Annual Report for the Meliadine Gold Project under its Nunavut Water Board License. The report must address the following information:

- Freshwater quantities obtained from Meliadine Lake;
- Quantity of water pumped from underground;
- Waste rock volumes;
- Environmental sampling data;
- Infrastructure modifications;
- Unauthorized discharges;
- Management plan updates;
- Restoration liability;
- INAC Inspection reports;
- Summary of drilling activities;
- Abandonment and restoration;
- Board requested studies;
- Public consultation; and
- Waste and water requests.

These requirements are outlined through the Type B Water Licence associated with Meliadine exploration (2BB-MEL1424) activities.

General Comments

No introduction is provided in the Annual Report. Without context, it is difficult for the reader to understand the basis of the report. Note that introductory text was included in the 2015 Annual Report.

Recommendation #1: Please include introductory text to provide the reader with more context including site location, purpose of activities, etc.

Freshwater Quantities

The annual total volume of freshwater taken from Meliadine Lake in 2016 was 14,938.7 m^3. Average daily water withdrawal was well below the Type B Water License daily limit (299 m^3/day), averaging approximately 41 m^3/day over the twelve-month period. Water usage did not exceed the limit on any reported day over the course of the monitoring year.

No further comments.

ater Quantity Pumped from Underground

The annual total volume of mine water pumped from underground in 2016 was 6,764 m^3. Flow volume was underestimated in July as the *"flow meter stopped working and monthly volumes were not accurately recorded."* (p. 4) We note that a degree of uncertainty is acceptable with this July value as it is a measurement internal to the project area representing volume of pumped from the underground mine to the surface and does not discharge directly to the environment. Flow from the underground to the surface does not have regulatory implications.

Waste Rock Volumes

In 2016 100,271 m^3 of run-of-mine rock was used for construction and 11,852 m^3 of rock was placed in the waste rock storage facility. AEM reports that, "*44,263 tonnes of ore is currently stockpiled on site*" (p. 4).

No further comments.

Environmental Sampling Data

Environmental sampling data are summarized in Appendix C, which presents the results of the water quality monitoring at the Meliadine mine in 2016. Monitoring data for MEL-6, MEL-7, MEL-8, P1, P2, P3, DP3-A Base and DP1-Base are presented. MEL-6, MEL-7 and MEL-8 are located within the receiving environment; measured concentrations are compared to environmental guidelines. Containment Ponds P1, P2, P3 and DP3-A are within the project footprint and are sampled through the surveillance monitoring program; measured concentrations are not regulated but used to help understand and manage site water. MEL-6 was sampled on three occasions in June, September and October; Mel-7 was sampled through out the entire year approximately weekly; and Mel-8 was sampled once in June. Containment Ponds P1, P2 and P3 were sampled 20 times between May and June at an approximately weekly frequency. Dikes P13-A Base and P1-Base were sampled 14 times between June and November; most samples were collected monthly with increased frequency around freshet (June) and in the fall (September). pH and oil and grease were not within the defined limits of 2BB-MEL1424 Part D, Item 11 for MEL-7 on two and three occasions respectively. Total suspended solids (TSS) was above the defined limits of 2BB-MEL1424, Part D, Item 14 for MEL-8. Some but not all deviations from the Water Licence limits are discussed under the Unauthorized Discharge section of the Annual Report.

The data are summarized in tables in Appendix C, but are not supported by text to explain or interpret results. Several items are unclear in the tables:

1. Some cells have been left blank or contain three dashed lines or the letters ND, but there is no explanation of what these descriptors mean (e.g., not sampled that date, not detected or measurement or lab error?);

2. A map of the sample sites was not included in the main body of the report. Please include a figure with all sample locations labelled.

3. The table of results for MEL-7 had multiple formatting issues making the table difficult to read and understand; the columns were too narrow causing data to be displayed in a column, no borders or columns were used to distinguish cells, samples above limits were not consistently highlighted, font size changed throughout the table, and no legend or supplemental notation was provided to explain the comments within cells (i.e. bad weather delay).

4. Sample location descriptions were inconsistent raising the question as to whether site locations were consistent from event to event.

5. The AEM report states, "*MEL-8 parameter was sampled at spring behind the pile of metal. That pile was been clean off, and the landfill has been constructed in the fall, I would think it applied. Nontheliess here are the results*." (p.41). The note is unclear if the results were intended to be included in the report and how they should be interpreted.

pH was below the 2BB-MEL1424 Part D, Item 11 Limits (6.0) on two sampling dates at MEL-7. A single non-compliance with pH was discussed in Section F-"Unauthorized Discharges" in the Annual Report (p. 5). Oil and grease was above the 2BB-MEL1424 Part D, Item 11 Limits (5 mg/L) on three occasions at Mel-7. Oil and grease non-compliance was discussed in Section F-"Unauthorized Discharges" in the Annual Report (p.5). These parameter exceedances were not highlighted or discussed in Appendix C.

Recommendation #4: Please address the five issues listed above and include an interpretation of the results to improve the clarity of the information presented in the Appendix C tables. Interpretative text should include a detailed discussion of all parameter exceedances including potential reasons for the exceedances, potential impacts on the receiving environment, and action taken to reduce measurements to acceptable levels (i.e., below limits).

No water quality data is provided for MEL-1, MEL-2, Pond A13, Pond A15, Pond A9, Lake A54, Pond A38, Stream A8-7 and Meliadine River. Data from these sites were presented in the 2015 annual report.

Recommendation #6: Please provide all water quality data collected in 2016, or provide an explanation why data was not collected from particular sites.

Infrastructure Modifications

Fuel Storage Facility

In AEM's 2015 Annual Report, it was stated, "*In 2016, there will be four 50,000 litre fuel tanks added for fuel storage*" (p.8). This information was not provided in the 2016 Annual Report.

Sewage Treatment Plant

In AEM's 2015 Annual Report, it was indicated that construction took place in January 2016 to prevent unfiltered wastewater from bypassing the filtration and UV system. The report also stated, "*Construction began upgrades to the "disinfection loop" portion of the STP (completed 2015 at the beginning of 2016)*" (p.9). None of these infrastructure modifications were included in AEM's 2016 Annual Report.

Recommendation #7: Please include all infrastructure modifications that took place in 2016 and updates on those which were indicated in the 2015 annual report as occurring in the following reporting year.

Unauthorized Discharges

AEM reports that, "*On February 14 2016, pH measured was 5.94 and as per water license, the allowable range is 6.5-9.0*" (p. 5). According to the water quality data presented in Appendix A for MEL-7, the non-compliance measurements occurred on January 4th, 2016 (5.97) and February 8th, 2016 (5.94).

The actions taken by AEM (addition of a pH adjustment pump and batch drum) appear to have resolved the pH non-compliance issue. The deviations from the pH limit were not large and the immediate actions taken by AEM to resolve the issue are considered prudent.

Oil and grease measurements were not within the limits determined by 2BB-MEL1424 Part D, Item 11 for MEL-7 on three different occasions; March 2nd, 2016 (33 mg/L), May 2nd, 2016 (782 mg/L) and December 5th, 2016 (75 mg/L). AEM reports that the incident on March 2nd occurred due to maintenance. Follow up actions included discussions with Maintenance personnel to complete work appropriately and prevent future oil and grease spills. Communication with the Maintenance Department is deemed necessary, it would also be prudent to discuss specific methods/actions that will be taken in the future to prevent increased oil and grease concentrations during maintenance work.

AEM reports that, "*On May 5 2016, oil and grease concentration was measured at 782 mg/L*" (p. 5). According to the water quality data presented in Appendix C for MEL-7, the non-compliance measurement occurred on May 2nd, 2016. AEM suggests the high oil and grease concentration measured was due to analysis error and provides the following rationale (p. 5):

> *"i. when sampled, no sheen was observed on the sample;*
> *ii. there has never been an analysis received with oil and grease that high ever;*
> *iii. no major maintenance has been completed in the STP;*
> *iv. no major breakdowns occurred in the STP;*
> *v. The STP-IN (sewage before treatment), taken for internal purposes, did not have a value that would reflect such high oil and grease result."*

Based on the evidence provided the assessment appears valid. It is suggested that the concentration of oil and grease measured in the STP-IN be included in the investigation.

Recommendation #8: Please clarify the dates of the pH and oil and grease non-compliance measurements.

Recommendation #9: Please include specific actions that can be taken to prevent increased oil and grease concentrations during maintenance.

AEM reports that oil and grease was measured at 75 mg/L on December 5th, 2016 at the MEL-7 site, but that the cause was not identified as of this report. Investigation into the oil and grease non-compliance measurement on December 5th, 2016 is still on going.

Recommendation #10: Please ensure results of the investigation are included in the 2017 annual report.

In a note to the Nunavut Water Board (NWB) and the Kivalliq Inuit Association (KIA) dated March 17th, 2016, AEM reported a trend in increased chloride concentrations starting mid-June 2015 in Lake A54 and Containment Pond P1. Coinciding trends were interpreted as a change in source loading of chloride to Containment Pond P1 and the establishment of a new pathway of water transfer from Containment Pond P1 to Lake A54. AEM noted that chloride concentrations in Lake A8 (a fish bearing lake) had also increased in sync with P1 and A54 chloride concentrations, but had remained below the CCME guideline of 120 mg/L. Similar trends were also observed in ammonia in the three identified waterbodies. The source of the ammonia and chloride was believed to be underground mine activities, salt used in drilling, high salinity groundwater, explosives, surface stores of chloride and snow management. AEM described five actions that had been initiated to understand the trends and contain and/or treat the source. These actions included:

1. More intensive sampling of underground sources;
2. Review of explosive practices;
3. Increased storage capacity in Containment Pond P1 and drainage basin;
4. Elimination of surface sump and re-routing of all water to Containment Pond 1 and
5. Review and improve management of surface calcium chloride storage and potentially containment snow.

AEM indicated they would provide continued updates about the situation to NWB and KIA.

The KIA requested HESL to review the letter prepared by Golder Associates on behalf of AEM in April 2016[1]. HESL agreed with Golder's hypothesis that the source of elevated chloride and ammonia in the receiving environment was primarily Containment Pond P1 and its associated drainage basin. HESL also supported Golder's interpretation of the results, which concluded that the probable source of the increased chloride and ammonia concentrations were from underground mine activities. HESL indicated that a review of explosive practices and elimination of the surface sump were prudent actions, raised several concerns with AEM's monitoring program and highlighted the need to address the source of the chloride and ammonia.

Since HESL's review AEM completed construction on four temporary water containment structures on May 10th, 2016; installed a water management pumping system and installed three evaporators on June 28th, 2016. Water quality samples were collected from P1 on a weekly basis during the open water season. Concentrations of chloride collected between May 22nd, and August 7th increased. Total chloride was not measured during the second half of 2016. Between August 9th and October 4th, dissolved chloride was measured and decreased from the summer high over the remainder of the open water season. Ammonia was measured on all sample dates, un-ionized ammonia was only measured between May 22nd, and July 5th and on August 7th.

AEM has provided follow up to these elevated concentrations in the 2016 annual report, outlining that there was an increase in chloride concentrations in both 2015 and 2016 in containment ponds P1 and P3, in Lake A54, Lake A38 and Lake A8. Historic chloride concentrations were plotted for each waterbody in Figures 2 through 5 of the Annual Report. The CCME maximum long term and short term guidelines are mislabeled (reversed) in each one of the figures. The CCME maximum Short Term guideline is 640 mg/L and the Long-Term guideline is 120 mg/L. Chloride concentrations exceeded both the Short Term and Long Term CCME guidelines in Lake A54 and A38 and containment ponds P1 an P3.

AEM reports that, "*A similar trend in chloride concentrations was seen in Pond A38 downstream of Lake A54*" (p.6). AEM also reports that, "*At Lake A38 similar chloride concentrations were measured in 2016 (717 mg/L in August) as in 2015 (897 mg/L in September)*" (p.6). It is unclear if waterbodies described are the same or two separate locations.

Water chemistry for Lakes A54, A38 and A8 were not included in Appendix C. See Recommendation #6.

Recommendation #11: Please clarify name of water bodies, correct figure labelling, and provide a discussion on the potential impacts of the chloride exceedances on the receiving environment.

AEM reports that ammonia concentrations increased in 2015 and that ammonia concentrations in containment pond P3, Lakes A54, A38 and A8 were above background concentrations, but lower than 2015 concentrations in 2016. Concentrations were not compared to CCME guidelines for ammonia.

Unionized ammonia is known to be more toxic than ammonia to aquatic biotic. Therefore, un-ionized ammonia concentrations should be calculated, discussed and compared to CCME guidelines. Un-ionized ammonia concentrations were not consistently reported for P1 or P3 in Appendix C. Un-ionized ammonia concentrations reached as high as 1.4 mg/L in P1 and 2.03 mg/L in P2 which are both above the CCME long-term guideline of 0.019 mg/L. Un-ionized ammonia was not compared to CCME guidelines in Appendix C.

Recommendation #12: Please compare ammonia concentrations to CCME guidelines in text, figures and tables, or present all ammonia concentrations as their un-ionized equivalent as determined from field temperature and pH measurements. Both ionized and un-ionized ammonia should be reported in all tables in Appendix C.

Include a discussion of all un-ionized ammonia results in the body of the report.

Recommendation #13: Please provide a detailed discussion on the potential impacts of un-ionized ammonia guideline exceedances on the receiving environment.

AEM reports that four temporary containment structures were constructed in 2016 in response to the trend of rising chloride and ammonia levels in Containment Pond 1, Lakes A54, A38 and A8. As indicated in our 2016 review of AEM's proposed response, we are concerned that the contact water within these containment structures will eventually need to be released. In addition, development of containment structures does not deal with the source of the chloride or ammonia to Containment Pond P1 from the rockfill platforms.

[1] *Hutchinson Environmental Sciences Ltd. 2016. Adverse Water Quality Trends in Meliadine Portal Area. Prepared for the Kivalliq Inuit Association.*

AEM reports that, "*construction continued with the installation of the water management pumping system and the three evaporators which were completed on June 28, 2016*" (p.6). If the water management pumping system eliminated the sumps and re-routed all water previously pumped from sump 1 to Containment Pond 1 this would be considered a prudent response to the rise of chloride and ammonia. The installment of the three evaporators may not be sufficient to create sufficient capacity for Containment Pond P1 to accommodate contact water during freshet. In addition, evaporators do not address the source of the chloride and ammonia to Containment Pond P1 and will cause both parameters to increase in concentration within Containment Pond P1 over time. Any flow from Containment Pond P1 to downstream waterbodies is likely to contain elevated concentrations of both parameters.

Recommendation #14: We suggest AEM install shallow piezometers downstream of the surface water sump toward Pond P1 to determine the quality of water moving through the active layer and install piezometers in the vicinity of the waste rock piles to monitor subsurface seepage, including water quality.

Appendix E Management Plan Updates

Only the Landfill Design and Management Plan and Landfarm Management Plan were included in Appendix E: Management Plant Updates. In AEM's IIBA Project Effects Report, it is reported that, "*addendums to the Water Management Plan and Borrow Pits and Quarries Management Plan…were updated*", (p. 4). The updated addendums to the Water Management Plan and Borrow Pits and Quarries Management Plan were not included in Appendix E for review.

Recommendation #15: Please include all management plans that have been updated in 2016 as part of the annual report.

Landfill Design and Management Plan

Section 1.3 Location of the Landfill

AEM states that "*Based on the above criteria, a landfill is planned east of Lake B7 as shown on Figure 1- 1*" (Appendix E, p. 4). Figure 1-1 of Appendix E does not have Lake B7 labelled.

AEM states that, according to the Mine Site Reclamation Guidelines for the Northwest Territories landfill, "*sites that drain into areas where water will be collected and monitored as part of the overall site plan are preferred*." (Appendix B, p. 4). But AEM states that "*Drainage patterns are poorly defined in the upper reaches of the H basin and are only active during spring freshet and during large rain events*." (Appendix B, p. 4). The landfill is located in H drainage basin. It is not clearly stated if the location meets the Mine Site Reclamation Guidelines for the Northwest Territories since the drainage in this basin is poorly defined.

Recommendation #16: Please label all areas referenced in the text on the corresponding figures.

Recommendation #17: Please clearly indicate if the landfill is in a location that the water will easily drain and be collected in accordance with: Indian and Northern Affairs Canada, 2006. Mind Site Reclamation Guidelines for the Northwest Territories.

Section 3. Plan for the On-Site Disposal of Solid Waste

AEM states that, "*Any point of discharge or runoff from the landfill will be sampled and analyzed for parameters as per NWB LIC# 2BB-MEL1424 Part D Item 14*" (Appendix B, p. 6). The frequency of sample collection is not indicated nor is a list of parameters for sample analysis provided.

Recommendation #18: Please provide a specific monitoring plan for the landfill including sample location, frequency, duration and sample parameter list.

Section 3.1 Waste Acceptable for Placement in Landfill

AEM indicates that white goods are acceptable for placement in the landfill. White goods are not defined within the Landfill Design and Management Plan. White goods could include refrigerators and air conditioning units which may contain ozone depleting substances.

Recommendation #19: Please define white goods or place restrictions on white goods to ensure ozone depleting substances are not disposed of in the landfill.

Section 3.1 Total Volume of Waste

AEM states that, "*If it is further assumed that the density of this solid waste is 0.5 tonnes/m3, then 200 to 400 m3 of waste would need to be landfilled each year over the four year life of the landfill*" (Appendix B, p. 10). In section 1.1 Project Overview AEM states that, "A 2 year landfill life has been assumed, November 2016-November 2018." (Appendix B p. 1). The life of the landfill is not consistent throughout Appendix E.

Recommendation #20: Please clarify and be consistent with the expected life of the landfill.

Section 3.4 Incinerator Ash Testing Protocol

AEM states that, "*Ash samples will be collected and tested annually, or upon a significant change in the source or type of material sent to the incinerator*" (Appendix B, p. 10). A definition of what constitutes a significant change is not indicated nor is the method by which incinerator disposal will be monitored to determine changes in source or material. Parameters to be tested are also not included in the incinerator ash testing protocol.

Recommendation #21: Please refer to the Incinerator Management Plan and define what constitutes a significant change in disposal source of material. Please clarify if these are the same protocols as proposed for the Meliadine Type A Water Licence included in the Incineration Management Plan.

Section 5. Landfill Conceptual Operations Plan

AEM provides a list of materials which are acceptable for disposal at the landfill and indicates that no attendant is required at the facility as trucks will haul waste to the landfill.

No further comments.

Section 6. Conceptual Closure Plan

AEM states that "*Contact water from the landfill in closure will continue to be managed using best management practices*" (Appendix B, p. 15).

Recommendation #22: Please describe the anticipated best management practices.

Appendix E Landfarm Management Plan

AEM's Landfarm Management Plan states that soils contaminated with light petroleum hydrocarbons (PHCs), such as diesel and gasoline, will be treated in the on-site Landfarm. Soil "*contaminated with heavy hydrocarbons (e.g., hydraulic fluid or grease) will need to be segregated, packaged, and shipped south for treatment and/or disposal*" (p. 92 of Appendix E). Section 3.1.1 of the Plan, however, notes that hydraulic oil and lubricating oil are both acceptable for treatment in the Landfarm. As such, there is uncertainty as to what types of contaminated soils will be accepted at the Landfarm. Further to this, AEM states that if "*the contaminated source is unknown, soil samples will be analyzed for PHCs and possibly additional contaminants prior to placement in the Landfarm*" (p. 97 of Appendix E).

Recommendation #23: Please provide a clear definition of what types of contaminated soils will be accepted into the Landfarm. In the case where the contamination source is unknown, it is recommended that the soil also be analyzed for BTEX, metals and PAH in addition to PHCs (F1-F4 range).

As part of AEM's Landfarm Management Plan, coarse-grained soil is separated from fine-grained soil through sieving, and the coarse and fine-grained soils are separately stored/treated in the Landfarm. The Plan defines coarse-grain as greater than 2.5 cm. Section 3.5.3 states that PHC odours from the coarse-grained soils will be monitored using a photoionization detector (PID), and "*when PHC odours are no longer detected, the material will be removed*…" (p. 101 of Appendix E).

Recommendation #24: In addition to the use of a PID, appropriate confirmatory sampling and laboratory analysis should be employed before removing coarse-grained soil from the Landfarm.

The Landfarm does not have a surface water drainage system. Instead, water that has accumulated in the Landfarm is pumped through a water filtration system (to treat for PHCs and total suspended solids) and, if the water meets the discharge criteria from AEM's water licence (Licence 2BB-MEL1424), then it is released to the environment. It is unclear if the water is pumped manually, or if water management in the Landfarm is governed using a submersible pump with level switches or other such automated pumping device. It is unclear what happens if the treated water does not meet the discharge criteria.

Figure 3-1 in the Landfarm Management Plan shows an aerial photograph of the Landfarm area. In this photograph, several large ponded areas are visible in the northwest, west and southeast corners of the Landfarm. Water should not be allowed to excessively pond in the Landfarm because the presence of the water will inhibit the remedial processes within the soil pile. Furthermore, ponded water could attract birds to the Landfarm.

Recommendation #25: Water should not be allowed to excessively pond in the Landfarm; water should be pumped either manually or automatically from the Landfarm once it reaches a prescribed level. It is also recommended that a bird deterrent method be employed to prevent birds from landing in the potentially PHC-contaminated water within the Landfarm.

Please clarify how water that does not meet AEM's water licence discharge criteria is handled?

Although the Landfarm is bermed, a snow fence and armouring the berm with uneven boulders is recommended to deter wildlife and mine workers from inadvertently entering the Landfarm. Further, the Landfarm should have appropriate signage to inform workers and others about the Landfarm, entry protocols, potential dangers, etc.

Recommendation #26: For health and safety and to keep wildlife out of the Landfarm, appropriate fencing and signage are recommended at the Landfarm.

Section 2.2.2 of the Landfarm Management Plan notes that groundwater is estimated to reach 1.5 m [below ground surface] in October. The Landfarm has an impervious liner; however, soil movement and tilling activities could potentially compromise the liner. As such downgradient groundwater monitoring, in the vicinity of the Landfarm, should be conducted on a set frequency to confirm containment of impacted water.

Recommendation #27: Conduct confirmatory groundwater sampling to confirm containment of impacted water.

Section 2.5.2 of the Landfarm Management Plan describes the soil sampling plan to determine the progress

for completion of remediation (i.e., confirmatory sampling) as consisting of two composite samples per sub-cell. One composite will consist of three grab surface samples and the other composite will consist of three grab samples at a 1 m depth. Quality Assurance/Quality Control sampling measures are not discussed in the report.

Recommendation #28: It is recommended that sampling QA/QC measures be included in the Landfarm Management Plan. This should include a defined number or percentage of blind duplicate samples to be collected.

Recommendation #29: It is recommended that information on: health and safety procedures and protocols pertaining to the Landfarm; decontamination of soil movement equipment procedures; and winter Landfarm management be included in the Landfarm Management Plan.

Restoration Liability

No comments.

INAC Inspection Reports

Under section F – Unauthorized Discharge Summary, AEM reports that, "*on July 20 2016, it was noted by the INAC inspector that a trench adjacent to Lake H13 was dug but not backfilled*" (p. 6). No section was included in the Annual Report which was dedicated to Indigenous and Northern Affairs Canada inspections. Note that this was included in the 2015 Annual Report.

Recommendation #26: Please include a brief description of follow-up action taken to address concerns detailed in INAC inspection and compliance reports prepared by the Inspector. If no inspections occurred, please indicate that in the Annual Report.

Summary of Drilling Activities

AEM completed 48 surface drilling holes in 2016, 33 of which were geotechnical holes for the portal entrance and to delineate the forthcoming pit.

No comments.

Artesian Flow Occurrences

No artesian wells were intercepted in 2016.

No comments.

Reclamation Work

In section K of the Annual Report AEM states, "*a description of all progressive and/or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of operations*" (p. 16). No photographic records were included in the report.

Drilling

Under Part F, Clause 3 of the 2015 Annual Report, AEM states that "*drill holes shall be immediately sealed and permanently capped to prevent induced contamination of groundwater or salinization of surface waters*" (p. 15). However, AEM reports that, "*hydrogeology holes were partly or completely cemented*" (2016 Annual Report, p. 16). It is not clear why some holes were only partly sealed with cement. This incomplete filling could lead to contamination of groundwater or surface waters, and poses a safety risk to Inuit and wildlife travelling on the land. Guidance in this section also appears to be in contradiction to the "Reclamation of Drill Sites" described in section 6 of Appendix B Interim Reclamation and Closure Plan in the 2015 Annual Report. The KIA encourages AEM to take an active approach to Abandonment and Restoration.

Recommendation #25: Please include all photographic records of reclamation work undertaken.

Recommendation #26: We recommend that AEM provide active restoration of drill sites by promptly backfilling drill holes with aggregate or plugging the holes with bentonite. All holes should subsequently be permanently capped and covered with the proposed fertilizer for revegetation, or peat moss and the status of closure activities for each drill hole documented in the annual report. This will remove the safety hazard posed by the hole and encourage revegetation of the sites.

Board Requested Studies

No comments.

Public Consultation

No comments.

Waste and Water Requests

No comments.

IIBA Project Effects Report

The IIBA Project Effects Report is a replicate of "Unauthorized Discharge" section of the Annual Report with the addition of information regarding extracted esker material inadvertently encroaching beyond the boundary of the quarry lease. The NWB was informed of the infraction of November 3rd, 2016 and addendums were made to the Water Management Plan and Borrow Pits and Quarries Management Plan.

AEM intends to transfer water from ponds H17 A, B and C to H17 (CP1) before the 2017 freshet. AEM's action are proportional to the infraction.

Please see :"Unauthorized Discharges" Recommendations 8 to 14 on pages 5 to 7.

3. Conclusions

In general, the 2016 Meliadine Annual Report is substandard. We identified numerous sections of the report, that had incomplete, missing or conflicting information (e.g., Water Quantity Pumped from Underground, Environmental Sampling Data, Infrastructure Modifications, Unauthorized Discharges, Water Management Plan, INAC Inspection Reports, and Reclamation Work) or that required more detailed discussion and interpretation of findings (e.g., with respect to the receiving environment, how the source of the increased chloride and ammonia in Containment Pond P1 will be addressed). While the project appears to be operating in a way that does not result in undue impact on the receiving environment, the lack of information and discussion in these sections makes it difficult to fully evaluate whether all potential impacts of the mine are being adequately monitored. These considerations should be addressed in future annual reports for the Meliadine Project.

4. Closing

We hope this memo meets your current needs. Should you have any questions, please do not hesitate to contact Lands Department to arrange conference call to review the concern you made have in our comments.

Luis Manzo P.Ag,
Director of Lands
Kivalliq Inuit Asociation
dirlands@kivalliqinuit.ca