Technical Memorandum

Date: **May 17, 2018**

To: **Nunavut Impact Review Board (NIRB)**

From: **Kivalliq Inuit Association – Luis Manzo**

Re: **J180039 – Meliadine Annual Report Review – Meliadine Gold Project, NIRB Project Certificate 006**

1. Introduction

Agnico Eagle Mines Ltd.'s (AEM) Meliadine Gold Project is subject to various authorizations, leases and permits from regulatory agencies including the Nunavut Water Board, Indigenous and Northern Affairs Canada, the Kivalliq Inuit Association (KIA) and the Nunavut Impact Review Board (NIRB). AEM is required to prepare an annual report on Meliadine mine activities under the NIRB Project Certificate No. 006. KIA request to GeoVector Management Inc. and Hutchinson Environmental Sciences Ltd. (HESL) review the 2017 Meliadine Gold Project Annual Monitoring Report for NIRB Project Certificate 006 on behalf of the KIA. This Annual Report was provided to the NIRB on April 9, 2018 and included the following appendices:

- Appendix A: Air Quality Monitoring Report
- Appendix B: Noise Monitoring Report
- Appendix C: Annual Geotechnical Inspection Report and Agnico's Response to the Recommendations
- Appendix D: Geochemical Monitoring Results – Saline Pond
- Appendix E: Tabular Summary of Water Quality Data
- Appendix F: Aquatic Effects Monitoring Report
- Appendix G: Environmental Effects Monitoring Cycle 1 Study Design
- Appendix I: Marine Mammal and Seabird Observer Logs
- Appendix K: List of Public Consultations
- Appendix L: Updated Management Plans
- Appendix M: Compliance Update with Terms and Conditions of Project Compliance
- Appendix N: AWAR Traffic Log.

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

2.1 General Comments

AEM has annual reporting requirements for the Nunavut Water Board (NWB), Fisheries and Oceans Canada (DFO) harmful alteration, disruption or destruction (HADD) Authorization; Indigenous and Northern Affairs Canada (INAC) land Leases and KIA Right of Ways.

We request a single harmonized annual report be prepared that includes reporting requirements for all authorizations.

Recommendation #1. AEM should produce a single comprehensive report for the NWB, NIRB, DFO, INAC and KIA that satisfies reporting requirements of all authorizations. We note that this approach was taken for the Meadowbank 2016 Annual Report. A consolidated document meeting all annual reporting requirements for the project increases the ease of review and ensures all contextual information is provided in a single location.

2.2 Section 2. Summary of Activities Undertaken in 2017

In 2017 Meliadine was in active construction stage. Pre-development construction activities undertaken in 2017 include the following:

- Construction of:
  - Dike D-CP1
  - Dike D-CP5
  - Permanent effluent water treatment plant and diffuser into Meliadine Lake
  - CP-1 AND CP-5 Jetties
  - Landfarm
  - Landfill
  - Emulsion Plant
  - Ventilation and emergency egress east intake and west exhaust
  - Channels 1,5,7 and 8
  - Berm 1
  - Berm 3
  - Culvert 2
  - Gazboy [sic]
  - Meliadine site fuel farm storage facilities
  - Second portal
  - Rankin Inlet Bypass Road
  - Fuel farm and laydown area
- Start of Multi-year construction of
  - Permanent Power Plant
  - Process Plant
  - Paste Plant

  - Multi-services building
- Installation of Telecommunication Tower
- Commissioning of:
  - Emulsion Plant
  - Sewage Treatment Plant
  - Fresh Water Treatment Plant
- Portal ramp advancement
- Fuel farm and laydown area
- Identification the location of an ATV trail and obtained the HTO's approval of the location.

Note that all activities are listed here as provided by AEM. However, a map of the annual site changes would help provide additional context within the scope of ongoing environmental management and mitigation activities.

Recommendation #2. AEM should provide a map of all activities undertaken during the reporting year.

2.3 Section 3. Atmospheric Environment Monitoring

2.3.1 Section 3.1 Air Quality Monitoring

In 2017, dustfall was monitored at seven locations and nitrogen dioxide and sulphur dioxide were monitored at two locations. Although measured dustfall has increased since 2012 in conjunction with increased site activity, no exceedances of Alberta's Ambient Air Quality Guidelines for recreational areas have been recorded at sample locations. Similarly, no exceedances of the Government of Nunavut Ambient Air Quality Standards or the FEIS maximum predicted values have been observed in nitrogen dioxide or sulphur dioxide concentrations. Greenhouse gas emissions were below the FEIS maximum predicted emission rate in 2017.

AEM had planned to monitor suspended particulates in 2017, but technical problems with equipment prevented collection of data. Monitoring for suspended particulates will thus begin in 2018. A new incinerator was installed in 2017 but stack testing was not possible because, as stated by AEM, the incinerator stack was incorrectly installed prohibiting a sampling probe from being inserted in the chamber. AEM plans to fix the problem so that stack testing can be initiated in 2018.

No comment

2.3.2 Section 3.2 Noise Monitoring Program

AEM began outdoor noise monitoring at four locations at the Meliadine site in 2016. In 2017, three of these locations recorded 24-h equivalent sound levels below predicted FEIS levels and below the site's noise monitoring criterion of 45 dBA. One station (station NPOR006 located off the mine site, but within the area of effect) recorded exceedances of the FEIS predicted levels in July and September and exceedance of the site criterion in July. AEM suggests that excess noise recorded at this site may have

been due to noise arising off site from a neighbouring cabin. AEM states that it will modify monitoring in 2018 to elucidate whether off site activities are contributing to sound exceedances at the NPOR006 monitoring location. AEM does not provide details on how the monitoring program will be altered to address this issue.

Recommendation #3. AEM should provide a more thorough review of potential reasons for the higher than predicted noise at station NPOR006.
Recommendation #4. Please provide details in the text of the Annual Report on how the noise monitoring program will be adjusted to determine the contribution of noise from external activities or locations (e.g., the cabin).

AEM states that night-time noise monitoring has a design target of 40 dBA for points 1.5 km from the site study area in remote areas. However, all assessed points of reception (i.e., monitoring locations) are less than that distance from the site. It is not clear why AEM has not included any monitoring locations at least 1.5 km from the site to enable accurate assessment of whether the night-time design target of 40 dBA is maintained.

Recommendation #5. Please explain why there are no noise monitoring locations at least 1.5 km from the site. We recommend that at least one location at least 1.5 km away be added to enable accurate night-time noise monitoring.

2.4 Section 4. Geotechnical and Permafrost Monitoring

2.4.1 Section 4.1. Geotechnical and Permafrost Monitoring

AEM conducted geotechnical monitoring of structures designed to withhold water or waste. In 2017 existing structures monitored on site included water collection ponds and associated dikes, a saline pond, diversion channels and associated berms, as well as landfarms and landfills.

Each year a third-party consultant also carries out a comprehensive geotechnical inspection on site. In 2017 Golder Associates completed this inspection. AEM provides Golder's report and AEM's response in Appendix C of the Annual Report. However, no information is provided in the text of the Annual Report itself on Golder's findings or recommendations, nor AEM's responses. The Annual Report should stand on its own as a summary of all monitoring and inspection activities conducted at Meliadine in 2017. Consequently, it should contain summaries of all results and interpretations provided in the appendices, not simply directions to review the appendices for this information.

Recommendation #6. Please include a summary of Golder's main findings and recommendations from its geotechnical inspection, as well as a summary of AEM's responses in the Annual Report text.

AEM states that thermistors were used to monitor permafrost and survey monuments were used to track settlement of dikes. The settlement data is summarized in the text, but no information is provided on thermistor data.

Recommendation #7. Please include a summary of the thermistor data in the Annual Report text, including interpretation of temperature profiles provided in Appendix C.

2.5 Section 5. Geochemical Monitoring

Geochemical sampling was conducted on surface rocks and underground rocks. One of the surface rock samples (G26) was considered Potentially Acid Generating (PAG).

The amount of surface rock tested was not quantified and the specific source of the PAG surface rock was not identified.

Recommendation #8. AEM should quantify the amount of rock tested and characterized as Non-Potentially Acid Generating (NPAG) and Potentially Acid Generating (PAG). Agnico should also note the source of rocks tested.

One surface rock sample was designated as PAG, however it is unclear what proportion of samples tested this one sample represents.

Recommendation #9. AEM should provide a summary of the proportion of PAG, NPAG and uncertain rock found during sampling.

Agnico indicates that material from the stockpile that contains the PAG sample rock will not be used by Agnico in the future.

Recommendation #10. AEM should provide a description of how the results of the waste rock designation modify waste rock management.
Recommendation #11. AEM should also indicate if there were signs of acid drainage in seeps from this rock pile.

Geochemical monitoring results were not compared to the FEIS predictions or how the results were used to re-evaluate rock disposal practices.

Recommendation #12. AEM should provide a comparison of its results with the FEIS predictions and an explanation of how it re-evaluated rock disposal practices in order to incorporate preventative and control measures into the Mine Waste Management Plan.

2.6 Section 6. Surface Water and Freshwater Environment

2.6.1 Section 6.1 Site Water Quantity Monitoring

The freshwater treatment plant was commissioned in March 2017. Monthly withdrawals of water from Meliadine Lake under license 2AM-1631 ranged from 288m^3 in March to 2,216m^3 in September. The total annual withdrawal was 14,863m^3, well within the Licence limit of 62,000 m^3.

No comment

Monthly water withdrawals under license 2BB-1424 ranged from 947m^3 in January to 2,829m^3 with an annual total of 18,229m^3. well within the Licence limit of 105,850 m^3.

No comment

No dewatering activities took place at Meliadine in 2017.

No comment

2.6.2 Section 6.2 Site Water Quality Monitoring

In 2017 water quality samples were collected on a regular basis from the following stations: MEL-6, MEL-7, MEL-8 (water license 2BB-1421) and MEL-SR-1 TO MEL-SR9, Channel 5, Culvert 3, DCP1 Downstream, DCP5 Downstream and MEL-17. Site water quality results were included in Appendix E.

The location of the monitoring sites was not provided. Individual sampling calendars were not provided for the various sites. No interpretation of the results was provided within the annual report.

Recommendation #13. A map of all monitoring sites should be provided.
Recommendation #14. Sampling calendars for each site monitored should be provided in the annual report.
Recommendation #15. Parameters monitored at each site should be described within the annual report.
Recommendation #16. AEM should provide a summary of the results obtained from their monitoring programs. Discussing exceedances and ecological relevance of parameters monitored.

Tables containing monitoring data have blank cells, cells with dashes, cells highlighted in yellow, red, black and orange. Not all text in tables is legible.

Recommendation #17. Tables in appendices should include a legend to help with data interpretation.

2.6.3 Section 6.3 Aquatic Effects Monitoring Program

Water quality in Meliadine Lake and the peninsula lakes in 2017 was similar to water quality in 2015 and 2016. The whole AEMP report was included in Appendix F.

Section 2.2 of the Aquatic Effects Monitoring Plan (AEMP) indicates that construction activities were initiated at the Mine in October 2016. Therefore, only data collected between 2015 and October 2016 should be considered baseline.

Under the same section Golder confirms that, "*the sewage treatment plant, landfarm, freshwater intake, and effluent discharge associated with the Type A water Licence (2AM MEL 1631)*" were in use in 2017.

Recommendation #18. In the AEM report it should be specified when the "preconstruction" and "construction" phases occurred at the mine site to assess what data can be considered baseline.

Under ice water quality sampling occurred in 2016 and 2017. Since the mine was under construction in 2017, it suggests that under ice baseline data has only been collected for one year (2016).
Section 3.1.4 of the AEMP describes the calculation of normal ranges for water quality parameters for Meliadine Lake. Open-water conditions were based on 2016 and 2017 data collected from the reference areas and ice-covered normal ranges were based on data collected at the Mid-field area. According to the AEMP Design Plan (Golder 2016)[1] the baseline range will be *"calculated based on available baseline data"*. Data was collected within Reference Area 2 in the summer and fall of 1997, the winter and summer of 1998 and the summer of 2008. In addition, data was collected within Reference Area 3 in the summer and fall of 1997 and the winter, summer and fall of 1998 (Golder 2012)[2]. These data should be included in the normal range calculation.

Construction at the mine site started in October 2016, therefore the mine began a new mine life stage at this point entering the "construction" phase. Therefore, data collected in 2017 should not be considered "baseline data".

Recommendation #19. Water quality normal ranges for open water and ice-covered conditions should be recalculated using available baseline data and should avoid the use of data collected during the construction phase of the mine.

Section 3.2.1 of the AEMP reports that 22 quality control samples were collected and that 7.5% of paired concentrations in duplicate discrete water quality samples differed by more than 20%. There was no explanation of how these results were used to inform future analysis.

Recommendation #20. Please indicate what proportion quality control samples make up of the entire sample program.

[1] *Golder Associates Ltd. (Golder) 2016. Meliadine Gold Project, Nunavut. Aquatic Effects Monitoring Prograqm (AEMP) Design Plan 6513-REP-03 Version 1. P. 108*
[2] *Golder Associates Ltd. (Golder) 2012. SD 7-1 Aquatics Baseline Synthesis Report, 1994 to 2009 – Meliadine Gold Project, Nunavut. P. 970*

Recommendation #21. Please indicate how results of the QAQC program influence future analysis of data.

Section 3.3.1.1 in the AEMP considers the range in pH values to be 6.6 to 8.3, but states that values exceeded the CWQG for the protection of aquatic life in 8% of samples and exceeded the DWQG in 40% of samples. The CWQG for the protection of aquatic life is 6.5 to 9, given the stated range it suggests that no values exceeded the CWQG.

Recommendation #22. The range should include values that are above or below guideline values. Allowing the reader to understand the extent of the exceedance.
Recommendation #23. The locations of the exceedance should be noted.
Recommendation #24. A possible explanation for the exceedance should be provided as well as an appropriate explanation or response framework.

Section 3.3.1.1 in the AEMP notes that, "similar conductivity values were observed in 2015 and 2016".

Recommendation #25. It should be specified if specific conductance or conductivity were measured.

Section 3.3.1.2 of the AEMP describes calculation of water quality summary statistics for Meliadine Lake using data from 2015 to 2017. Data collected between 2015 and October 2016 occurred during the preconstruction phase of the mine. Data collected between October 2016 and 2017 occurred during the construction phase of the mine. Data collected during different mine life phases should not be combined, especially sites that may be influenced by the various phases (i.e. the nearfield site).

Recommendation #26. Summary statistics should clearly distinguish pre and post-construction phase data.

Section 3.4.1 of the AEMP report notes that median open water concentrations of TDS, calcium, sodium, magnesium, chloride, sulphate, arsenic iron, manganese and nickel at the near-field site were above the upper boundary of the normal range. Median ice-covered concentrations of ammonia, total arsenic, copper, iron, manganese, molybdenum, nickel and uranium at the near-field site were higher than the upper bound of the normal range. According to the aquatic monitoring response framework outlined in the AEMP Design Plan (Golder 2016) an example of a low action level includes, *"increasing trend toward conditions outside of baseline or normal range."* Examples of responses for low level actions include:

- AEMP best practices
- Confirm Low Action Level trigger
- Compare to FEIS predictions
- Prepare a response plan
- Investigate further to identify contributing factors from the mine
- Examine ecological relevance
- Identify potential mitigation options
- Increase monitoring

- Re-evaluate benchmark and revise if necessary
- Set Moderate and High Action Levels
- Establish new stations if the plume appears to be moving faster and farther than expected

None of the above steps were taken.

Recommendation #27. Water quality results from the 2017 monitoring program should be compared to FEIS predictions and response framework triggers and the ecological relevance of each triggered parameter discussed.

Section 4.1.4 of the AEMP report indicates that normal ranges for sediment quality were calculated using baseline data collected from the near-field, mid-field and reference areas in 2015 and 2016 and that normal ranges may be re-defined in future responses to allow for the inclusion of additional monitoring data. According to the AEMP Design Plan (Golder 2016) normal ranges are to be calculated using all available baseline data. Construction at the mine site began in October 2016, therefore the mine entered a new phase in the mine life, the construction phase. Data collected after October 2016 should no longer be considered baseline data, because construction on site may affect water quality and sediment quality at the near-field and mid-field sites, preventing its use in the calculation of normal ranges. In addition, sediment quality data had been collected in 1998 and 2008 within Reference Areas 2 and 3 and close to the near-field site (Golder 2012). These data should be incorporated into the calculation for normal ranges for sediment quality.

Recommendation #28. Sediment quality normal rangers should only include baseline data collected in 1998, 2008, 2015 and 2016.

Section 5.3.3 of the AEMP report described nutrient enrichment at the near-field site,

"instances of slightly higher concentrations of TP, dissolved phosphorus and orthophosphate in the Near-field area compared to other sampling areas during sampling events from 2015 to 2017. The median TP concentration in 2016 was slightly higher in the Near-field area compared to other sampling areas, and these differences were found to be statistically significant. The plankton component also reported higher chlorophyll a concentrations and phytoplankton biomass in the Near-field area compared to other areas. These results suggest a potential slight nutrient enrichment effect in the Near-field area compared to other sampling areas."

Phytoplankton is not currently part of the aquatic monitoring response framework despite being included within the ongoing aquatic environment monitoring.

Section 7.3.1.1 of the AEMP report also described nutrient enrichment at the near-field site,

"A significant trend of increasing total nitrogen was observed in each exposure area in September, along with a significant increase in nitrogen from previous years in August 2017 in the Near-field exposure area."

Concentrations of total phosphorus significantly increased from previous years in September 2017 in each exposure area"

Recommendation #29. Due to nutrient enrichment at the Near-field site, low level action responses should be put into place. These include ensuring AEMP best practices are being used; preparing a response plan; investigating contributing factors; identifying potential mitigation options and increasing monitoring.
Recommendation #30. Periphyton should be added to the aquatic monitoring response framework for nutrient enrichment.

Section 6.3.2.1 in the AEMP reports,

"As the Near-field and reference areas were sampled in different years, it could not be determined whether differences reflected spatial or interannual variation in size-at-age (i.e., it could not be determined whether growth rates were higher at the Near-field area when compared to the reference areas, or whether growth rates were higher in 2015 when compared to 2017). Sampling effort also varied among sampling areas."

Recommendation #31. It is recommended that fish sample collections occur within the same year to avoid attempts to differentiate temporal versus inter-annual variation.
Recommendation #32. Sampling effort should be standardized across sites to reduce variation between samples due to sampling effort.

Section 8.1.1 of the AEMP report notes that only the near-field and mid-field areas were sampled under ice.

Recommendation #33. All sites (Near-field, Mid-field, and the three reference sites) should be sampled under ice to establish the extent of nutrient enrichment.

Section 8.1.4 of the AEMP reports the abundance of a fish parasite and how it has the potential to confound the detection of changes in energy storage and reproductive endpoints.

Recommendation #34. An explanation of how fish parasites will influence interpretation of fish health data should be provided.

2.6.4 Section 6.4 Water Quality Under Metal Mining Effluent Regulations (MMER)

Meliadine Mine was triggered under the MMER in 2016 after dewatering of Lake H17. The Cycle 1 study design was submitted to Environment Canada in August 2017; the study will be completed in 2018. The Environmental Effects Monitoring (EEM) Cycle 1 Study design was provided in Appendix G of the annual report.

Under section 3.0 of the Metal Mining Effluent Regulations Plan (Golder 2017)[3] Golder has used a lethal fish survey and a non-lethal fish survey as a surrogate to the recommended standard adult fish surveys using two sentinel species. While alternates are acceptable under the Metal Mining Environmental Effects Monitoring (EEM) Technical Guidance Document (TGD; EC 2012)[4], the authorization officer must be notified without delay.

Recommendation #35. We recommend AEM provide documentation that the authorization officer has been notified as an appendix to the Annual Report to demonstrate compliance with requirement under MMER.

2.6.5 Contact Water Quality, P-Area

Chloride and ammonia concentrations were elevated in 2015 and four temporary water containment dikes were constructed in response, creating three containment ponds which are now collectively referred to as "P-Area". Three evaporators, drainage ditches and water pumping systems were installed within P-Area in 2016-2017. Data between August 2016 and 2017 were provided in figure format. Data prior to August 2016 were not included due to changes in laboratories used to analyse water samples.

Recommendation #36. AEM should include data from 2015 to 2017 despite the change in laboratories to help illustrate if the management initiatives have been successful in maintaining and reducing high concentrations of chloride and ammonia in runoff.
Recommendation #37. AEM should provide a discussion on any concerns relating to merging the data from the three laboratories.
Recommendation #38. Total ammonia concentrations should be converted to unionized ammonia concentrations to assess the toxicological impacts of potential discharges to the receiving environment.

According to AEM,

"*Median CP5 chloride concentration post-Jul 2016 was 1,600 mg/L (range: 1,100 – 2,200 mg/L) and prior to late-August 2017 was 1,300 mg/L (range: 730 – 2300 mg/L). Following August 2017, the median chloride concentration at CP5 increased to 4,300 mg/L (range 400 – 440 mg/L).*"

The time frame referred to within the results description is vague and confusing – "post-Jul 2016" is included in "prior to late August 2017".

Recommendation #39. Please be specific when referring to time frames.

Temperature and pH are discussed in the annual report with regards to the P-Area. However, they are not used to calculate un-ionized ammonia (the most toxic form of ammonia) and provide a comparison to the relevant CCME guideline.

[3] *Golder Associates Ltd. (Golder) 2017. Meliadine Gold Mine – EEM Cycle 1 Study Design. P. 34*
[4] *Environment Canada (EC) 2012. Metal Mining Technical Guidance for Environmental Effects Monitoring. Cat. No.:En14-61/2012E-PDF ISBN 978-1-100-20496-3.*

Recommendation #40. Temperature and pH measured at the same time as water quality sample collection, should be used to calculate un-ionized ammonia concentrations in A54, A38 and A8 to evaluate if elevated ammonia concentrations could be considered toxic.

2.7 Section 7. Terrestrial Wildlife and Wildlife Habitat Monitoring

AEM states that all employees and contractors must report wildlife sightings in wildlife logs posted throughout the Meliadine site. These observations, including information on problematic interactions, wildlife surveys along the All Weather Access Road (AWAR), caribou migration and operational shut downs related to caribou migration, aerial observations by helicopters, and on site audits, are reported monthly to the Government of Nunavut, the Rankin Inlet Hunters and Trappers Association and the KIA. AEM does not provide any information on these observations for 2017 in the Annual Report or its appendices.

Recommendation #41. Please include a summary of wildlife sightings on the Meliadine site for 2017, including information on problematic interactions, AWAR wildlife surveys, caribou migration and any associated operation shut downs, helicopter observations, and on site audits.

AEM hired Golder to conduct wildlife and vegetation monitoring programs in 2017 under the Terrestrial Ecosystem Monitoring and Management Plan (TEMMP). In 2017 the first TEMMP Annual Report was produced to summarize data collected and describe natural and mine-related changes in wildlife populations observed through the program. AEM states that the full text of the 2017 TEMPP Annual Report will be included with the 2017 Annual Report but it does not appear in the appendices and is not summarized in the text of the Annual Report.

Recommendation #42. Please include the 2017 TEMPP Annual Report as an appendix to the 2017 Annual Report and summarize its main findings and interpretations in the Annual Report text.

2.8 Section 8. Marine Mammal and Seabird Observer (MMSO) Program

AEM initiated the MMSO Program in 2017. No information on the program's protocol is provided in the Annual Report. AEM states that complete sightings records are provided in Appendix I. This is the raw data of sightings, and is lacking summary, analysis and interpretation of observations. It is not possible to evaluate the effectiveness of the MMSO Program without this information.

Recommendation #43. Please explain the MMSO protocol and provide a summary of the MMSO Program findings for 2017, including an analysis of any trends or patterns and interpretation of results within the context of assessing potential mine-related impacts on marine mammals and seabirds.

2.9 Section 9. Socio-Economic Monitoring

2.9.1 Archaeology Monitoring

AEM states that the complete Archaeological Impact Assessment and Mitigation Report for 2017 will be included in the 2017 Annual Report but it does not appear in the appendices and is not summarized in the text of the Annual Report.

Recommendation #44. Please include the Archaeological Impact Assessment and Mitigation Report as an appendix to the 2017 Annual Report and summarize its main findings and interpretations in the Annual Report text.

2.9.2 Consultations

AEM provides a list of public and regulatory consultations in Appendix K however there is no information provided on the main topics of discussion or concern, nor outcomes of these meetings either in Appendix K or the Annual Report.

Recommendation #45. Please provide additional information on the content of each consultation listed in Appendix K, as well as outcomes of each of these meetings, in the text of the Annual Report.

2.10 Section 10. Updates of Management Plans

Updated Management Plans were included in Appendix L. These plans included:

- Borrow Pits and Quarries Management Plan
- Environmental Management and Protection Plan
- Explosives Management Plan
- Freshet Action Plan
- Groundwater Management Plan
- Hazardous Materials Management Plan
- Incineration Management Plan
- Landfarm Management Plan
- Landfill Management Plan
- Mine Waste Management Plan
- QA/QC Plan
- Road Management Plan
- Spill Contingency Plan
- Water Management Plan

All updated management plans contained a “Document Control” page which included the version number, date, section, page, revision reason and author. Some document control pages, were not completely filled out and were missing the section, or pages that had been altered. Other document control pages

had very vague responses for the revision reason and the author. Without this information it is difficult to determine what has been updated in the plan.

Recommendation #46. AEM and their subcontractors should ensure that document control pages of each plan, report or manual are filled out completely and that specific reasons for the revision are provided and that all authors are identified.

2.11 Section 11. Permitting, Inspections and Compliance

2.11.1 Section 11.1 Active Permits

A list of active permits and authorizations for Meliadine Gold Project issued by KIA, NWB, NIRB, GN, GN-CGS, Nunavut Airports and Hamlet were provided.

No Comment

2.11.2 Site Inspections

A list of 11 inspections/site visits/audits completed by regulators at Meliadine in 2017 was provided in Table 10-1 of the annual report. Feedback/Outcome information was provided for inspections and site visits where deficiencies were found. Feedback/Outcome information was detailed in items 1 through 7. Recommendations pertaining to each of these items is below:

Item 1, detailing the INAC March 23, 2017 inspection details an exceedance of ammonia effluent quality limits. An internal investigation was carried out and the 3rd party water treatment consultant was contacted to develop an action plan to improve effluent quality. This response was provided to INAC on May 25, 2017. A summary of the action plan was not included in the annual report.

Recommendation #47. AEM should provide a summary of the actions taken to reduce effluent ammonia concentrations as described in their action plan. The action plan should also be provided as an Appendix in the annual report.

Item 2, detailing the INAC April 10, 2017 inspection of a diesel fuel spill indicated that INAC requested additional information regarding, clean-up and mitigation actions. The response was provided to INAC on May 5, 2017. No summary was provided on the actions taken to clean-up or mitigate the spill.

Recommendation #48. AEM should provide a summary of the clean-up and mitigation actions taken to address the diesel fuel spill.

Item 3, detailing the ECCC August 2-3, 2017 inspection indicated that corrective actions are planned for spring 2018. The corrective actions expected to be taken were not included.

Recommendation #49. Please provide details on what the corrective actions entail and when they are expected to come into place.

Item 5, detailing the GN regional manager/conservation officer site visit on October 19, 2017 indicated that wildlife training had been provided for Meliadine AEM environment department personnel. Also, environment technicians were to attend a firearms course in 2018.

Recommendation #50. AEM should indicate what specific training has been provided for the environment department personnel.

Item 6, details the INAC inspector visit on October 18-20, 2017 and requests for a rigorous monitoring program at the exploration STP, decommissioning of the snow cell within P-area and implementation of the Freshet Action Plan for 2018. Additional sampling was conducted at the STP and the snow cell is expected to be removed in 2018.

Recommendation #51. AEM should provide specific details with regards to the additional sampling including what parameters were sampled and the frequency of sampling.
Recommendation #52. AEM should provide an expected date for the decommissioning of the snow cell within P-area.

Item 7 detailed the INAC written warning dated November 17, 2018 about the repeated exceedances of effluent limits at the exploration STP. Agnico suspended effluent discharge to the environment and began treating all effluent at the main camp STP. Extensive clean-up, maintenance and an upgrade of the plant was completed. AEM reports that the quality of the effluent is substantially improved and in compliance with effluent limits. The clean-up actions taken were not included in the report, nor was the maintenance or corresponding upgrades to the plant.

Recommendation #53. AEM should provide the information regarding the clean-up actions taken, as well as identify what maintenance and upgrades were performed at the exploration STP.
Recommendation #54. AEM should provide a summary of the improvements in the report text and an Appendix showing tabular format of the sampling completed before and after STP upgrades with inclusion of the effluent limits.
Recommendation #55. AEM should confirm the date that treated effluent began being discharged into the CP1.

2.11.3 Section 11.3 Compliance with Terms and Conditions of Project Certificate

Term and Condition No. 57 indicates that, *"Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes: a. An examination for trends in the measured natural variability of Valued Ecosystem Components in the region relative to the baseline reporting; b. A detailed analysis of wildlife response to operations with emphasis on wildlife behaviour, mortalities and displacements (if any), and responses to operations of the all-weather access road and associated access roads/trails; c. A demonstration and description of how the monitoring results, including the all-*

weather access road and associated access roads/trails contribute to cumulative effects of the project; and d. Any proposed changes to the monitoring survey methodologies, statistical approaches or proposed adaptive management stemming from the results of the monitoring program."

AEM's response was, *"In 2017 the project was in construction stage, evaluation and assessment of observed trends in Valuable Environmental Components was not feasible."*

Recommendation #56. AEM should provide an explanation as to why the review was not completed, because there was sufficient project activity to interact with the stated VECs satisfied.

Term and Condition No.68 it states, *"The Proponent shall demonstrate consideration for the potential cumulative effects of other development projects and shipping activities (including community resupply) when assessing their cumulative effects on marine birds in the Hudson Strait, in its annual report."* AEM's response was, *"Not yet addressed."*

Recommendation #57. AEM should provide an explanation as to why the assessment was not completed, because there was sufficient project activity to interact with the stated VECs.

2.11.4 Section 11.4 Responses to NIRB's Recommendations

A summary of estimated versus predicted traffic volumes was provided in Table 11-4. Actual traffic exceeded predicted traffic, however there were no exceedances of Alberta's Ambient Air Quality Guidelines.

No comment.

2.12 Section 12. 2018 Workplan

The construction phase will continue in 2018. AEM has indicated that activities will include:

- Construction of dikes, saline water treatment plant, channels, berm, crusher and pad, and second tank farm;
- Completion of permanent power plant, multi-services building and Rankin Inlet bypass road;
- Continuation of work on paste plant and process plant;
- Installation of permanent freshwater intake;
- Advancement of portal ramp;
- Drilling activities;
- AWAR operation, inspection and maintenance;
- Inspection and maintenance of watercourse crossings during freshet, and after heavy or prolonged rainfall events; and

- Snow removal and management.

No comment.

3. Conclusions

In general, the 2017 Meliadine Annual Report does not meet the requirements stipulated by NIRB and the needs of the KIA. We identified numerous sections of the report, that had incomplete or missing information (e.g., A lack of noise monitoring locations at least 1.5 km from the site; summary of the thermistor data; wildlife sightings; summary of the MMSO Program findings for 2017; etc.) or that required more detailed discussion and interpretation of findings (e.g., containment of increased chloride and ammonia concentrations from P-Area). 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 Richard Nesbitt of Hutchinson Environmental Sciences Ltd. (richard.nesbitt @environmentalsciences.ca or at 519-576-1711). We would be happy to answer any questions you may have.

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