

TECHNICAL REVIEW
OF
MELIADINE GOLD PROJECT
2018 ANNUAL REPORT

Prepared By:



KIVALLIQ INUIT ASSOCIATION

June 12, 2019

Prepared For:

NUNAVUT IMPACT REVIEW BOARD

Executive Summary

The Kivalliq Inuit Association (KivIA) completed a technical review of Agnico Eagle Mines Limited's (AEM) "Meliadine Gold Project, 2018 Annual Report". The KivIA review has the following recommendations.

The 2018 Annual Report for the Meliadine Gold Project represents a significant improvement from the previous year. Many issues raised by the KivIA in previous years have been addressed. The KivIA further commend AEM on their proactive approach to spills at the Itivia site and the progress being made towards future discharges of saline water into Melvin Bay rather than Meliadine Lake.

From the information provided within the 2018 Annual Report, it appears Meliadine is predominantly operating in such a way as to minimize impacts to the freshwater and marine aquatic environment. Where a trend in spills or other impacts has been observed, AEM has generally taken a proactive approach to preventing future occurrences or potentially deleterious impacts. However, the Project still needs to get significantly better at preventing and minimizing these spills. The KivIA recommends that AEM lower the reportable spill limit by 50% which would help develop a better culture of preventing and minimizing spills of hazardous materials.

However, the KivIA disagrees with AEM's conclusion that observed aluminum concentrations at the diffuser in Meliadine Lake were the result of laboratory error and have requested additional investigations as to the cause of the observed impacts within Meliadine Lake. The KivIA is further concerned with AEM's treatment of sediment analysis and the implications of not meeting data quality objectives for nutrients in select sampling events. The KivIA has further highlighted the need for iterative improvements in environmental management for the marine environment and additional monitoring with which to evaluate any future impacts stemming from saline discharges into Melvin Bay. Failure to address these concerns may decrease the likelihood mine related impacts are promptly identified and addressed in the future as Meliadine proceeds towards full production.

The 2018 Terrestrial Effects Monitoring and Mitigation Program (TEMMP) Annual Report provides a brief overview of the different methods for monitoring caribou and other wildlife and does a good job presenting work stoppage numbers. While it is clear that AEM, working with KivIA land use inspectors, the HTO, community, and government, is taking essential steps to protect caribou, there are no data presented on caribou observations or collar movements, nor the types of monitoring that triggered enhanced mitigation. A comparison between caribou data provided in the annual reports for Meadowbank/Whale Tail and Meliadine shows clear differences in reporting between the two mines. Given that in most recent years caribou come through the Meliadine area during July when cows and calves are highly vulnerable to disturbance and stress and given the traffic volume in 2018 exceeded what was expected and stated in the FEIS by

nearly twice as much, the KivIA recommends that the TEMMP reporting must be far more rigorous. The objectives state in part that “*Adaptive management will be implemented if the Project impacts exceed the predictions*” (S 2.0, pg 9). Rigorous reporting is required to enable effective adaptive management of caribou and other wildlife at the Meliadine Project.

The KivIA recommends that the current (2018) TEMMP report (Appendix H-6) be rejected and be revised to include systematic and detailed caribou observations and collar data, details of the frequency and type of monitoring and systematic records of the triggers that resulted in increased mitigation (e.g., work stoppages).

The KivIA also recommends that AEM establish a Terrestrial Advisory Group (TAG) similar to the TAG in place at Meadowbank/Whale Tail, that will be able to assist AEM to develop sound and systematic TEMMP reporting to demonstrate how AEM’s adaptive management of wildlife, especially caribou, is working.

Table of Contents

1.0	Introduction.....	5
2.0	Summary of 2018 Meliadine Gold Project Activities.....	5
3.0	Summary of Review and Suggested Recommendations	6
4.0	Conclusions.....	16

1.0 Introduction

The Kivalliq Inuit Association (KivIA) completed a technical review of Agnico Eagle Mines Limited's (AEM) "Meliadine Gold Project, 2018 Annual Report". The review has outlined the following recommendations suggested by the KivIA.

The KivIA represents Inuit beneficiaries of the Nunavut Land Claim Agreement at the regional and territorial levels, respectively. The KivIA manages Inuit Owned Lands (IOL) with the main aim of promoting self-reliance and social well-being of Inuit now and in the future. The IOL's are managed in order to support sustainable economic development opportunities for Inuit as long as it is completed in an environmentally and socially responsible manner.

The review was completed using the following guidance provided the NIRB for interested parties reviewing the 2018 Annual Report. Specifically, the NIRB requested "*comments with respect to their jurisdiction and/or area of expertise... on the following:*

1. Effects monitoring

- a. Whether the conclusions reached by Agnico Eagle in the 2018 Annual Report are valid; and*
- b. Any areas of significance requiring further supporting information or any changes to the monitoring program which may be required.*

2. Compliance monitoring

- a. Provide a summary of any compliance monitoring and/or site inspections undertaken in association with the Project, including specifically;*
 - i. Identify the Terms and Conditions from the Project Certificate which have been incorporated into any permits, certificates, licences or other approvals issued for the Project, where applicable;*
 - ii. A summary of any inspections conducted during the 2018 reporting period, and the results of these inspections; and*
 - iii. A summary of Sabina's compliance status with regard to authorizations that have been issued for the Project."*

2.0 Summary of 2018 Meliadine Gold Project Activities

The Meliadine Gold Project, 2018 Annual Report provides a summary of the status of the project, major activities undertaken, changes in infrastructure and monitoring activities in 2018. The project was still in the construction phase in 2018 and so work focused on developing the underground in preparation to operate the Tiriganiaq underground mine. A total of 688,069 tonnes of waste, 39,216 tonnes of marginal ore and 60,846 tonnes of ore was excavated. Construction activities included:

- Completion of the Effluent Water Treatment Plant and diffuser into Meliadine Lake;
- Construction of CP-1 and CP-5 jetties;
- Construction of the landfarm and landfill;
- Completion of the emulsion plant and associated service road;
- Initiation of construction on the power plant, process plant and multi-service buildings;
- Initiation of construction of ventilation and the emergency egress, east intake and west exhaust infatuation;
- Work on channels 1, 5, 7, 8, CP-3 and CP-4; Berms 1, 2 and 3; ponds CP-3 and CP-4; ore pad 2; culverts 1, 2, 3, 4, 7, 8, 10, 11, 13, 14, 15,16,18 and 19;
- Construction of the fuel farm storage facilities at the Meliadine site;
- Installation of the telecommunication tower;
- Construction of the portal ramp advancement and Portal 2;
- Construction of the Rankin Inlet bypass road; and
- Construction of the fuel farm and laydown area at Itivia.

3.0 Summary of Review and Suggested Recommendations

The following documents were reviewed:

- 1) Meliadine Gold Project, 2018 Annual Report, 77 pages in total, and
- 2) Appendices A to N.

This section is a summary of the twenty-six (26) comments with suggested recommendations. These are organized in sequence based on the section of the 2018 Annual Report and on the section within the Appendices being commented on.

3.1: Appendix B1, Part 1, 2018 Annual Geotechnical Inspection, Golder Associates Ltd. (Golders), Executive Summary.

The Golders geotechnical inspection included the main site, the exploration camp site, all weather access road (AWAR), Itivia site and by pass road. The inspection outlined the following areas that had issues that were recommended for attention by AEM:

- i) surveillance and monitoring - 16 recommendations
- ii) operational procedures - 7 recommendations
- iii) required maintenance or repairs – 22 recommendations
- iv) future construction - 2 recommendations

The KivIA recommends that AEM accept the forty-seven (47) recommendations in the Golders geotechnical inspection report. The KivIA recommends that AEM implement all forty-seven (47) recommendations during 2019.

3.2: Annual Report, Section 6, Spill Management; Appendix F-3, Reportable Spills and Follow-up Reports.

AEM has done a good job documenting spills of hazardous materials. However, the project still needs to get significantly better at preventing and minimizing these spills.

The KivIA recommends that AEM lower the reportable spill limit by 50% which would help develop a better culture of preventing and minimizing spills of hazardous materials.

3.3: Annual Report Section 7.1.2 AEMP Meliadine Lake Summary. Follow Up Report: #18-409 July 23, 2018 MEL-14 Aluminum Concentration Criteria Exceeded

AEM notes that “Potential mine-related changes in water quality in Meliadine Lake were observed in the Near-field area in 2018 for specific conductivity, TDS, hardness, several major ions, and a number of total metals; concentrations exceeded the upper bound of their respective normal range and increased in the Near-field and relative to reference areas over time. Water Licence exceedances in the effluent were observed for TDS and total aluminum. However, the exceedance of total aluminum WL limit occurred only in one sample, with other effluent samples noticeably lower in concentration, suggesting that the measured value may have been anomalous. In addition, although total aluminum concentrations were higher in the Near-field area, there was no indication of declining concentrations with distance from the diffuser.”

This exceedance is further reported on in a follow up report (#18-409) which indicated that those samples were deemed outliers and AEM has suggested they may have been a result of “laboratory error”.

The KivIA notes that while the observed exceedance was short term with no spatial trend from the diffuser, the KivIA is still concerned that aluminum concentrations exceeded discharge criteria at both MEL-13 within the Exposure Area in Meliadine Lake, and MEL-14, the Effluent Characterization sample. The presence of two exceedances in linked samples decreases the likelihood that the anomalous aluminum observations may have been a result of laboratory error.

It may be more likely that a short-term exceedance was the result of mine activities with relatively complete mixing within the Near-field area.

The KivIA recommends AEM consider that the observed exceedance may have been the result of mine related activities and further investigate potential causes of the exceedance. This recommendation is intended to decrease the likelihood of future water licence exceedances as the mine proceeds towards full production.

3.4: Annual Report Section 3.2, Table 3.7

The water quality and water quantity model outputs presented in the 2018 annual report do not account for saline discharges to Melvin Bay; model outputs still assume saline discharges will be part of the onsite water management plan. AEM acknowledges within the annual report that these model outputs may no longer be appropriate: *“The presented TDS concentrations are the result of overly-conservative assumptions applied to the model update. As such, both the water balance and water quality model are undergoing revision in 2019 to address these deficiencies.”*

The KivIA acknowledges that AEM has only received ministerial approval for saline discharges to the marine environment as of February 2019 and are currently working to address the operational changes that will result.

The KivIA recommends that AEM include a direct comparison between water quality and water quantity predictions and management requirements at the Meliadine site that will result from the operational change of discharging hypersaline water into Melvin Bay as opposed to Meliadine Lake.

3.5: Annual Report Section 7.3.1.7; Follow Up Report: #18-251 June 10, 2018 Itivia Surface Water Run-off; Follow Up Report: #18-250 June 17, 2018 Itivia Surface Water Run-off; Follow Up Report: #18-313 June 20, 2018 Itivia Surface Water Run-off.

AEM noted several spills in the Itivia site stemming from *“snow melting inside and outside the site disturbance area”* that have resulted in measured TSS exceeding authorizations downstream of the site during freshet. AEM has been proactive with respect to the elevated TSS concentrations indicating that a *“third party consultant has inspected the area to recommend improvements to mitigate and reduce erosion and sediment control. The snow management plan has been revised and some work is planned to improve the TSS management in 2019.”* AEM further notes that *“The consultant’s findings will be summarized in a final report and issued to regulators on August 24th”*.

Enlisting consultant support, and the updated Snow Management Plan and Freshet Action Plan are seen as positive steps, but it is still difficult to assess site vulnerabilities and flow paths at the Itivia site from the figures provided within the Annual Report and its appendices.

The KivIA recommends that AEM provide a relief figure of the Itivia site indicating flow paths of the proposed snow storage areas as part of future updates to the Snow Management Plan. In addition, AEM must provide the consultant’s final report to the KivIA as it becomes available.

3.6: Appendix I-1, Management Plan Updates;

Appendix I-1 is a large and unwieldy document albeit containing valuable information. The size and lack of table of contents within that Appendix makes it difficult to navigate and reference back to specific management plans later.

The KivIA recommends that in future annual reports, for ease of navigation, AEM include a table of contents for Annual Report Appendices of Management Plan Updates.

3.7: Appendix I-1, Management Plan Update; Water Management Plan Section 3.9.4 Effluent Water Treatment Plant (EWTP).

AEM indicates: *“Regarding turbidity, two trigger limits have been set. The first trigger is set to 1.2 NTU which corresponds to approximately 15 mg/L... The second trigger limit is set to 2.3 NTU which corresponds to approximately 25 mg/L TSS (Figure 3.4). When this second trigger is reached, discharge to Meliadine Lake will be stopped. The correlation strength pertaining to the TSS-turbidity rating curve is $R^2 = 0.79$. Thus, the trigger limit was set below the maximum allowable concentration (15 mg/L – TSS Max Ave Concentration and 30 mg/L – TSS Max Grab Concentration) to allow for associated uncertainty the [sic] correlation”.*

The KivIA notes that $R^2 = 0.79$ % introduces an approximately 21% potential unexplained variance between measured NTU and TSS. However, the proposed second trigger limit for NTU corresponds to a TSS concentration of 25 mg/L which is approximately 80% of the target.

The KivIA recommends that AEM incorporate a more conservative second trigger based on NTU for discharges to Meliadine Lake from CP1 until a more robust correlation between TSS and NTU is developed. We propose an interim second trigger for NTU that corresponds to a TSS concentration of between 20 mg/L and 22.5 mg/L. This more conservative trigger is intended to provide a greater level of protection for the aquatic environment while still providing AEM with a degree of operational flexibility while additional data points are collected to strengthen the correlation between NTU and TSS for discharges into Meliadine Lake.

3.8: Water Management Plan; Conceptual Ocean Discharge Monitoring Plan Section 4 Conceptual Monitoring Design; Groundwater Management Plan Appendix C – Specific Work Instructions for Under-Ice Marine Water Quality Sampling Program – Winter 2019.

AEM has indicated that they will be using seven stations in the exposure area and three stations in “each reference area” to evaluate the marine receiving environment. However, it is unclear where these stations are located. We further note that Table 2 (Groundwater Management Plan Appendix C) shows only one year of environmental

monitoring in Melvin Bay was used to establish Background Marine Ion Concentrations. In addition, the Groundwater Management Plan Appendix C – Specific Work Instructions for Under-Ice Marine Water Quality Sampling Program – Winter 2019 indicates that sampling is planned for Winter 2019 in the exposure area but does not appear to be proposed for the three reference areas (Reference Area R1, Reference Area A, Reference Area B).

The KivIA recommends the inclusion of specific monitoring locations both in the exposure area and within the reference areas in the Ocean Discharge Monitoring Plan as it is updated. It is further recommended that AEM broaden the planned marine monitoring in 2019 to update the baseline characterization of the exposure area and develop a baseline characterization within the reference locations to provide a basis for ongoing comparison and evaluation of potential effects in the marine environment.

3.9: Appendix G-1 AEMP/EEM report; Section 2.4.2.2 Acute and Sublethal Toxicity Page 33.

AEM states, “*Sublethal effects were observed on growth of common duckweed (Lemna minor) in two of the three samples, and on reproduction of the water flea (Ceriodaphnia dubia) in one sample (Table 2.4-7).*”

The cause of the observed sublethal effects in three separate sublethal toxicity tests are not provided within the report. AEM should investigate the source of sublethal toxicity in the effluent to ensure corrective actions can be taken in the future. Implementation of corrective actions may also ensure potential sublethal biological effects are minimized.

The KivIA recommends that AEM investigate the cause of the sublethal toxicity effects noted in *Lemna minor* and *Ceriodaphnia dubia*. The results of that investigation as well as potential management options may mitigate the observed sublethal effects in the 2019 annual report and in the future EEM report.

3.10: Appendix G-1 AEMP/EEM report; Section 6.2.1 Sampling Design Page 75

AEM notes, “*In 2018, water quality monitoring was scheduled for four times per calendar year, but the September water quality program was cancelled due to unsafe boating conditions (i.e., high winds) that prevented safe access to sampling stations.*” The KivIA agrees that unnecessary risks are required to obtain field data but requests further explanation as to why the sample event was not rescheduled.

3.11: Appendix G-1 AEMP/EEM report; Section 6.5.2 AEMP, Page 121

AEM states, “*The observed changes in water quality suggest a Mine-related effect on water quality in the Near-field and Mid-field areas. The effect is within the range of conditions predicted by FEIS. However, given the limited dataset, there is uncertainty*

associated with identifying a source for the spatial and temporal trends identified in this report. It is anticipated that the 2019 and 2020 monitoring will allow for more detailed analysis of trends and Mine-related effects.”

Collecting additional data to investigate the observed mine related effects on water quality may not effectively identify the source of the water quality changes reported. A targeted source tracking study starting with indicator parameters may be effective in determining what aspects of the project are driving the observed changes and determining what potential mitigation measures may be appropriate.

The KivIA recommends that AEM provide updates on the observed changes in water quality in the Near and Mid field areas in the 2019 annual report. Should changes continue to be observed but a source cannot be determined, the KivIA recommends that AEM conduct a source tracking study in 2020 on indicator parameters to identify the source of the increasing concentrations of specific conductivity, TDS, hardness, TOC, DOC, major ions and total aluminum, barium, copper, mercury, molybdenum, nickel, uranium, lithium and strontium.

3.12: Appendix G-1 AEMP/EEM report; Section 7.1 Objectives Page 124; Section 7.4.4 Comparison to FEIS Predictions, Page 143.

AEM states that one of the main objectives of the AEMP monitoring activities in the Peninsula Lakes was to, “*verify and update the FEIS predictions*”.

AEM also states, “*To meet the primary objectives of the water quality component, analysis and interpretation of water quality data in 2018 were focused on answering two key questions, as defined in the AEMP Design Plan (Golder 2016a): 1) Are concentrations of key parameters in the Peninsula Lakes consistent with FEIS predictions and less than AEMP benchmarks?*”

It is the KivIA’s understanding that AEM intended to compare water quality from the Peninsula Lakes 2018 monitoring program to FEIS prediction under Section 7.4.4 of the AEMP/EEM report. This task does not appear to have been completed; FEIS predictions for the Peninsula Lakes were not provided for comparison in the report. Since this is one of the main objects of Section 7 of the AEMP/EEM report and one of the key questions as defined in the AEMP Design Plan it is prudent to include FEIS predictions in future reports.

3.13: Appendix G-1 AEMP/EEM report; Section 8.4.2.1 EEM Page 170.

AEM states, “*In 2018, the following parameters had a mean concentration in the Near-field area that was greater than two times the Reference area mean, up to a maximum of 4.6 times the reference mean (arsenic): clay, cobalt, mercury, thallium, arsenic, iron, molybdenum, uranium, bismuth, lead, nickel, zinc, cadmium, manganese and selenium.*

Sediments at Near-field area stations were mostly silt-dominated in comparison to sediments sampled at Reference Area 1, which had a higher percentage of sand (Table 8.4-5)..... Higher metal concentrations and finer sediments documented in the Near-field area in 2018 relative to the reference areas also occurred prior to the Mine effluent discharge under baseline conditions in 2015 and 2016 (as discussed in Section 8.4.1.2)."

The comparison of historical sediment data to current monitoring data has not been normalized to particle size, particularly percent fines. Normalized sediment chemistry data to particle size may prevent analysis of changes in sediment chemistry from being confounded by the physical characteristics of the sediment.

The KivIA recommends that AEM normalize sediment data to percent fines for the EEM data analysis to help differentiate changes in sediment chemistry between the near-field and reference sites without being confounded by physical characteristics of the sediment.

3.14: Appendix G-1 AEMP/EEM report; Section 8.4.2.2 AEMP, Page 172.

AEM states, "For three parameters, the outlier removal affected the test results; these are arsenic, cobalt and nickel. For these parameters, the overall comparison was not significant when the outliers were included, but tests were significant without the outliers."

Removal of outliers are acceptable for annual reports, but these data should be preserved within an overall database for future reanalysis. As the dataset grows annually, data points previously deemed as outliers may subsequently fall within an expanded characterization of normal range and may be useful for future comparisons of annual monitoring data as the overall dataset is expanded.

The KivIA recommends that AEM re-evaluate values previously identified as outliers on an annual basis as these data appear to have an impact on the statistical evaluation of sampling sites.

3.15: Appendix G-1 AEMP/EEM report; Section 8.4.4 Comparison to Normal Ranges, Page 179.

AEM states, "Normal ranges were calculated using data available from the AEMP Reference areas, 2015 and 2016 data from the Near-field and Mid-field AEMP exposure areas, and appropriate pre-2015 data included in the FEIS6. These data were included in the normal range calculation to make sure that the normal ranges captured the natural spatial and temporal variability in particle-size and some metals, as identified within and among AEMP study areas by this 2018 assessment. Normal ranges may be updated with future AEMP reference area data as they become available to further characterize natural variability."

Inclusion of additional reference sediment chemistry data that has not been standardized for particle size may inflate the characterization of the normal range used for future comparisons of metal concentrations between reference and exposure areas.

The KivIA recommends that sediment chemistry data be normalized to percent fines when calculating the normal range to compensate for natural differences in particle size between the near-field and reference site sample locations.

3.16: Appendix G-1 AEMP/EEM report; Section 11.2.2.

AEM states, "A total of 12% of paired concentrations in duplicate DIN samples had a RPD greater than 20%. Each of the three RPD exceedances came from duplicate samples collected at MEL-01-09 in August 2018, where RPDs for concentrations of TKN, TN and TP exceeded 20%. All RPDs for the other set of DIN duplicate samples collected at MEL-02-01 in 2018 were below 20%."

The RPD failure rate for TKN, TN and TP suggest that the nutrient data from the day the August samples were collected may be compromised. AEM does not discuss how these data were handled or justify their inclusion in the data analysis.

The KivIA recommends that AEM provide a discussion as to whether nutrient data from the August sampling event are appropriate for inclusion in the data analysis given three key nutrient parameters exceeded the RPD of 20% data quality objective. In addition, similar discussions should also be included in future annual reports when RPDs exceeding 20% between duplicates cluster around certain parameter types such as nutrients.

3.17: Appendix G-1 AEMP/EEM report; Section 11.3.1.2 Evaluation of Variability in Phytoplankton Biomass and Chlorophyll a in the Near-field Area Relative to nutrients, Page 281.

AEM states, "The apparent lack of relationships between nutrient concentrations and indicators of primary productivity do not necessarily indicate the lack of an effect on productivity". The reviewer agrees with this comment made by the proponent.

The KivIA recommends that AEM update the discussion in Section 11.3.1.2 to elaborate on the potential impacts of changes in nutrient concentrations on primary productivity in the absence of a clear relationship between those primary producers and the observed change in nutrient concentrations.

3.18: Meliadine 2018 Annual Report, section 10.3, AWAR.

The AWAR states “*In 2018, water, Dust Stop and calcium chloride were used as dust suppressants on the AWAR*”, but the same paragraph states “*Dust Stop required special equipment for application that was not available at the time the dust suppression was required*” and subsequent text suggests only water and calcium chloride were used (pg 64). The KivIA recommends that AEM should clarify these contradictory statements.

3.19: Meliadine 2018 Annual Report, section 10.3, AWAR.

The traffic volume to date exceeds what was predicted in the FEIS by nearly a factor of two.

The KivIA recommends that the report provide an explanation of this huge overrun in traffic during the construction phase and the implications for wildlife.

3.20: TEMMP Report. Appendix H-6.

The TEMMP report provides a brief overview of the different methods for monitoring caribou and other wildlife and does a good job presenting work stoppage numbers. While it is clear that AEM, working with KivIA land use inspectors, the HTO, community, and government, is taking essential steps to protect caribou, there are no data presented on caribou observations or collar movements, nor the types of monitoring that triggered enhanced mitigation. A comparison between caribou data provided in the annual reports for Meadowbank/Whale Tail and Meliadine shows clear differences in reporting between the two mines. Given that in most recent years caribou come through the Meliadine area during July when cows and calves are highly vulnerable to disturbance and stress and given the traffic volume in 2018 exceeded what was expected and stated in the FEIS by nearly twice as much, the KivIA recommends that the TEMMP reporting must be far more rigorous. The objectives state in part that “*Adaptive management will be implemented if the Project impacts exceed the predictions*” (S 2.0, pg 9). Rigorous reporting is required to enable effective adaptive management of caribou and other wildlife at the Meliadine project.

The KivIA recommends that the current (2018) TEMMP report (Appendix H-6) be rejected and be revised to include systematic and detailed caribou observations and collar data, details of the frequency and type of monitoring and systematic records of the triggers that resulted in increased mitigation (e.g., work stoppages).

The KivIA also recommends that AEM establish a Terrestrial Advisory Group (TAG) similar to the TAG in place at Meadowbank/Whale Tail, that will be able to assist AEM to develop sound and systematic TEMMP reporting to demonstrate how AEM’s adaptive management of wildlife, especially caribou, is working.

3.21: TEMMP Report. Appendix H-6. Section 6.1 Wildlife Track Surveys.

This section provides a couple of sentences reporting on track surveys conducted in November and December 2018, but there are no objectives or methods provided.

The KivIA recommends that the point of these surveys should be clarified and the detailed methods and results explained.

3.22: TEMMP Report. Appendix H-6. Section 6.3 Incidents and Mortalities.

The TEMMP states that 22 Arctic fox were trapped and dispatched, which is a somewhat surprising number of deaths and raises questions about why.

The KivIA recommends that in addition to “*On-going waste management and, regular toolbox meetings reiterating that harassing and feeding wildlife are harmful, unacceptable and against company rules*” (Table 6.5-1, pg 18), AEM should be conducting and reporting on regular monitoring of waste disposal (e.g., landfill surveys, outside food source surveys, and instances of feeding of wildlife/foxes). There should also be reporting on whether any of the foxes tested positive for rabies (rabies is mentioned as a concern in Table 6.5-1) and the data should be compared to previous years.

3.23: TEMMP Report. Appendix H-6. Section 8.1 Caribou Behavior.

The TEMMP provides a simple table of caribou behaviour observations from 2018 (Table 8.1-1), and a conclusion of “*Observations showed no obvious behavioral response to mine activity*” (pg 20).

The KivIA recommends that the TEMMP (and concluding comments) would be greatly strengthened by providing details on results, including distance from infrastructure, composition of the group observed, length of time for observations, and time spent in the various behaviours.

3.24: TEMMP Report. Appendix H-6. Section 8.2 Caribou Advisory.

The preparation for the 2018 caribou migration appeared to be thorough, but the reporting of triggers that initiated the mitigation measures/caribou advisories shown in Table 8.2-1 is lacking.

The KivIA recommends that there should be detailed and clear reporting of the

monitoring that triggered thresholds to intensify (or scale down) mitigation (e.g., collars, incidental observations, site and road surveillance monitoring) and at what distance from infrastructure that monitoring occurred.

3.25: TEMMP Report. Appendix H-6. Section 8.3 Accuracy of Impact Predictions.

Sensory disturbance is a key monitoring indicator and <10% caribou deflections from AWAR is a preliminary threshold. AEM should monitor and report on the effects from mining development on caribou permeability of the site. (We suggest there is less concern about measuring the ZOI, given that the vast majority of caribou presence at the site is during post-calving migration). KivIA notes that Term and Condition (T&C) 57 is clear in stating that the annual report shall incorporate a review section which includes *“b. A detailed analysis of wildlife responses to operations with emphasis on wildlife behaviour, mortalities **and displacements** [emphasis added](if any), and responses to operations of the all-weather access road and associated access roads/trails”*. And as noted in T&C 44, monitoring *“should be adequate to test impact predictions, monitor impact thresholds and trends over time, and to support implementation of mitigation measures”*. Granted, the mine was not operational in 2018, but construction activities resulted in heavy traffic volume on the AWAR and the TEMMP program was designed to cover construction and operation periods.

The KivIA recommends that displacement/deflection of caribou and responses to operations during migration should be reported annually.

The KivIA also recommends that data analysis should be conducted to test impact predictions, monitor impact thresholds and trends over time, and to support implementation of mitigation measures.

3.26: Meliadine 2018 Annual Report, section 12.0, Socio-Economic; Appendix M-1 Socio-economic Monitoring Report.

The KivIA continues to be disappointed with Inuit employment rates. More effective ways to increase Inuit participation in the workforce need to be developed, in collaboration with the KivIA in order to achieve desired levels of Inuit employment. Additional training and career path development should be a focus in order to achieve these improvements.

4.0 Conclusions

The 2018 Annual Report for the Meliadine Gold Project represents a significant improvement from the previous year. Many issues raised by the KIA in previous years have been addressed. The KivIA further commend AEM on their proactive approach to spills at the Itivia site and the progress being made towards future discharges of saline water into Melvin Bay rather than Meliadine Lake.

From the information provided within the 2018 Annual Report, it appears Meliadine is predominantly operating in such a way as to minimize impacts to the freshwater and marine aquatic environment. Where a trend in spills or other impacts has been observed, AEM has generally taken a proactive approach to rectifying future occurrences or potentially deleterious impacts. However, AEM still needs to get significantly better at preventing and minimizing these spills. The KivIA recommends that AEM lower the reportable spill limit by 50% which would help develop a better culture of preventing and minimizing spills of hazardous materials.

However, the KivIA disagrees with AEM's conclusion that observed aluminum concentrations at the diffuser in Meliadine Lake were the result of laboratory error and have requested additional investigations as to the cause of the observed impacts within Meliadine Lake. The KivIA is further concerned with AEM's treatment of sediment analysis and the implications of not meeting data quality objectives for nutrients in select sampling events. The KivIA has further highlighted the need for iterative improvements in environmental management for the marine environment and additional monitoring with which to evaluate any future impacts stemming from saline discharges into Melvin Bay. Failure to address these concerns may decrease the likelihood mine related impacts are promptly identified and addressed in the future as Meliadine proceeds towards full production.

The TEMMP report provides a brief overview of the different methods for monitoring caribou and other wildlife and does a good job presenting work stoppage numbers. While it is clear that AEM, working with KivIA land use inspectors, the HTO, community, and government, is taking essential steps to protect caribou, there are no data presented on caribou observations or collar movements, nor the types of monitoring that triggered enhanced mitigation. A comparison between caribou data provided in the annual reports for Meadowbank/Whale Tail and Meliadine shows clear differences in reporting between the two mines. Given that in most recent years caribou come through the Meliadine area during July when cows and calves are highly vulnerable to disturbance and stress and given the traffic volume in 2018 exceeded what was expected and stated in the FEIS by nearly twice as much, the KivIA recommends that the TEMMP reporting must be far more rigorous. The objectives state in part that "*Adaptive management will be implemented if the Project impacts exceed the predictions*" (S 2.0, pg 9). Rigorous reporting is required to enable effective adaptive management of caribou and other wildlife at the Meliadine project.

The KivIA recommends that the current (2018) TEMMP report (Appendix H-6) be rejected and be revised to include systematic and detailed caribou observations and collar data, details of the frequency and type of monitoring, and systematic records of the triggers that resulted in increased mitigation (e.g., work stoppages).

The KivIA also recommends that AEM establish a Terrestrial Advisory Group (TAG) similar to the TAG in place at Meadowbank/Whale Tail, that will be able to assist the

company develop sound and systematic TEMMP reporting to demonstrate how AEM's adaptive management of wildlife, especially caribou, is working.