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RE: NIRB File No. 11MN034: Comment request for Agnico Eagle Mines Limited's Meliadine Project 2022 Annual Report

The Government of Nunavut (GN) would like to thank the Nunavut Impact Review Board (NIRB) for the opportunity to review and comment on Agnico Eagle Mines Limited's Meliadine Project 2022 Annual Report.

The GN has reviewed the Meliadine 2022 Annual Report and provides comments below (see Appendix A). Should you have any questions, please do not hesitate to contact me by email at dlapierre1@gov.nu.ca.

Adrian

Dianne Lapierre
Avatiliriniq Coordinator

*On behalf of
David Kunuk, Deputy Minister
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Appendix A:

Government of Nunavut Comments on the Meliadine Project 2022 Annual Report

GN AR # 01	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Direct Mortality and Attraction of Predators and Scavengers
Terms and Conditions	NIRB Project Certificate No. 006 T&C 55, 56, 75
References	<ul style="list-style-type: none"> • 2022 Annual Report, Appendix 27: TEMMP Section 1.1 – Background • 2022 Annual Report, Appendix 27: TEMMP Section 1.4 – Monitoring Approach • 2022 Annual Report, Appendix 27: TEMMP Section 1.5 – Objectives • 2022 Annual Report, Appendix 27: TEMMP Table 9 – Wildlife Observations • 2022 Annual Report, Appendix 27: TEMMP Table 12 – Incidental Wildlife Observations • 2022 Annual Report, Appendix 27: TEMMP Table 13 – Incidental Bird Nests • 2022 Annual Report, Appendix 27: TEMMP Table 14 – Wildlife Mortalities and Injuries • 2022 Annual Report, Appendix 27: TEMMP Section 9.5 – Incidents and Mortalities • 2022 Annual Report, Appendix 27: TEMMP Table 15 – Accuracy of Impact Predictions – Wildlife Incidents 2022 • 2022 Annual Report, Appendix 12: 2022 Wildlife Observations

IDENTIFICATION OF ISSUE

In the introduction to the 2022 Terrestrial Environment Management and Monitoring Plan Annual Report (TEMMP), the Proponent states: “The purpose of this report is to summarize the 2022 data collected from wildlife and vegetation monitoring programs, and to describe natural variation and potential Project-related changes...”. Similarly, the Proponent describes how residual effects will require adaptive management. The objectives of the TEMMP are to evaluate monitoring and mitigation, summarize adaptive management strategies, and provide recommendations for 2023. In Table 9, wildlife observations on site appear to be increasing; however, it is unclear if this is related to increased survey effort as the data are not standardized. However, in Table 10, it appears that fewer surveys have been completed in the mine area during the snow-free seasons when wildlife observations might be expected to be higher. In subsequent tables (Table 12-14) there has been no reporting of trends since monitoring began to describe natural variation or potential Project-related changes.

Table 14 and 15 show that the threshold for direct mortality of fox has been exceeded and there appears to be a significant attraction to the incinerator, kitchen, landfill among other areas. The Proponent stated: “Environment Department deployed many mitigation measures to minimize the presence of foxes on site” (paragraph two after Table 14 [page 38]) which included regular toolbox meetings about company policy and waste segregation and on-going waste management and “Inspections are completed regularly in every location outside to prevent food waste availability”. However, these measures are a standard approach to mitigating human-wildlife interactions and are not examples of adaptive management.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

Managing attraction of wildlife to the mine is critical to prevent animals from becoming habituated, tolerant, or food-conditioned to prevent human-wildlife interactions and to prevent direct mortality and the need to euthanize.

RECOMMENDATION(S)

The Government of Nunavut recommends the following regarding the above concerns:

1. That wildlife data be standardized by effort and that trends on mortalities, injuries, and wildlife observations be reported.
2. That wildlife observations be categorized to indicate observations that may indicate habituated, tolerant, and/or food-conditioned individuals.

3. That the details and frequency of waste management inspections be reported.
4. Finally, that adaptive management actions be taken immediately to reduce attraction of wildlife to the incinerator, kitchen, landfill, and other problem areas and that these actions be reported.

GN AR # 02	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Wildlife Awareness Training & Reporting
Terms and Conditions	NIRB Project Certificate No. 006 T&Cs 56, 57, 58, 75, and 82
References	<ul style="list-style-type: none"> • 2022 Annual Report, Appendix 27: TEMMP Section 9.5 – Incidents and Mortalities • 2022 Annual Report, Appendix 27: TEMMP Table 15 – Accuracy of Impact Predictions – Wildlife Incidents 2022 • 2022 Annual Report, Appendix 38: Training
IDENTIFICATION OF ISSUE	
<p>In Section 9.5 and Table 15 of the 2022 Terrestrial Environment Management and Monitoring Plan Annual Report (TEMMP), the Proponent discusses how environmental awareness training can limit mortality of wildlife and that on-going and regular toolbox meetings on awareness have occurred. However, in Appendix 38, training records show no indication of wildlife awareness training. According to T&C 58 the Proponent shall ensure all employees receive awareness training related to birds and bird habitat.</p> <p>In addition, despite training programs, the Marine Mammal and Seabird Observation (MMSO) Program (Appendix 30) has been subject to poor data collection, specifically with respect to collecting survey effort. Quality data is required for confidence in the results and interpretation of monitoring programs.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>Awareness training is key to prevent direct and indirect effects on wildlife. Human-wildlife incidents and subsequent euthanasia of habituated or food-conditioned animals is likely a result of improper waste management. Targeted training of workers is needed to maintain good facility housekeeping and follow waste management procedures. Awareness training should include a discussion of the importance of waste management</p>	

and prohibitions on feeding wildlife to prevent wildlife from becoming habituated or food conditioned. Similarly, other key mitigations such as reporting nesting birds and species at risk should be communicated. In this way, human-wildlife interactions can be avoided or minimized. In addition, training, data management, and Quality Assurance/Quality Control (QA/QC) procedures are important to ensure required information is collected to inform monitoring programs. Missing data can hinder the ability to make inferences regarding the efficacy of mitigations or establish trends in the data. Documenting and providing examples of training would provide confidence to regulators that these important mitigations are followed.

RECOMMENDATION(S)

The Government of Nunavut recommends the following regarding the above concerns:

1. That records be kept tracking and annually reporting wildlife awareness training and tool-box meetings.
2. That Marine Mammal and Seabird Observation training is continued and focuses on data collection procedures.
3. That a Quality Assurance and Quality Control procedure be developed to verify that data is complete.

GN AR # 03	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Caribou Monitoring
Terms and Conditions	NIRB Project Certificate No. 006 T&C 44, 54, 56
References	<ul style="list-style-type: none"> • 2022 Annual Report, Appendix 27: TEMMP, Appendix J Meliadine Project Caribou Behaviour Study, 2022 – Section 6.3.7 Response to Disturbance • 2022 Annual Report, Appendix 27: TEMMP, Appendix J Meliadine Project Caribou Behaviour Study, 2022 – Section 6.4.2 Effect of Group Size • 2022 Annual Report, Appendix 27: TEMMP, Appendix J Meliadine Project Caribou Behaviour Study, 2022 – Section 6.4.4 Results Summary
IDENTIFICATION OF ISSUE	
<p>In Section 6.3.7 of the Meliadine Project Caribou Behaviour Study (Appendix J of the Terrestrial Environment Management and Monitoring Plan Annual Report (TEMMP)), the Proponent stated that “Summarizing the data over the entire 30-minute survey is useful for broad comparisons but has the disadvantage that response behaviour can be washed out in a relatively uneventful survey.” When discussing the effect of group size in Section 6.4.2, it was stated: “These results should be taken with caution as smaller groups of caribou naturally have greater variability in values and this could bias the results.” It was also stated in Section 6.4.4 that “These results should be treated with caution due to the high number of variables and the variability in the behaviours observed, and because response behaviours were averaged over each 30-minute survey period.” and “Using average behaviour type across the 30-minute (10 sampling periods) effectively dilutes the caribou response, and likely explains why duration of response models performed so poorly.”</p> <p>These statements and results suggest improvements to the analysis can be made. Analyzing data in a generalized linear mixed effect model may address issues if the 3-</p>	

minute surveys are nested within the 30-minute survey period, survey period and group is treated as a mixed effect, independent variables are treated as continuous to prevent loss of information and convergence issues, and non-linear relationships in the data (if existing) are explored. Finally, the executive summary reported that peak migration occurred June 28 and 29, but elsewhere in the TEMMP it is reported that peak migration was between July 11 and 15.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

As discussed by the Proponent, averaging behavioural data in a 30-minute survey may result in loss of information or bias the results. This can have implication on the accurate interpretation of the findings or the ability to detect any effects. Adopting such a modeling approach may result in low confidence in the results, especially if they suggest that an effect has not occurred. Additionally, relying on such an approach may undermine the reliability of assessing the efficacy of mitigations. Conversely, if an effect is present but remains unidentified due to modelling approach, it may hinder the implementation of necessary adaptive management actions to rectify the issue.

RECOMMENDATION(S)

The Government of Nunavut recommends the following regarding the above concerns:

1. That the Proponent confirm peak caribou migration as either between June 28 and 29 or between July 11 and 15.
2. That the Proponent adjust the modelling approach to reduce bias, improve power, and retain information. It is recommended that the Proponent consider analyzing the 3-minute behaviour data as nested within the 30-minute survey and that each survey and group be treated as a mixed effect, rather than averaging data.
3. That group size and distance is not treated as categorical but considered a continuous variable to improve the power of the model, retain potentially important information, prevent convergence issues, and allow for the examination of other non-linear patterns in the data.
 - a. Alternatively, identifying other potential modeling approaches to overcome loss of information and biased results is recommended.

GN AR # 04	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Harvest Study
Terms and Conditions	NIRB Project Certificate No. 006 T&C 45,46
References	<ul style="list-style-type: none"> 2022 Annual Report, Appendix 27: TEMMP, Appendix M Meliadine Harvest Study, 2022 – Table 6.2 Hunter Caribou Harvest Statistics
IDENTIFICATION OF ISSUE	
<p>In Table 6.2, the average annual caribou harvest from the 2022 Rankin Inlet Hunter Harvest Study is reported as 243.4 caribou which appears to be incorrectly reported and should be 608.5. The Proponent compares the results of the 2022 study with the historical study around Rankin Inlet which included three other participating communities. It is unclear if the 2022 Harvest Study reports exclusively reports data from Rankin Inlet or if data from other communities was included. Direct comparison to historical data may be inappropriate if methods are not similar or if assumptions regarding the studies are not explicitly stated. When comparing to historical studies, the number of participants and the proportion of active hunters should also be reported.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>Incorrectly reporting harvest data or inappropriate comparisons to historical data may introduce bias into the trends observed in harvest data. Given the first three years of harvest monitoring are to be used to establish thresholds that will be used in future harvest monitoring and to determine the efficacy of mitigations and the need for adaptive management actions, it is critical that these data be free of errors or bias. Reported data must be accurate, effort amongst studies reported, and assumptions explicitly stated if direct comparisons are made to historical or other studies. In this way, data can be compared free of bias and proper interpretation can be made. Otherwise, improper thresholds may be established leading to the failure to implement mitigations and potentially leading to overharvest.</p>	

RECOMMENDATION(S)

The Government of Nunavut recommends the following regarding the above concerns:

1. That Table 6.2 be adjusted to reflect accurate average harvest data.
2. That more detail be provided on the communities that participated and/or assumptions made when comparing 2022 data with historical surveys.

GN AR # 05	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Nesting Raptors
Terms and Conditions	NIRB Project Certificate No. 006 T&C 59, 60, 61, 62, 71, 72
References	<ul style="list-style-type: none"> • 2022 Annual Report, Appendix 27: TEMMP, Appendix G Arctic Raptor Study, 2022, Section 8.2.2 • 2022 Annual Report, Appendix 27: TEMMP, Appendix G Arctic Raptor Study, 2022, Table 1 • 2022 Annual Report, Appendix 27: TEMMP, Appendix G Arctic Raptor Study, 2022, Table 3 • 2022 Annual Report, Appendix 27: TEMMP, Appendix G Arctic Raptor Study, 2022, Table 6
IDENTIFICATION OF ISSUE	
<p>In Section 8.2.2 and in Appendix G (Arctic Raptors Research Program Report) of the 2022 Terrestrial Environment Management and Monitoring Plan Annual Report (TEMMP), the Proponent describes how the null model (that without distance to disturbance) best explained occupancy and stated: “The analysis completed for the Arctic Raptors Research Program found no evidence of an effect of distance to disturbance on occupancy.” However, the support for the models (peregrine falcon for instance) is weak with an Akaike Information Criterion (AIC) weight of only 0.53 and alternative models in close support. Indeed, Delta AICc for alternative models were within close range of the top model and log likelihoods were similar. For M3, which models distance to disturbance on occupancy, there was close support, particularly for rough-legged hawk, with nearly identical support to the null model (AIC weight: 0.34 compared to 0.32) respectively. M2 was similarly supported for rough-legged hawk. Although the results suggest some other factor is likely responsible for occupancy, given that the models were relatively similar in fit and support, results also suggest that distance to disturbance may explain some variation in the data and may be associated with changes in occupancy. Therefore, results suggest that evidence is weak for the conclusion that there is no effect of distance to disturbance on occupancy.</p>	

In addition, the raptor study reported the distance to disturbance for all reported raptor nests. Thirty-nine nests were within 1.5 km of project infrastructure including rough-legged hawks within 90 m of footprint and peregrine falcons within 50 and 70 m of footprint. The report states in the Discussion that it "...meets the T&C outlines by Nunavut Impact Review Board (NIRB) by documenting and mapping raptor nesting sites within 1.5 km of the project infrastructure, including minimum 'no disturbance buffers'". T&C 62 states that "The Proponent shall protect any nests found (or indicated nests) with a buffer zone determined by the setback distances outlined in its 2022 Terrestrial Environment Mitigation and Monitoring Plan (TEMMP), until the young have fledged. If it is determined that observance of these setbacks is not feasible, the Proponent will develop nest-specific guidelines and procedures to ensure bird's nests and their young are protected." It is unclear if minimum 'no disturbance buffers' or setbacks were implemented for these nests or whether these distances were simply a product of how close they nested to the mine. It is also unclear what, if any, nest-specific guidelines, and procedures were implemented to ensure nest and young were protected, or whether young fledged the nest.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

Industrial development can disturb nesting birds, including raptors and this may be a violation of legislation. Disturbance during nesting can lead to direct effects such as nest destruction or indirect effects such as nest abandonment or failure. Therefore, it is essential that potentially disturbing activities be avoided in areas that may disrupt normal nesting behaviour. Typically, buffers and setbacks are implemented to prohibit entry and work in areas where birds may become disturbed. Buffer and setback distances may differ depending on the individual, the species, the work, and the site-specific conditions around the nest (e.g., vegetation or topography). When buffers or setbacks are not feasible, other nest-specific guidelines and procedures may be necessary to protect nests. Indeed, when setbacks are not feasible, T&C 62 requires that nest-specific guidelines and procedures are implemented to ensure nests are protected until young fledge.

It is important that the annual report demonstrate how raptor nests were protected by reporting the minimum no disturbance buffers or setbacks. This may require specifying if work encroached within 1.5 km of nests or whether nests were constructed in proximity to existing disturbance and work activities. If buffers and setbacks were not feasible, it is required to report the nest-specific guidelines and procedures used to protect the nest and demonstrate that the young successfully fledged the nest.

RECOMMENDATION(S)	
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The Government of Nunavut recommends the following regarding the above concerns:

1. That the annual report explicitly state what buffers or setbacks were applied to protect nests, identify nests where work encroaches within 1.5 km of nests or where nests were constructed in proximity to existing disturbance and work activities, and/or provide the nest-specific guidelines and procedures that were implemented to ensure the nests were protected and confirm that the young fledged.
2. That the Proponent report on the fate of nesting for those nests where mitigation was necessary.
3. That the Proponent continue to explore the relationship of raptor nesting and the potential for disturbance to affect occupancy.

GN AR # 06	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Spills – Spills Contingency Plan
Terms and Conditions	NIRB Project Certificate No. 006 T&C 124
References	<ul style="list-style-type: none"> • 2022 Annual Report, Section 6 – Environmental Incident Management • 2022 Annual Report, Appendix 16: 2022 Reportable Spills • 2022 Annual Report, Appendix 17: 2022 Non-reportable Spills • Spill Contingency Plan V12, Section 8 – Training and Emergency Spill Exercise
IDENTIFICATION OF ISSUE	
<p>Section 6 of the 2022 Annual Report describes reportable and non-reportable incidents, primarily spills, that occurred during the reporting period. 2022 saw a significant increase in reportable incidents over 2021 (56 versus 27), as did incident totals (183 versus 129). Moreover, incident totals show a significant increasing trend from 2019-2022. The report describes training of staff in spill prevention, with increased awareness leading to more events being properly identified and reported as spills, thus increasing report counts. The Government of Nunavut (GN) understands that improvements to incident reporting awareness can lead to increased report counts, however increasing trends are of concern. Improvements in spill prevention can be obtained through root cause analysis and corrective actions, and through a continuous improvement process to apply lessons learned from incidents. Although the Spill Contingency Plan (SCP) has seen significant updates since 2019, Section 8 of the SCP does not identify inclusion of lessons learned in its spill prevention training curriculum. The SCP does not include specifics on how it is to be continuously improved.</p>	

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

Incident and accident prevention and management programs rely on the continuous improvement cycle for their effectiveness, covering planning, implementation, quality control and review/lessons learned/continuous improvement phases. Program improvement can come about through both reactive and proactive measures – amongst proactive measures are the tracking and analysis of trends, as increasing incident trends can indicate issues with program effectiveness and can forecast an increasing probability of a major incident occurring. Increasing incident trends since 2019 are of concern.

RECOMMENDATION(S)

The GN recommends the following regarding the above concerns:

1. That spill prevention training for employees includes a lessons learned topic, whereby the results of root cause analyses of past incidents are outlined, and the lessons learned and improvements made to the spill prevention program and related processes (spill identification, response/clean-up and reporting) are detailed.
2. That the SCP Section 8.1 Training be updated to note inclusion of past incident root cause analyses and lessons learned in the training program.

GN AR # 07	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Air Quality
Terms and Conditions	NIRB Project Certificate No. 006 (2022) T&C 1, 2, 3, 27B
References	<ul style="list-style-type: none"> • 2022 Annual Report, Section 7.7 – Air • 2022 Annual Report, Appendix 25: 2022 Air Quality Monitoring Report • 2022 Meliadine Gold Mine NIRB Project Certificate (No. 006) • 2020 Agnico Eagle Meliadine Gold Mine – Air Quality Monitoring Plan, June 2020, V3
IDENTIFICATION OF ISSUE	
<p>Section 7.7 and Appendix 25 of the 2022 Annual Report describe the ambient air quality monitoring program.</p> <p>As indicated in Table 3 of Appendix 25, equipment failures were the leading cause of the loss of total suspended particulates (TSP) and Particulate Matter (PM_{2.5}/PM₁₀) datapoints in 2022. Although an explanation and mitigation strategy were provided for the losses from the dichotomous unit at DF-5, discussions were not provided for other failures including the extended period of data loss from the Partisol unit at DF-5 in June and July. Furthermore, Figure 9 indicates a gap in cadmium data in September; this gap is not seen in the TSP or iron results and no explanation has been provided.</p> <p>On a similar note of missing data/information, the frequency of Quality Assurance and Quality Control (QA/QC) samples was not maintained in accordance with the Air Quality Monitoring Plan and the report lacks detail on the sampler calibration, maintenance, or audit schedule/results.</p> <p>The Government of Nunavut (GN) notes that Section 7 (Mitigative and Adaptive Strategies) of Appendix 25 indicates efforts will be made to increase the use of trip/travel</p>	

blanks but lacks information on how equipment issues will be addressed. Section 7 also states that, following the elevated TSP and dust concentrations measured in March, dust mitigation options will be reviewed to inform future practices for any similar construction activities taking place during the winter. It is unclear why such reviews would only be conducted for construction activities to take place in the winter.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

Consistent sample collection is key to understanding trends in air quality and a robust QA/QC program is meant to identify potential sources of error in the data. Therefore, barriers to sample collection and analysis need to be removed. Mitigation of these issue through regular maintenance, availability of backup equipment, and adequate training/communication plans are important to avoiding or addressing data loss in a timely fashion.

RECOMMENDATION(S)

The GN recommends the following regarding the above concerns:

1. That the specifics of all equipment failures be reviewed, and a plan be developed to avoid extended periods of data loss due to such failures in the future. This may include increasing the availability of backup equipment on the site or re-evaluating the equipment maintenance schedule or elements.
2. Although Section 7 of Appendix 25 indicates “efforts will be made to increase the use of trip/travel blanks”, GN recommends that at a greater commitment be made to QA/QC program outlined in the Air Quality Monitoring Plan which states travel blanks will be included with each shipment.
3. Finally, that dust mitigation options be reviewed for construction activities that are conducted throughout the year, not just the winter.



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Building *Nunavut* Together
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