TECHNICAL MEMORANDUM

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FROM Corey De La Mare **EMAIL**

WHALE TAIL PIT - CARIBOU MONITORING WORKSHOP #2 SUMMARY

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) hosted a second caribou monitoring workshop as part of ongoing consultation for their proposed Whale Tail Project, which is an expansion of their operational Meadowbank Mine. Attendees included representatives from Agnico Eagle (Jamie Kataluk, Ryan Vanengen, Robin Allard, Erika Voyer and Pujjuut Kusugak) and their consultant (Corey De La Mare and Damian Panayi of Golder), the Government of Nunavut (Jacques Lacroix, Lauren Perrin, Stephen Atkinson), the Kivalliq Inuit Association (KIA) (Luis Manzo, Jeff Hart and Kim Poole), and the Baker Lake Hunter and Trappers Organization (HTO) (Jamie Seeteenak and Greg Tapatai). The workshop was hosted by Agnico Eagle at the Ottawa Airport – Hilton Garden Inn on February 22-23, 2017 from 830 to 1630 each day.

The purpose of the meeting was to follow up from the first workshop which was held in Winnipeg, MB on November 18, 2016 with roughly the same participants.

Workshop Agenda

Day 1: February 22nd – 8:30 to 4:30

- Introduction
- TEMP overview
- Review draft revisions as a follow-up to the November Workshop
- Address IRs related to:
  - Adaptive Management and monitoring tools;
  - Caribou mitigation and monitoring measures (see below);
  - Data availability, analysis, and collaboration;
  - Triggers and thresholds for adaptive management;
  - Blasting management, including zone of influence;
  - Site infrastructure, including the haul road;

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- Road access/traffic, harvesting, and caribou deflections;
- Cumulative effects.

Day 2: February 23rd – 8:30 to 3:00

- TEMP Live Edit and Tracked Changes
- Open Discussion on Future Monitoring and Research Studies

2.0 DAY 1 TEMP OVERVIEW AND IRs

A general discussion was held on various topics as they relate primarily to caribou detection and monitoring, and triggering of adaptive management. Below is a summary of those discussion topics.

Road discussion – somewhere in the TEMP there should be a detailed design of the haul road including widths, profile, materials, etc (alignment and profile has been updated). This description could include metrics around length of caribou passable design and length of road where caribou passing over the road is possible. Basically define what could be perceived as a barrier for caribou based on physical characteristics, heights, material, etc. This may have been in the original Whale Tail (Amaruq) road application and a map would suffice.

Group Size Threshold – continued discussion and definition of the 50 animal group size. Define as a single group of 50 or a count along a certain distance (say 50 within 1 km), certain area or certain timeframe. Some of these details need to be more defined in the next version of the TEMP.

Map of HOL Survey Locations – show viewscape of HOL surveys and road (i.e., existing AWAR and Amaruq haul road) based on DEM. Also, may be good to show some type of density-dependent indicator of caribou observations, so we can see if there are any areas that are missed based on HOL or road. This viewscape should be in the TEMP. The Viewshed is now complete and will be provided in the TEMP and in a separate technical memorandum (dated April 18, 2017).

Mitigation – the KivIA and GNDoE feel that mitigation is too vague, and several mitigation actions are at the discretion of the Superintendent, and not enough action. Reiterated that existing protocols and actions from Agnico Eagle will be stated in the next version of the TEMP.

Main comment of mitigation is that the monitoring does not necessary line up with the triggers/thresholds. For example, we are not clear on how far out caribou can be observed based on Height of Land survey locations and road-based observations. Discussion then expanded around the concept of having drivers report to dispatch, so that the data gets captured. By in large, this is exactly what happens now as follows: “12 caribou about 400 m east of the AWAR at KM XX”. This information could be used for daily count updates to help trigger monitoring, which would then have to be managed on a daily basis and owned by a single entity.

Objectives of the TEMP for Ungulates – **GNDoE** - be more specific for this section, in particular, define the objectives of the TEMP. Test Project effects and mitigation efficacy around migratory movements, establish a zone of influence to document what it is or what it isn’t. The GNDoE (Stephen A.) feels that this is not being done enough in Nunavut. Mitigation and monitoring could be tied to project phases (construction and operations and different operational activities within). KivIA suggested we review ENR’s ZOI working group draft document for the diamond mines as it discusses the when, why, how, etc for monitoring. Agnico Eagle and Golder are familiar with this as Golder has been involved in the development of this document.

KivIA– overall objectives should be discussed again, test effects (EA) predictions, test mitigation efficacy. What is the overall objectives from a big picture perspective. These objectives will be updated in the next version of the TEMP.

KivIA – Table 12. Ungulate activities within 1,000 m and adjacent to Project facilities and roads, unnatural caribou use patterns at >1,000 m. We discussed the different sensory triggers, but the ultimate measurement would be distribution and abundance. We are concerned about how big the ZOI and how intense it is (i.e., Steve Wilson paper was mentioned. Wilson, S.F. 2016. Managing Zone-of-Influence effects of oil and gas activities on terrestrial wildlife and habitats in British Columbia. Journal of Ecosystems & Management 16 (1):1–14. or perhaps it was Wilson, R.R., L.S. Parrett, K. Joly and J.R. Dau. 2015. Effects of roads on individual caribou movements during migration. Biological Conservation 195: 2–8). The main feeling is that distribution and abundance should be the main parameter for determining ZOI. The biggest data collection method is collar data (provided that it is programmed correctly) and aerial surveys, however, aerial surveys are not permissible in Nunavut. Objectives related to ZOI to include: assess distance and intensity, document and minimize. The second objective would be barriers to movement (direction, and barriers) so document and minimize. Third objective is mortality mitigation – which should also be avoided as much as possible.

KivIA – Table 12 in the TEMP. Another Potential effect is related to Hunting by Baker Lake Residents. What does it mean? Avoidance of caribou along the road due to hunting? What does that mean? Perhaps remove second row of this table. The Hunter Harvest Survey (HHS) would like to be re-initiated by Agnico Eagle through a partnership with the HTO, GN and KivIA.

Agnico Eagle – Latest conversations with **Agnico Eagle** and the **GN** to discuss/determine how frequent caribou data fixes are and how frequent they can be sent to **Agnico Eagle**. Question about Level 2 for a week – as a precaution stay in Level 2 for a week. **Agnico Eagle** is confident that they can get out of Level 2 within a week, and then the question is does it go back to operational or Level 1? This would depend on the data. The specific mitigation action needs to be flexible, Agnico Eagle can't stop all haul trucks for the entire week. If we look at other TEMPs, there is a seasonal component with different thresholds and different mitigation at different times. There are more fixed protocols at certain times of the year and more discretionary protocols at other times. For this project, caribou calving and post-calving distribution does not overlap with the Project, so perhaps just mention these but not likely have to deal with it. It shows that we're aware there are sensitive periods and we can ramp up on mitigation at certain times. **Agnico Eagle** wants to go back to what the mitigation is from an operational perspective. Shutting down the road for a week could be problematic, but the concern is that we need to have the monitoring in place to justify when to reduce the operational mitigation. **KivIA** is less concerned with Level 3 as long as a group of caribou can move through the mine area, perhaps this mitigation is group specific for crossing the road. Again, **KivIA** is more concerned with the sensory aspect and not the mortality aspect. **GNDoE** feels that we need to pull out the tables into a few different charts based on activity such as road, heavy equipment operation, blasting, etc and then further refine by season (as winter is not as important). **KivIA** feels that the heavy equipment on the road has a larger influence than the trucks rolling around the pit. **Agnico Eagle'**s response is that we box activities into Whale Tail pit and the haul road. We should then tease mitigation out by season as well. We could add a column or more rows in mitigation by season.

GNDoE – Monitoring and mitigation is a balancing act, if monitoring is low grade then mitigation is broader. If you have good monitoring than mitigation can be more fixed. We should consider some type of fixed mitigation during migration. **HTO** – elders say that during the spring migration time, more care should be paid for caribou at this time because they are sensitive to calving at this time. The **HTO** has been discussing having peak migration monitoring at the peak migration times. **HTO** had asked Agnico Eagle for the specific protocol on how to close

the road, as last year the road was shut down but the HTO felt the shutdown was too late and after the caribou were gone.

Agnico Eagle – in the next version of the TEMP we'll see more specific mitigation for when caribou are within 1.5 km of Whale Tail Pit and other features. **HTO** – commented that when the road was being built, caribou came after every quarry was blasted and the thought was that it was due to smell of food or curious to the new smells, etc.

Agnico Eagle – The GNDoE talks about the blast zone and 120 dBA seems to be a bit too high from a distance threshold. Sabina is 4 km and so is Meliadine. However, discussion around this distance is a bit mixed. The caribou response to the mining component and not necessarily blasting only. How do you detect caribou within 4 km? Are there actual information on blasting zones and effects to caribou. HOL surveys and their viewscape will help feed into the monitoring or caribou detection distance. Information to be used includes helicopters flying around, collar data, HOL survey, hunters/community folks. GNDoE would like to understand a bit more of what the process is, are these surveys done and then the decision is determined on blasting? A decision tree could be developed here.

Final thoughts on Caribou – **GNDoE** expressed concerns around the impact predictions for the Haul road, so Agnico Eagle would be monitoring harvest and some threshold for the HHS. What the **GNDoE** doesn't like is the 20% threshold and the onus to monitor overall harvest. Bit of a discussion around harvesting and hunting pressure. Agnico Eagle feels that the GNDoE should be an essential partner in the HHS but the GNDoE has still been non-committal. Agnico Eagle solicited the HTO and there were more than 60 ATVs on one weekday last year so there's a lot of pressure on caribou to KM 85. This is during peak migration, but according to **Agnico Eagle** (**Jamie Kataluk**) folks are out on the land outside of peak migration. Some go to Whitehills Lake to drink the fresh water. Caribou move away from where the people are. It's also not just Inuit – the GN also uses the road. When the road is used for hunting, they're going as far as the gas will allow. Experienced hunters like to go to areas where the perceived caribou health is better so they are travelling far to access those caribou. Should also be noted that road is maintained through post-closure, likely until 2040. Some confusion as to if there are new changes from the Whale Tail Haul road.

Predators – **KivIA** wanted to understand why 12 wolves have been killed on site over the past 10 years, seems high. **Agnico Eagle** – likely due to poor waste management and handling on site and found that there was an attraction to the site by wolves. Admittedly, the early actions (wolf dispatch) were excessive and we have since corrected these practices. Since 2012 there have been no mortalities until 2017 when we recently had worked with the GN, and unfortunately after about 1 month required to dispatch 2 wolves. Thresholds are around 2 – why is that and should it be 2 individuals of each species? Probably should be by species, and perhaps 2 should be justified. Culture has changed – waste management is better and people's actions are better. 1 Active den for thresholds. **HTO** – discussion of an incident with a sick wolf and the GN Conservation Officer (CO). Agnico Eagle – always follows the instruction of the CO and heeds their suggestions/actions/recommendations, etc.

Small Mammals – **KivIA** says the 100 individuals' threshold is not necessary. You can still keep track of information but don't have to have them as a VC. Luiz feels that fox, wolf and caribou are linked as compensation to the KivIA. Small mammals are likely not required to be part of the TEMP.

Raptors – **KivIA** - how do you tell if a nest failure is project-related or weather-related? Agnico Eagle relies on Alistair Franke and his research team to determine this. Really challenging to screen out nest failures based on project. Nest failure and productivity issues related to operations? This happens at so many sites, but really no detectable change from any mine. Commonly nest within the vicinity of project features – **KivIA** wants to see a

nest management plan if they're close to operations where Project activities may affect nests. At Ekati they discourage nests from being established at certain areas where the operations may be affected by an active nest. Take the top line out of the table – "healthy prey populations". **GNDoE** - have to keep the nest failure information in it. For the diamond mines, there is a nest action plan for nests in the "vicinity" of the project. However, you want triggers and thresholds and mitigation (Adaptive Management) for raptors and the nest management plan is the "cookbook". Still need Table 15 in there. Discussion around setting up management buffers around active nests on-site or in "vicinity". **GNDoE** – have to keep the table and some of the potential effects, etc. Define vicinity – maximum of 500 m according to KivIA.

Waterbirds – Table 16 changes. No changes requested, however, Agnico Eagle has received comments from Environment and Climate Change Canada (ECCC).

Upland Breeding Birds – Table 17 changes. Any comments on BBS? PRISM plot information. Get rid of the bird table. Perhaps just contribute to ECCC by doing PRISM work.

GNDoE – one last topic. Elsewhere, the GNDoE has seen reference to the idea of using various methods to deter or safely remove animals from a given zone, whether it's a blasting zone, or away from a road, etc. What's often not clear, is what are the criteria to undertake these actions? The GN's concern is around caribou hanging out in say the blasting zone prior to a blast. GN would like to see something on this, whether it's to use people, vehicles, or any type of deterrent. GN would like to know what the rules are, circumstances, rules, species, duration, etc. GN needs to understand that deterrents are not used to ensure the ongoing operations of the mine. As an example, do you need to move a herd off the runway if no planes are coming? But the GN does understand that there are situations when health and safety is a factor. **Agnico Eagle** response: normally encounter 5-10 on the airstrip, they go and check them out and see what they're doing and follow them around to see where they head off to and make sure they don't hit another hazardous area. But they usually don't have to deter them. **GNDoE** recognizes that they are presenting an extreme view of this, but the GN doesn't want the active moving of animals if it's unnecessary. Wildlife response plan, make sure there are deterrent plans for all beasts (e.g., bears). Use a zone approach that others have done – green, yellow, red. Example provided was bear management in Parks Canada – where management includes the closing of a campground to physical deterrent. Wants Flowchart: Hazard – yes/no, if no then done. Agnico Eagle did hire Bearwise in the past to develop protocols, these will be included in the next version of the TEMP.

Reporting – develop a Terrestrial Advisory Group (TAG) including the development of a terms of reference for this group. The TAG would meeting 1-2 times/year. Reporting can be determined through this but likely having a summary report annually and then perhaps a greater detailed analysis reporting every three years. Thinking of a table that outlines the monitoring activity/analysis and then columns according to phases of the Project – construction, operations, etc. Then frequency of analysis, every three years gives you some information. But an annual report helps so that you can see trends. ***Mitigation audit*** – once a year check in with the technicians on site to see how mitigation works, how often they implement certain mitigation, what other types of mitigation has been implemented, and what can be improved/changed.

1.0 DAY 2 - WILDLIFE MONITORING AND RESEARCH DISCUSSION

In the NWT, the ENR was delayed in terms of getting things initiated to set the regional scale for ZOI establishment and research program.

In Nunavut, you need an intermediate coordinator to have the GN to suggest a research program but it's not the mandate of a proponent to get this going. **Agnico Eagle** looks to the **GN** to play the coordination role, and these are good ideas. Let's keep the research focused on caribou and let's look at the work that **GNDoE** is doing.

GNDoE – thinking out loud, larger contributions and having relevance to operations and future operations, certainly the caribou interactions with road movements. For Whale Tail you have a "Before" scenario with collar movements and ties into a BACI – should look at this right away. Lots of mitigation/management measures proposed but no experimental way to assess these. 1) How well are HOL surveys picking up caribou? Could look at double observer counts. 2) Sensory disturbance: better to slow down or better to speed up – optimum traffic pattern, gaps between vehicles, or convoys with wider gaps, what is the best scenario to decrease sensory disturbance? Part of this can be to determine the spacing, and identify gaps in between vehicles, what has this done to allow for caribou to cross through the road. What if we put in a mandatory 2 hour break to see if that helps better. 3) Unmanned surveys – take a video of the landscape and have HTO count the caribou from the video, could do it by multiple people. Drones are not a good idea from the HTO perspective, from their perspective, a drone is harassment to wildlife.

HTO Ideas - talked to Agnico Eagle to hire local people that know the names of the land, the people and the caribou. These are people that can help to make decisions on whether to shut down the road, etc. The community is like one (i.e., connected), hiring someone local can help with understanding when the caribou are coming, etc. Last year, caribou were up in the switchback area, there was a lot of caribou and a lot of people. When the caribou were gone, then the road was shut down – too late. Someone local could be working on the road with his ATV so that they can go to the right spots on the land. From the HTOs perspective, the HOL locations if chosen by Agnico Eagle will be useless. Agnico Eagle has an action to include the HTO in HOL survey locations. **HTO** – would be nice, contract or not, if the person monitoring on the road will have a radio to call back to the gatehouse to document the information. **Agnico Eagle** – leveraging information from people using the roads, same as the previous thought on reporting for example "12 caribou 500 m west of KM 22". **HTO** member could be road monitor and also explain safety, etc. **Agnico Eagle** – opportunity to deliver training and build capacity with more locals. **Agnico Eagle** are trying to meet with Rankin HTO to start wildlife road monitoring. Agnico Eagle spoke about Meliadine as they were shut down for 8 days last year, so perhaps this is where we can try the different convoy speeds/spacing issue.

GNDoE – build a predictive model based on movement predictors to help with knowing when to be prepared.

Agnico Eagle – do a study design at the different sites and have them run at the same time, in terms of HOL surveys and spacing/convoying, etc. Could have more than one person in town able to do these wildlife surveys.

KivIA – areas identified for caribou crossings is good, but you need to work on friendly crossings. If it's a friendly crossing, then perhaps speed is not an issue. **Agnico Eagle** - Can you test road profile at various crossings to determine crossing design? **KivIA** – Ekati looked at this through camera data, pretty conclusive that high, steep and big boulders dissuade animals, and low, gradually sloped with smaller materials is easier. Need to look at caribou trails, collar data, etc. to make sure that the road is as permeable as possible. No study design is necessary. Sable pit example – know the caribou trail locations, got the elders on the site to help guide where to put the crossings.

HTO – during one of the meetings at the community hall, there was mention of the hovercraft. Where is that at right now? **Agnico Eagle** – hovercrafts are proposed to be used for exploration purposes from Meadowbank, 2 hovercrafts to be used on approved winter routes. Used to move personnel and light materials, and they will be used all seasons on these currently approved winter routes. If this is feasible, we will evaluate other uses at a

broader scale. **GN** – discussed how loud these things are. **Agnico Eagle** – yes, there are some challenges with the equipment/engine, so Agnico Eagle has altered the engine to reduce the noise. Definitely can be a game changer for Nunavut transportation. **HTO** – send an email the first time that the skirt rips.

KivIA – everything that is done for caribou, you're going to do the same for Muskox? Try and do the same to not scare them? **Agnico Eagle** – yes, operations team knew of them last year and the animals were crossing the Vault road frequently. **Agnico Eagle** – operators were asked to slow down and turn off their strobe lights as they were passing by muskox. **GNDoE** - they are not migratory so they can have multiple stressors at more than one point in time for an individual. Very little telemetry work done on muskox, perhaps there is something to look at here, for example there could be multiple touch points from a muskox and operations. Others have looked at stress hormones (Sabina), but the GN has mixed feelings on this.

KivIA – when they haul to Meadowbank is it stockpiled or straight into the mill? **Agnico Eagle** - Production rate is 9,000 T/D and haul can be 6,000 – 13,000 T/D, as an example, stockpiling could be done up to 4,000 T/D right at the mill. **KivIA** – this does not deter the possibility of established a convoy or haul ceasing so that the road can be quiet. **Agnico Eagle** – depends on current production, stockpile volumes, etc. In the realm of possibility but situation dependent.

GNDoE – another idea around animal mortalities. If you're documenting animals that are dying (euthanized), have you ever thought about getting them sent out for proper necropsy? There is a Veterinary college in Montreal, and they could build a database of animal health. You may start to gather a bit of information on reasons, it's a contribution of knowledge on health to wildlife in the region and not necessarily to blame the mine proponent. It's a contribution to health science but understood that it is not a mandate to **Agnico Eagle**. You could create an arrangement with St. Hyacinth to see if they would jump at the opportunity to deal with these euthanized animals. **Agnico Eagle** – do they need the whole animal for the necropsy, but perhaps without the hide is ok.

GNDoE – any meteorological monitoring on site? **Agnico Eagle** - Yes, we collect precipitation, wind, temperature, and is used for the airport for travel. **GNDoE** – thinking about noise model projections in the FEIS, testing those predictions – noise monitoring program, but are we looking at receptor thresholds. Monitoring locations are 1 – 2 km away from the blast area. Could look at the real data from years past to see what the noise levels actually are. If you take your predicted traffic count and speed, if you're standing at one spot in the road, the noise is going to peak then drop-off then peak and drop-off, etc. How far apart do two trucks have to be so that noise effects don't overlap? **KivIA**– vibration off blasts is still a sensory cue. Dust is more of a sensory disturbance but it's at a different scale, this forage is covered with dust and doesn't taste good. Versus caribou react to truck, blast, etc. – more immediate.

2.0 REAL DELIVERABLES

- **Whale Tail Haul Road** and crossings and detailed design of road (profile, materials, height, etc.)
- **Viewscapes** – HOL locations, road, etc. Need some buffers for functional viewscapes (provided to NIRB on April 19th, 2017)
- **TEMP** – revise the document prior to the final hearing and next workshop (Approximately early June). Specifically, revise decision trees – haul road, AWAR, and mine pit operations and then by season.
- **GN/HTO/KivIA** – think about the HHS (based out of Baker Lake) and determine how to promote it within their organizations. Suggestion was made to have an independent group that will facilitate this work.