

APPENDIX

GN Comment # 01	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Flight Compliance Reporting
Terms and Conditions	59,71, and 72
References	180403-08MN053-2017 Annual Report-IA2E
IDENTIFICATION OF ISSUE	
<p>The Proponent has recently implemented a system requiring all helicopter pilots to complete a flight log to track flight data. Part of this log is the justification for flight altitudes lower than the required flight altitudes of 1,100m and 650m inside and outside the snow goose conservation area respectively in the project's terms and conditions. The Proponent has analyzed and separated the flight data into the following 6 categories:</p> <ol style="list-style-type: none"> <i>1. Those data within the snow goose area in July and August, where the 1,100 m agl elevation requirement was achieved (compliant);</i> <i>2. Those data within the snow goose area in July and August where the 1,100 m agl elevation requirement was not achieved, but lower elevation flying was justified by pilots (compliant);</i> <i>3. Those data within the snow goose area in July and August where the 1,100 m agl elevation requirement was not achieved and no justification for low level flying was given (non-compliant);</i> <i>4. Those data within and outside the snow goose area in all months where the 650 m agl elevation requirement was achieved (compliant);</i> <i>5. Those data within and outside the snow goose area in all months where the 650 m agl elevation requirement was not achieved, but lower elevation flying was justified by pilots (compliant); and</i> <i>6. Those data within and outside the snow goose area in all months where the 650 m agl elevation requirement was not achieved and no justification for low level flying was given (non-compliant).</i> <p>The Government of Nunavut (GN) appreciates the 6-category model but has concerns regarding the compliant vs. non-compliant system as chosen by the Proponent. Reporting flights that are below the minimum altitudes required by the T&C as compliant skews the perception of the actual disturbance to</p>	

wildlife resulting from helicopter overflights.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

Helicopters and other aircraft represent a source of both auditory and visual disturbance for wildlife. Disturbance of this nature can increase stress on animals and result in avoidance behaviour that can increase caloric needs and decrease likelihood of survival. The evaluation of Project related effects requires a clear presentation of real-world circumstances including compliance with flight altitudes required by the relevant Project T&Cs.

RECOMMENDATION(S)

The GN recognizes that flights with justification for flying below the prescribed altitudes, including aircraft and human safety, are compliant with the relevant terms and conditions. However, low level flights, justified or not, will still impact wildlife. In order to more accurately capture Project effects, the GN recommends that the Proponent amends its presentation of flight data.

The GN requests that flight data are presented in more than just binary categories of “compliant” and “non-compliant”. Flight data should be presented as:

- 1) Whether the altitude requirement was adhered to or not, and
- 2) Flights as having justification (compliant), or not (non-compliant) for their flown altitudes.

This approach captures both the total number of flights below required altitudes, and those where no justification was given.

The GN requests that the Proponent amend the reporting structure for clarity and stakeholder review. This will help the Proponent, NIRB, and stakeholders assess the potential cumulative effects of overflights on wildlife.

GN Comment # 02																	
Department	Environment																
Organization	Government of Nunavut																
Subject/Topic	Caribou Monitoring Methods - Height of Land Surveys																
Terms and Conditions	53																
References	<ul style="list-style-type: none"> • 180403-08MN053-2017 Annual Report-IA2E (BIMC 2018) • 2017 Mary River Project Terrestrial Environment Annual Monitoring Report (EDI 2018) • 2016 Terrestrial Environment Annual Monitoring Report (EDI 2017) 																
IDENTIFICATION OF ISSUE																	
<p>Section 4.6.8 of the Proponent’s Annual Report provides an overview of Baffinland Iron Mines (BIM) 2017 monitoring activities to address terrestrial concerns, with note of particular emphasis on the monitoring of caribou:</p> <p style="text-align: center;"><i>“Caribou has been and continues to be one of the primary focusses of stakeholder concern with respect to the terrestrial environment. The TEWG is a stakeholder body that Baffinland interacts with regarding caribou and other components of the terrestrial environment.”</i></p> <p>Table 4.17 lists the possible project effects on the terrestrial environment and the monitoring programs used to assess these effects.</p> <p>Table 4.17 Terrestrial Environment Impact Evaluation</p> <table border="1"> <thead> <tr> <th style="background-color: #c00000; color: white;">Component</th> <th style="background-color: #c00000; color: white;">Effects</th> <th style="background-color: #c00000; color: white;">Monitoring Program</th> <th style="background-color: #c00000; color: white;">Impact</th> </tr> </thead> <tbody> <tr> <td>Habitat Loss</td> <td>Direct habitat loss due to the Project footprint, and indirect habitat loss due to sensory disturbances</td> <td>Height of Land monitoring; snow track and snow bank monitoring; incidental observations; GN regional aerial surveys.</td> <td>Within FEIS predictions</td> </tr> <tr> <td>Restriction of Movement</td> <td>Project infrastructure and the tote road act as a barrier to the movement of caribou</td> <td>Regional numbers appear very low.</td> <td></td> </tr> <tr> <td>Mortality</td> <td>Mortality resulting from vehicle collisions or project-induced hunting</td> <td>Incidental observations; biologists and other staff on-site: no mortalities observed</td> <td>Within FEIS predictions</td> </tr> </tbody> </table> <p>The Proponent’s Annual Report describes the methods employed in conducting the caribou height of land (HOL) surveys and the amount of time employed for survey effort and the results of the surveys.</p>		Component	Effects	Monitoring Program	Impact	Habitat Loss	Direct habitat loss due to the Project footprint, and indirect habitat loss due to sensory disturbances	Height of Land monitoring; snow track and snow bank monitoring; incidental observations; GN regional aerial surveys.	Within FEIS predictions	Restriction of Movement	Project infrastructure and the tote road act as a barrier to the movement of caribou	Regional numbers appear very low.		Mortality	Mortality resulting from vehicle collisions or project-induced hunting	Incidental observations; biologists and other staff on-site: no mortalities observed	Within FEIS predictions
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During 2017, the Proponent's Terrestrial Monitoring Report states that a total of 19 hours 28 minutes of survey effort were undertaken, and that no caribou were detected during the surveys in 2017. The surveys have failed to detect caribou since 2013. The Government of Nunavut (GN) is concerned that these surveys are failing to meet the objective of detecting project related effects on caribou.

The fact that no caribou were observed in the last 4 years could be a result of the following:

- 1) Caribou were not detected because they are simply not present in the area during the survey, possibly owing to low population density or low survey effort.
- 2) Caribou were not detected due to avoidance behaviour and/or deflection from Project infrastructure and activities.

The GN is concerned that the current study design and level of survey effort does not offer the power to distinguish between these two possibilities.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

In both the GN's 2014 and 2015 comments on the Proponent's annual reporting the GN made the following recommendation: "Contributing to the regional monitoring effort lead by the GN would be a far more efficient way for Baffinland to conduct caribou monitoring at this time."

The GN also commented in both its 2014 and 2015 Annual Report comments that "[t]he current study design will not be able to detect project effects. The current sampling intensity of 21 hours over the year represents 0.2% of the time when caribou could be present. The sampling extent is similarly limited and will be insufficient to detect any behavioural or other effects the road may have on caribou" (GN, 2014 Mary River Annual Report Comment #2).

In 2017 the effort by the Proponent increased HOL survey effort from ~12.5 hours in 2016, to 19.5 hours, but this represents an increase of just 0.08% of the time when caribou might be present, divided among the 23 HOL survey sites surveyed in 2017. The time spent conducting the HOL survey is insufficient to detect any Project effects.

Furthermore, the study design relies on behavioural observations to indicate how caribou might be interacting with Project infrastructure and activities. This approach is only effective when caribou are frequently observed, such as in instances of high caribou population density. The North Baffin population density is too low, and surveys have failed to collect any observations in the last 4 years.

RECOMMENDATION(S)

The GN requests that the Proponent monitor project effects on caribou as required by the Terms and Conditions by:

- Significantly increasing the HOL survey effort such that a large, statistically defensible portion of the year when caribou may be present along the road corridor is being observed (similar to what the Proponent does for monitoring narwhal at Bruce Head)

Or, given the low densities of caribou in the PDA and the survey area, the Proponent could alternatively:

- Invest the effort of an **improved** HOL survey into regional monitoring programs led by the GN, including aerial surveys and collaring programs, so as to increase effort in areas of the

PDA where caribou may be present.

The GN expects the Proponent to work closely with the GN and the TEWG when developing and/or modifying mitigation and monitoring programs.

GN Comment # 03	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Caribou Monitoring Methods- Snow Track Surveys
Terms and Conditions	53
References	180403-08MN053-2017 Annual Report-IA2E
IDENTIFICATION OF ISSUE	
<p>Section 4 of the Proponent’s annual report, Project Certificate Condition No. 53, to monitor and mitigate impacts of the transportation corridor to caribou.</p> <p>The Proponent utilizes a variety of methods to attempt to satisfy the project condition including snow track surveys. According to the Proponent, “[s]now track surveys are used to monitor caribou interaction with the Tote Road to determine if they cross it or deflect their paths of movement, and are conducted once annually” (BIM 2017 AR).</p> <p>These surveys will not have power to detect project related effects due to:</p> <ol style="list-style-type: none"> a) Incomplete study design (lacking important covariates) b) Small sample size c) Low caribou densities d) Narrow field of view and proximity to the road prevents detection of deflection or avoidance behaviour <p>Snow tracking effort was further reduced in terms of spatial extent in 2017:</p> <p style="padding-left: 40px;"><i>“In 2017, the snow track survey was conducted differently than in previous years due to an abundance of high snowbanks (>1 m) observed along the Tote Road, which would have made it difficult or impossible to see potential tracks beyond the banks from the truck. Instead of driving slowly along the Tote Road and looking for tracks from the vehicle, the survey team stopped at every kilometer marker and got out of the truck to look for tracks behind the snow banks. In areas where snowbank heights were <1 m, surveyors still got out of the truck to look for tracks in order to maintain consistent methods at all survey points. Some additional stops were made between kilometer markers if tracks were observed, or if snowbanks appeared to be >2 m in height.”</i></p> <p>Assuming the field of view of the observer is similar in both cases – driving along the road making continuous observations and stopping to get out at each km marker – the latter represents approximately 30 times less area observed than continuous observations used in previous years.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	

Snow track surveys are intended to “monitor caribou interaction with the Tote Road to determine if they cross it or deflect their paths of movement”, yet they are only “conducted once annually”.

Detecting presence/absence of an animal requires multiple visits within a season and even then, only allows inference of animal activity in the biologically relevant season for a species. Furthermore, since snow tracks can be altered or *erased* by wind, snowfall, and temperature changes, this method requires a measure of the length of time that tracks may have accumulated since a clearing event.

Assessing snow tracks from the tote road serves to limit the ability of the program to assess deflection. Observers are limited by their line of sight, and if caribou are deflected from the road or exhibit avoidance behaviour that keeps them – and their tracks – outside of the observers’ line of sight from the road, then these impacts would remain undetected by the snow track survey.

The current study design only captures one example of deflection, whereby the snowbank height doesn’t allow for caribou to cross the road, so they closely parallel the road until finding a suitable place to cross it or turn away and do not cross. The modification of the study design utilized in 2017 further reduces the deflection detectability, as a deflected crossing could occur within the 1km between observation points.

RECOMMENDATION(S)

The GN requests that the Proponent:

- a) Significantly increase the snow tracking effort (i.e. more than once a year), and
- b) Modify the study design to include a measure of track resetting events, and
- c) Address the issue of limited detection of deflection or avoidance behaviour, e.g. consider utilizing snow machines to conduct track surveys at an offset from the road, and
- d) Maintain consistency in the spatial extent of surveys between years (after an initial increase), as the current design is insufficient to represent animal activity along the tote road.

The GN recognizes that caribou populations are low, and detectability is reduced as a result. While snow track surveys are not supporting the monitoring of caribou, they do serve to collect data on other furbearers. As an alternative to continued snow track surveys, the GN would support an alternative approach:

- a) Invest the effort of an **improved** snow tracking survey into a contribution toward regional caribou monitoring studies operated by either the proponent, or the GN (see GN comment #02)
- b) This annual contribution to regional studies would continue until such time that caribou populations increase to the point that snow tracking surveys would detect caribou interaction with the tote road.

Changes to study design should be made in consultation with the TEWG. The study design should be of the same standard of statistically rigorous snow tracking studies found in published primary literature.

GN Comment # 04	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Snowbank Monitoring and Traffic Management
Terms and Conditions	53
References	180403-08MN053-2017 Annual Report-IA2E
IDENTIFICATION OF ISSUE	
<p>Section 4 of the Proponent’s Annual Report, Project Certificate Condition No. 53, addresses the requirement of the Proponent to mitigate impacts to caribou from Project-related traffic including from snowbanks along the tote road.</p> <p>The Proponent has committed to managing snowbank heights to less than 1m to facilitate movement of caribou across the road corridor. Compliance to snowbank heights of 1m has dropped from 85% of sampling sites in 2016, to 65% in 2017.</p> <p>The Annual Report provides no indication of snowbank height compliance relative to areas known to be traditional caribou use areas.</p> <p>The barrier effect of the road is not limited to only snowbank heights. Noise and vibration from trucks can cause caribou to avoid roads, as can high traffic volume. These impacts are not currently dealt with by the Proponent.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>Managing snowbank heights is the principal mitigation the Proponent is undertaking to limit road barrier effects to caribou:</p> <p style="text-align: center;"><i>“Due to low embankments and existing low profile road conditions, there were no caribou crossings proposed for the Tote Road. Monitoring to date has focused on managing snowbank heights to minimize barriers to movement.”</i></p> <p>The current monitoring methods are limited to one visit in April and are thus not likely indicative of snowbank heights throughout the winter. Management methods for snowbanks are not achieving the 1m limit in 35% of sampled sites.</p> <p>In 2017 “there was an average number of 196 ore haul transits per day”, though total transits sometimes exceed 350 per day. The means caribou attempting to cross the tote road will encounter on average 1 ore truck every 7 minutes and up to 1 vehicle every 4 minutes. The potential impact of truck traffic on caribou deflection from the road corridor is not addressed by any of the current mitigations.</p>	

RECOMMENDATION(S)

The GN requests that the Proponent increase its effort in monitoring snowbank heights to 1 visit per month during snow accumulation months. The GN also requests that the Proponent provide more detail in reporting snowbank heights, including spatial locations of exceedances of 1m relative to expected caribou movement corridors.

The GN requests that the Proponent improve snowbank height management, particularly in areas known to be traditional movement corridors for caribou.

The GN requests that the Proponent start explicitly addressing the barrier effect of traffic volume, especially given that traffic volumes are expected to continue to increase in the near future. This effort should include acknowledgement of the potential impacts of traffic volume and a strategy to address these impacts with specific mitigations.

GN Comment # 05	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Dustfall
Terms and Conditions	10, 34, 53, 58
References	<ul style="list-style-type: none"> • 180403-08MN053-2017 Annual Report-IA2E • 2017 Mary River Project Terrestrial Environment Annual Monitoring Report (EDI 2018) • Mary River Project Addendum to Final Environmental Impact Statement: Volume 6-Terrestrial Environment. 58 pp. (BIM 2013)
IDENTIFICATION OF ISSUE	
<p>Section 4 of the Proponent’s annual report, addresses the requirement of the Proponent to develop, implement, and report on specific plans for monitoring and mitigating dustfall. Dustfall is to be monitored at intervals in the vicinity of the Milne Inlet Tote Road and project development areas as a basis for adaptive management. Mitigation measures are to be established if monitoring indicates dust deposition from Project activity exceeds predictions.</p> <p>The deposition of fugitive dust throughout the project area has been substantially higher than initially predicted. In 2017, the average dustfall value for all sites with dust thresholds exceeded predictions by 300%, and dustfall at two sites (DF-RS-04, and DF-RN-04) exceeded predictions by 800%. The monitoring program has detected project generated dust, however there appears to have been little effort in enacting specific adaptive management measures to resolve multi-year exceedances in dustfall.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>Consistent year-to-year exceedances in predicted dustfall suggest the Proponent’s chosen mitigation methods and efforts are unable to control project related dust emissions. Project Certificate T&C 10 requires the Proponent to develop and implement the specific adaptive management measures if monitoring indicates that dust deposition from project activity is greater than initially predicted. As reported in the 2017 Terrestrial Environment Annual Report (EDI 2018), dust suppression activities did occur and were potentially successful in reducing dustfall to a degree but were generally insufficient to reduce dustfall to predicted levels. Only two sites were below the set threshold value, and by less than a 10% margin.</p> <p>The isopleth model developed by BIMC in 2013 (BIM 2013) does not reflect the level of dust generated through Project activity. Not only are dustfall values generally more than 300% higher than predicted, the average dust collected at sites in the “moderate” isopleth category is 70% higher than those in the “high” category.</p>	

These inaccuracies need to be corrected through a revision of the isopleth model as a basis for the dustfall and vegetation monitoring programs. In order to measure project related effects on vegetation it is necessary to sample sites receiving the highest and most variable levels of dustfall. Within the vegetation program, “four distance classes were chosen based on a review of relevant available literature and dust isopleth modeling” (BIM 2013). Inaccuracies in the dust model will therefore result in inaccuracies in the measured impact to vegetation and weaken the vegetation study design.

The dustfall model should be re-parameterized and calibrated using multiple years of available dustfall data coupled with an updated understanding of likely changes to project activities and infrastructure in the immediate future. For added clarity, this should be done independently of the Phase 2 proposal.

RECOMMENDATION(S)

The GN requests that the Proponent:

- 1) Revise the dust isopleth model using data from dustfall collection thus far and the level of Project activities projected for 2018. Should Project activity change substantially in the future, the model should be revised again;
- 2) Review and revise other monitoring programs which were designed using the former isopleth model. This should result in additional sample sites for dust, vegetation and metals monitoring where the largest amount of dust is being generated. Existing sites should remain to maintain data continuity and model calibration;
- 3) Revise its Dust Management, Roads Management, and/or other relevant Management Plans to include “specific adaptive management measures to be considered if monitoring indicates that dust deposition from Project activity is greater than initially predicted” as required by T&C 10;
- 4) Take sufficient steps in 2018 to control its dust emissions from both the tote road and point sources throughout the Project area, through the implementation of the revised isopleth model and management plans;
- 5) Work with the TEWG to review and approve changes to existing mitigation and monitoring programs.

GN Comment # 06	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Vegetation Monitoring Methods
Terms and Conditions	36, 38, 50, 58
References	<ul style="list-style-type: none"> • 180403-08MN053-2017 Annual Report-IA2E (Annual Report) • 2017 Mary River Project Terrestrial Environment Annual Monitoring Report (EDI 2018) (TEAMR) • Hasselbach, L., et al. (2004). Spatial patterns of cadmium and lead deposition on and adjacent to National Park Service lands in the vicinity of Red Dog Mine, Alaska. <i>Science of the Environment</i>, 348, 211-230. • Neitlich, P. N., et al. (2017). Trends in spatial patterns of heavy metal deposition on National Park Service lands along the Red Dog Mine haul road, Alaska, 2001-2006. <i>PLoS ONE</i> 12(5): e0177936. https://doi.org/10.1371/journal.pone.0177936
IDENTIFICATION OF ISSUE	
<p>Section 4 of the Proponent’s annual report, Project Certificate Condition No. 36, Vegetation Monitoring, provides an overview of monitoring activities relevant to detection of project related effect to vegetation. The Proponent states that “[t]here is no evidence of changes in vegetation abundance in the Project area from 2014 to 2017 as a result of the Project.... As a result, there is no evidence to support a Project-related effect.”</p> <p>However, the current study design lacks sufficient survey effort and statistical power to detect most project related effects. Furthermore, there is no monitoring effort in some areas receiving the highest levels of dustfall, which will lead to underreporting of impacts to vegetation. In 2014:</p> <p style="padding-left: 40px;"><i>“The GN suggested power detection for the exclosures is poor due to site variability, low coverage, etc. The way it is currently laid out, BIM would not have the power to detect meaningful change over a meaningful timeframe. Overall, the GN was concerned that the project will not yield useful data for assessing project effects.”</i> (TEWG Meeting 5 Notes, November 26, 2014)</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>The current study design is not statistically robust and does not allow the Proponent to determine if there are medium to large scale project related effects on vegetation.</p> <p>The Proponent monitors 15 transects for a total of 66 sites (EDI 2018) over a large impacted area</p>	

including more than 100km of road. 20 of the 66 sites are along the tote road, with the remaining 46 sites surrounding the mine site and Milne Port. Similar studies completed in Alaska along the Red Dog Mine haul road (75km) utilized over 150 sites (Neitlich et al. 2017, Hasselbach et al. 2004). The Proponent's study represents a relatively small amount of effort over such a large geographic extent and, according to a power analyses run by the Proponent in 2014, this study design will only be able to detect large changes to the vegetation community (2014 Terrestrial Environment Annual Monitoring Report). Natural background variation in the study area, as indicated in the 2017 TEAMR, will further confound the lack of detectable project effects.

The Proponent monitors sites based on initial study design in order to detect effects of dustfall and pollution on vegetation. An additional problem arises from the fact that dustfall predictions have varied widely from the isopleth modeling upon which the vegetation study was designed, and dustfall has consistently exceeded predictions. In 2017, this was by as much as 800% in two locations (DF-RS-04, and DF-RN-04).

Furthermore, the areas most impacted by dustfall may not be sampled and any conclusions regarding project related effects may be incorrect (see maps 2, 3, 4 from the 2017 TEAMR). Several areas of intense dust suppression do not have adjacent vegetation or dust collection sites.

RECOMMENDATION(S)

The GN requests that the Proponent increase its effort to monitor Project related effects on vegetation as required to meet Terms and Conditions. The Proponent could accomplish this through all of the following:

- a) Conducting a new power analysis with data collected since 2014 to both assess the ability to detect differences between years within sites and between years and across sites by distance class, and adjusting the study effort based on the results of that analysis
- b) Increasing the number of transects and sample sites according to a minimum accepted Project effects threshold as agreed to by the TEWG and supported by the new power analysis
- c) Add additional sample transects and sample sites where the greatest impact to vegetation from dustfall is occurring. Possible sites likely correspond to the areas along the tote road where dust suppression activities are required to meet OHS requirements
- d) Re-evaluating the dustfall isopleth model using real data collected at the Project site and making subsequent modifications to the vegetation study based on the new, more accurate dustfall model

The GN also requests that the text in future reports reflects the limitations of the current study design and resulting datasets to detect Project related effects on vegetation.

GN Comment # 07	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Metals Monitoring
Terms and Conditions	34, 58
References	<ul style="list-style-type: none"> • 180403-08MN053-2017 Annual Report-IA2E • 2017 Mary River Project Terrestrial Environment Annual Monitoring Report (EDI 2018) (TEAMR) • Hasselbach, L., et al. (2004). Spatial patterns of cadmium and lead deposition on and adjacent to National Park Service lands in the vicinity of Red Dog Mine, Alaska. <i>Science of the Environment</i>, 348, 211-230. • Neitlich, P. N., et al. (2017). Trends in spatial patterns of heavy metal deposition on National Park Service lands along the Red Dog Mine haul road, Alaska, 2001-2006. <i>PLoS ONE</i> 12(5): e0177936. https://doi.org/10.1371/journal.pone.0177936
IDENTIFICATION OF ISSUE	
<p>Section 4.6.8 of the Proponent’s annual report addresses the requirement of the Proponent to monitor soil metal levels to “mitigate and monitor for impacts to wildlife”.</p> <p>The main vector for metal contamination is dustfall, which has exceeded all predictions by an average of 300%, and in two cases by 800% (DF-RS-04, and DF-RN-04).</p> <p>In 2016, two sites exceeded threshold levels of metals. The Proponent attributed the high values to sampling or analytical errors:</p> <p style="padding-left: 40px;"><i>“Metal concentrations in soil and lichen samples [in 2017] at sites L-71 and L-91 were below CCME and relevant thresholds provided in the literature, suggesting that 2016 sample analysis may have been elevated due to either analytical or field collection outliers.”</i></p> <p>Interannual variation in precipitation, runoff, dustfall, and vegetation cover, combined with a relatively small sample size and lack of duplicates cast sufficient doubt on the Proponent’s claim that the elevated metals concentrations found in 2016 are outliers. There is no evidence available to support their claim, nor do the data support the veracity of the sample analysis. As such, the Proponent should not assume that the measured exceedances are outliers.</p> <p>Higher than predicted metals levels and multi-year dustfall exceedances suggest an increase in metals sampling is required.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	

Monitoring and mitigating contamination of soil, caribou forage and possibly caribou is of the utmost importance. According to the Proponent: “Samples are analyzed for total metal concentrations to assess the relationship of metals in soil and lichen with distance from the PDA.”

The Proponent sampled a total of 117 sites between 2012-16, however, less than 10 of these sites are in close proximity to the one of the largest Project related sources of metals to the environment - the tote road. Similar studies in Alaska on the Red Dog Mine haul road utilized over 150 sites along the road, with duplicates making up an additional 50% of samples for over 225 (Hasselbach, et al. 2004).

Multi-year exceedances in dustfall, along with large gaps in study coverage in the areas experiencing the highest levels of dustfall necessitate additional sample sites. Using dust suppression effort, necessitated by Occupational Health and Safety (OHS) reasons, as a proxy for dustfall volume, these sites can be easily identified in Maps 2,3 of the 2017 TEAMR.

The GN supports this work, however changes need to be made to the sampling program in order for the Proponent to substantiate claims of no Project related effects.

RECOMMENDATION(S)

The GN requests that the Proponent expand the metals monitoring program by:

- a) Increasing the number of sampling sites in parallel to an expanded vegetation monitoring program targeting sites receiving the most dustfall
- b) Utilize sample sites expected to have the highest dustfall, based on an updated and verified dustfall isopleth model, and opinion of site-based personnel conducting dust suppression.
- c) Utilize duplicates when completing metals analysis
- d) When a site tests above threshold levels, test duplicates (if available) and additional new sites in the vicinity. Retest the site shown to exceed thresholds, for at least 3 continuous years to verify high value are indeed a result of sampling errors.
- e) Consider archiving samples for reanalysis, should the need arise

GN Comment # 08	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Marine and Terrestrial Environment Working Groups (MEWG/TEWG)
Terms and Conditions	49, 77
References	180403-08MN053-2017 Annual Report-IA2E
IDENTIFICATION OF ISSUE	
<p>Section 4 of the Proponents annual report addresses the requirement of the Proponent to establish Marine and Terrestrial Environment Working Groups (MEWG/TEWG), which will act as advisory groups in connection with mitigation measures for the protection of the marine and terrestrial environments, and in connection with its Environmental Effects Monitoring Program, as it pertains to the marine and terrestrial environments.</p> <p>The MEWG/TEWG are advisory bodies and do not determine the monitoring requirements of the Proponent. In order for reviewers of annual monitoring reports to assess the effectiveness of these groups, it is necessary to review the record of recommendations made by members of the MEWG/TEWG to amend mitigation and monitoring programs. Further, these recommendations need to be assessed against any modifications made by the Proponent.</p> <p>As stated by the GN during the Nov. 2017, MEWG meeting: “The MEWG has been reactionary to BIMC, not proactive in reviewing and advising on Project and monitoring program changes.” This statement emphasizes the fact that the working groups have not been involved in the development of mitigation and monitoring programs, only proposing changes once rolled out by the Proponent.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>The GN has repeatedly presented its recommended changes at the MEWG/TEWG that have not been accepted, for example, those regarding HOL caribou surveys. While the GN acknowledges that the MEWG/TEWG are advisory bodies and have no formal authority to direct the Proponent’s actions, it is necessary for the Proponent to record in the Annual Report a history of recommendations made by members of the MEWG/TEWG, and which the Proponent acted upon, and which it did not.</p>	
RECOMMENDATION(S)	
<p>The GN requests that the Proponent report on significant study design changes recommended by the GN and other members of the MEWG/TEWG.</p> <p>This reporting would most effectively take the form of a table listing recommendations raised at the</p>	

working group meetings, whether the recommendations were accepted, varied or rejected and a justification for doing so, citing the appropriate project condition. This would allow regulatory agencies to better judge the efficacy of the MEWG/TEWG model in fulfillment of project conditions 49 & 77, as well as the requirement for adaptive and collaborative management.

GN Comment # 09	
Department	Health
Organization	Government of Nunavut
Subject/Topic	Impacts to Health Services
Terms and Conditions	158
References	<ul style="list-style-type: none"> • Mary River Project, 2017 NIRB Annual Monitoring Report page 364 • Appendix F – Socioeconomic monitoring report page 72, pg. 74
IDENTIFICATION OF ISSUE	
<p>In the Mary River Project 2017 NIRB Annual Monitoring Report, the recommendation/lessons learned under Condition 158 comment on impacts from net migration. Appendix F – Socioeconomic monitoring report page 72, notes:</p> <p style="padding-left: 40px;"><i>“In 2017, there were 6,337 recorded visits to the Project site medic, an increase of 2,325 visits from 2016.”</i></p> <p>Page 74 further notes:</p> <p style="padding-left: 40px;"><i>“One of the primary ways the Project could negatively influence health service provision in the North Baffin LSA in-migration of workers - has been shown not to be occurring in any significant manner. In fact, the Project may be having a positive effect on LSA health service provision, by providing employees with regular access to an on-site Project medic. Baffinland’s benefit plan also includes an EFAP which offers all permanent employees and their dependents professional short-term counselling on an as-needed basis. On-site Inuit Elders are also available for the Project’s Inuit employees to meet with. This access allows LSA employees to have at least some of their health needs addressed on-site, thereby reducing demands placed on local health care providers.”</i></p> <p>Impacts to Government of Nunavut Department of Health services can occur other than from in-migration. The impacts can be both positive and negative on the department of health.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>Although net migration does not appear to impact health services, net migration is not the only possible health service impact. Both positive and negative impacts need to be further investigated by the Proponent. The clinic visits are not categorized by mine sustained (i.e. physical injury sustained at work) vs general health (i.e. cold and flu relief). There is no employee family assistance program (EFAP) data provided. Requests for health service may arise out of pre-employment medicals i.e. where a specialist service (optometrist) is required to meet sight requirements at the mine. The mine’s health benefits can also be a positive impact as some services may be accessible by employees improving health and</p>	

reducing service costs to the health department.

RECOMMENDATION(S)

The GN requests a better definition of data be provided to track positive and negative impacts to health services. Impacts and benefits related to the mine operation can include Communicable Disease reporting/testing, work related/non-work related clinic visits, health plan utilization report, EFAP utilization report and the number of referrals and consultations with GN Department of Health.

GN Comment # 10	
Department	Health
Organization	Government of Nunavut
Subject/Topic	Food Security
Terms and Conditions	148
References	<ul style="list-style-type: none"> • Mary River Project, 2017 NIRB Annual Monitoring Report pg 341 • Appendix F – Socioeconomic monitoring report, 8.2.2 page 70 Inuit Employee Turnover.
IDENTIFICATION OF ISSUE	
<p>Annual monitoring report, Pg. 341 notes:</p> <p style="padding-left: 40px;"><i>“There are indications the Project continues to improve household income and food security in the Local Study Area (LSA), by providing LSA residents with meaningful incomes (through employment) that enable the purchase of food and support the participation in harvesting activities.”</i></p> <p>Appendix F – Socioeconomic monitoring report page 70 notes:</p> <p style="padding-left: 40px;"><i>“In 2017, there were 42 Inuit employee departures (not including contractors) at the Project. This is equivalent to a 45% Inuit employee turnover rate.”</i></p> <p>The identified sections of the annual monitoring report do not accurately reflect a food secure population. A 45% turnover rate for Inuit staff would mean that those staff are not receiving a meaningful income from the mine and therefore may not be food secure.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>A 45% turnover rate is not an accurate measurement of employment that would support the Proponent’s food security statement related to meaningful incomes. Length of service of Inuit employees would be a more accurate measurement showing an impact on food security related to ongoing employment.</p>	
RECOMMENDATION(S)	
<p>The GN recommends that Baffinland report on average length of service for Inuit employees to provide a more accurate reflection on food security contribution.</p>	

GN Comment # 11	
Department	Culture and Heritage
Organization	Government of Nunavut
Subject/Topic	Inclusion of the Annual Site Status Report
Terms and Conditions	NA
References	2017 Annual Report p. 7 Cultural Resources
IDENTIFICATION OF ISSUE	
The Proponent submits an Annual Site Status Report to the Government of Nunavut (GN) Department of Culture and Heritage (CH) on archaeological resources on February 28 of each year. Reference to this report was not included in the Proponent's 2017 Annual Report.	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
Reference to the Proponent's Annual Site Status Report should be included in the Proponent's Annual Report for the purposes of clarity.	
RECOMMENDATION(S)	
The GN suggests requests that the Proponent adds reference to the document: Mary River Project - 2017 Archaeological Work Status Update for the Government of Nunavut.	