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NRCan File #NT-056
NIRB File No. 08MN053

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By email: info@nirb.ca

Subject: Natural Resources Canada's (NRCan) Information Requests regarding the Draft Environmental Impact Statement (Draft EIS) for the Baffinland Iron Mine Corporation's proposed Mary River Project

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Thank you for the Nunavut Impact Review Board's (NIRB) letter dated February 15, 2011, regarding the conformity determination and commencement of the technical review period for the Baffinland Iron Mines Corporation Mary River project review.

In response to the request for Information Requests, Natural Resources Canada's Earth Sciences Sector experts have reviewed the Draft EIS documents in the following areas: permafrost related to the port and railway, mine slope stability, coastal geomorphology, implications of climate change and hydrogeology. Please note that all IRs are directed to the proponent, and are provided in the attachment to this letter by subject area.

If the NIRB wish to discuss any of NRCan's proposed information requests, in particular those that could require additional data collection by proponent, the pleae contact me at (613) 943-0773 or John.Clark@nrcan.gc.ca

Sincerely,

Original Signed by

John Clarke
Regional Team Leader
Natural Resources Canada

cc: Rob Johnstone, Minerals and Metals Sector, NRCan

Canada

Reviewer #: 1

Areas of Expertise: permafrost, geotechnical and arctic science

Documents Reviewed:

- Nunavut Impact Review Board Guidelines for Preparation of EIS for Mary River Project (NIRB File No. 08MN053) and Addendum to Guidelines for Preparation of EIS
- Environmental Impact Statement for Baffinland Iron Mines Corp. Mary River Project:
    - Vol. 1 Main Document
    - Vol. 3 Project Description
    - Vol. 5 Atmospheric Environment – mainly material on baseline climate and climate change (section 1, App. 5A)
    - Vol. 6 Terrestrial Environment – material on physical environment including landform, soils and permafrost (section 2)
    - Vol. 7 Freshwater Environment – material on freshwater quantity, streamflow issues relevant to water crossing design for transportation corridor design (section 2, App. 7A)
    - Vol. 9 Cumulative Effects Assessment (section 1, 2, 3)
    - Vol. 10 Environmental Health and Safety Management

Information Request#:1

Issue: Baseline information on geotechnical properties of surficial materials in the project area

Reference:
TOR 7.1, 7.13, 7.3, 8.1 (8.1.4, 8.1.7)
NPC NBRLUP App. J,K
NWB Table 5.0
EIS Vol. 6, section 2; Vol. 1, sections 2, 5.2, 6

Conclusion: Detailed information on the properties of subsurface materials has not been provided in the EIS. TOR 7.3 specifies that all data, models and studies should be documented so that the analyses are transparent and reproducible. However, only general descriptions of the properties of subsurface materials are provided in Vol. 6 (sec. 2) and is not of a sufficient level of detail to assess the validity of Proponent's conclusions regarding impacts throughout the project area including the transportation corridor alignments, mine site and onshore areas of the ports. Sufficient detail for baseline information is required to determine whether the design of project components including Tote Road and the railway is sufficient to mitigate environmental impacts.

Rationale: Terrain sensitivity within the project area will depend on the geotechnical properties of soils, including texture, ice and moisture contents which will affect its strength and thaw sensitivity. This information is essential to ensure adequate design of

project components including waste rock piles, roads, railways and water crossings, to mitigate impacts of the environment on the project and impacts of the project on the environment. The description of subsurface conditions for specific portions of the project area including sections along proposed transportation corridor alignments is helpful but the information is generally qualitative (e.g. description of ground ice conditions) and the level of detail is inadequate for assessment of the sensitivity and strength characteristics of the underlying sediments. Note that TOR 8.1.4.2 indicates that the description of geology and geomorphology should be supplemented when appropriate by maps, figures, cross-sections and borehole logs (information also required by NWB, Table 5.0).

The Proponent has indicated in Vol. 6 (sec. 2, p. 17-18) that field investigations included over 400 boreholes and test pits throughout the project area including the mine site, ports, transportation corridor and borrow areas. In addition geophysical investigations were also conducted to delineate high ice content sediments. The results of these investigations have been presented in a series of reports including Knight Piesold (2006, 2007a,b, 2008a-c,g,h, 2010a,b,f) and AMEC (2010a,b). These reports likely contain more detailed and quantitative information, including borehole logs that provides required details on subsurface conditions including texture, visible ice contents (ground ice characteristics), moisture contents (and relation to plastic/liquid limits). This more detailed information is required for terrain sensitivity assessment and to evaluate the impact assessment provided by the Proponent.

Request: NRCan requests that reports be provided that present detailed information on the results from geotechnical field investigations conducted at the project site including drawings, tables and maps showing locations where these investigations were conducted. These should include results from geotechnical borehole drilling programs, test pits and geophysical investigations. The information provided should include the results of both field observations and lab testing.

Reviewer#: 2

Area of Expertise: permafrost, arctic science

Documents Reviewed:

- Nunavut Impact Review Board Guidelines for Preparation of EIS for Mary River Project (NIRB File No. 08MN053) and Addendum to Guidelines for Preparation of EIS
- Environmental Impact Statement for Baffinland Iron Mines Corp. Mary River Project:
    - Vol. 1 Main Document
    - Vol. 3 Project Description
    - Vol. 5 Atmospheric Environment – mainly material on baseline climate and climate change (section 1, App. 5A)
    - Vol. 6 Terrestrial Environment – material on physical environment including landform, soils and permafrost (section 2)
    - Vol. 7 Freshwater Environment – material on freshwater quantity, streamflow issues relevant to water crossing design for transportation corridor design (section 2, App. 7A)
    - Vol. 9 Cumulative Effects Assessment (section 1, 2, 3)
    - Vol. 10 Environmental Health and Safety Management

Information Request#: 2

Issue: Baseline information on surficial geology and terrain sensitivity along Tote Road and railway alignments

Reference:
TOR 7.1, 7.13, 8.1 (8.1.4, 8.1.7)
NPC NBRLUP App. J,K
EIS Vol. 6, section 2; Vol. 1, sections 2, 5.2, 6; Vol. 3, sections 2, 3 App. 3B, 3D

Conclusion: Detailed information on surficial geology and terrain sensitivity along the Tote Road and railway alignment is not available at a scale similar to the alignment maps provided in App. 3B and 3D. The small scale map provided and verbal descriptions provided in Vol. 6 (section 2) do not provide adequate information to characterize the spatial distribution of subsurface materials, their properties and potential terrain sensitivity. This information is required to assess the validity of the Proponent's conclusions regarding impacts related to the transportation corridors and all activities associated with construction and operation, including borrow resource extraction.

Rationale: Surficial materials and therefore terrain sensitivity vary within the proposed transportation corridors. It is essential to characterize the surficial materials along the proposed alignments including locations of proposed borrow pits. The Proponent has indicated in Vol. 6 (sec. 2) that air photo interpretation (API) was conducted for the project development area in order to map surficial geology, presumably in combination

with surficial maps produced by the Geological Survey of Canada for the region (although other sources from which information was obtained are not described). API was also utilized to identify hazardous permafrost areas and areas of instability such as landslides. This analysis was supplemented by field investigations, including borehole drilling and geophysical investigations. The surficial geology map (Fig. 6-2.2) for the project development area is helpful but the information is not provided at a level of detail to determine the spatial distribution of surficial materials along the alignments, including transitions between terrain types. Also, no information is provided on the map to indicate terrain sensitivity such as areas where ice wedges have been observed (or where massive ice may be present) or evidence of terrain instability (e.g. solifluction lobes, previous landslides). Although the verbal descriptions provided for sections of the transportation corridors are helpful, presentation on alignment maps is necessary to understand the distribution of these terrain types relative to topography, water crossings etc. Large scale alignment sheets have been provided for the railway in App.3D. These provide useful information on topography and design features but provide no information on surficial geology and terrain sensitivity. Alignment sheets for the road and railway at this scale that also show this additional information on surficial materials and identify sensitive terrain along with locations of proposed borrow sites are therefore required. The Proponent has indicated (vol. 6 pg. 17) that a series of reports (Knight Piesold 2008d – g) provide the results of the API and these along with other site investigation reports, likely contain the more detailed alignment maps that show surficial geology and terrain sensitivity.

Request: Please provide more detailed information on surficial geology and terrain sensitivity along proposed Tote Road and railway alignments. This may include but is not limited to reports referred to in the EIS such as Knight Piesold (2008d-g) and detailed alignment sheets (at a scale similar to that provided in App. 3D) providing this additional information.

Information Request#: 3

Issue: Baseline information on ground thermal conditions in the project area

Reference:
TOR 6.2, 6.5, 7.1, 7.13, 7.3, 8.1 (8.1.4, 8.1.7)
NPC NBRLUP App. J,K
NWB Table 5.0
EIS Vol. 6, section 2; Vol. 1, sections 2, 5.2, 6;

Conclusion: Limited information on ground thermal conditions including ground temperature and active layer thickness has been provided in the EIS. In Vol. 6 (p. 11) a typical permafrost temperature is provided as is a range in active layer thickness (p. 10). Very little additional information is provided regarding the ground thermal and active layer conditions associated with location of specific project components such as sections of the transportation corridors and waste rock piles. This information is required in order to assess terrain sensitivity and to ensure that design of project components is adequate

and will ensure that impacts are minimized over the life of the project. In order for NRCan to conduct its technical review and assess the validity of the Proponent's conclusions regarding impacts, additional information on ground thermal and active layer conditions are required.

Rationale: The ground thermal regime is a factor influencing the behaviour of frozen ground. Information on ground temperatures and active layer thickness is required for design of project components, such as the railway and Tote Road, to ensure they maintain their integrity throughout the project life. This information is also required to determine the impacts of the environment on the project and the impacts of the project on the environment. The Proponent has indicated that the typical permafrost temperature at depths of 10-15 m is roughly -10°C. The ground thermal regime can be spatially variable and is dependent on various factors including vegetation, snow cover, aspect, drainage, thermal properties of underlying materials. Recent measurements (2008-09) of ground temperatures from communities in the northern Baffin Island area at Arctic Bay, Pond Inlet and Igloolik indicate that mean annual ground temperature ranges from -8.5 to -10.6°C (Ednie and Smith 2010, 2011). Historical observations (likely from the 1960s) for the project area (Milne River and Mary River) indicate a temperature of -12.2°C at depths of 9 to 15 m (see for e.g. Smith and Burgess, 2000). However these values may not reflect current conditions as permafrost has warmed recently in the eastern Arctic (Smith et al. 2010a,b).

In vol. 6 (sec. 2), the Proponent indicates that 50 temperature cables were installed throughout the project site. However, the only temperature data that are provided are for depths of 200-400m at the mine site (Figure 6-2.4). While this information is useful for characterizing the conditions that occur at the depths at which ore will be mined, it is not sufficient for characterizing the shallow ground thermal regime which is required for infrastructure design and the impacts that may be associated with project components such as the road, railway and waste rock piles. Information on the shallow (upper 15-20 m) ground thermal regime such as the minimum, maximum and mean temperatures at depth and summer thaw depths is required to understand the permafrost temperatures in areas of planned facilities (as required by TOR 8.17.1) and the sensitivity to climate change. This information is required for NRCan to conduct an adequate review of the Proponent's impact analysis.

Request: NRCan requests that any reports describing the ground thermal conditions (ground temperature, thaw depths) throughout the project area be provided.

References:

Ednie, M. and Smith, S.L., 2011. Establishment of community-based permafrost monitoring sites and initial ground thermal data Baffin Region, Nunavut, Geological Survey of Canada Open File 6727.

Ednie, M. and Smith, S.L., 2010. Establishment of community-based permafrost monitoring sites, Baffin region, Nunavut, GEO2010, 63rd Canadian Geotechnical Conference & 6th Canadian Permafrost Conference GEO2010 Calgary Organizing Committee, Calgary, Sept. 2010, pp. 1205-1211.

Smith, S. and Burgess, M., 2000. Ground temperature database for northern Canada. Geological Survey of Canada Open File 3954.
Smith, S.L., Lewkowicz, A.G., Burn, C.R., Allard, M. and Throop, J., 2010. The thermal state of permafrost in Canada - Results from the International Polar Year, GEO2010, 63rd Canadian Geotechnical Conference and the 6th Canadian Permafrost Conference. GEO2010 Calgary Organizing Committee, Calgary, Sept 2010, pp. 1214-1221.
Smith, S.L., Romanovsky, V.E., Lewkowicz, A.G., Burn, C.R., Allard, M., Clow, G.D., Yoshikawa, K., and Throop, J. 2010. Thermal state of permafrost in North America - A contribution to the International Polar Year. Permafrost and Periglacial Processes, **21**: 117-135.

Information Request#: 4

Issue: Impact assessment for soils, landforms and permafrost – impacts associated with interaction between project components and terrain

Reference:
TOR 2.6, 6.2, 6.5, 7.1, 7.13, 7.3, 8.1 (8.1.4, 8.1.7)
NPC NBRLUP App. J,K
NWB Table 4.0, 5.0
EIS Vol. 6, section 2; Vol. 1, sections 2, 5.2, 6, 8; Vol. 3, sections 2, 3

Conclusion: There is a lack of information provided on the analysis conducted to determine that design of project components (e.g. road, railway embankments, water crossings/bridge abutments, waste rock piles) is adequate to ensure that impacts on soils landforms and permafrost will be minimized and that the impacts of the environment on the project will not affect performance of project facilities. This information is required in order to conduct a technical review and assess the validity of the Proponent's conclusions regarding impacts.

Rationale: TOR 2.6 and 7.3 specify that all data, models and studies should be documented so that the analyses are transparent and reproducible. Note that issues related to lack of details on baseline information have been discussed above in IRs#1,2,3. The proponent has indicated in Vol. 6 (sec. 2) that project components will be designed to protect permafrost and ensure that there will be no impacts on terrain stability that could affect infrastructure performance. For example, the Proponent has outlined potential impacts that may occur such as thaw settlement, creep of foundations and beneath the waste rock pile, and slope instability. Information has been provided on embankment height, bridge abutment design, waste rock pile design (Vol. 3). However, there is no information provided to demonstrate that the potential impacts have been adequately considered in the design. For example there is no information provided on analysis (thermal modelling etc.) conducted to determine the impacts of ground surface disturbance associated with infrastructure construction or to demonstrate that embankment design ensures the active layer does not extend below the base of the

embankment fill. There is no information provided on stability analysis of slopes at water crossings to support the design of bridges and assessment of impacts on aquatic habitat. It is unclear whether any thermal modelling or other analysis has been conducted. NRCan requires additional information on the analysis that has been conducted to support the design of project components and the Proponent's conclusions that impacts related to the terrain (soils, landforms and permafrost) will be minimized.

Request: NRCan requests that further information be provided on the analysis conducted to demonstrate that design of project components (such as road, railway embankments, bridges, waste rock piles) is adequate to ensure impacts will be minimized and infrastructure integrity will be maintained. This includes, but is not limited to any reports documenting: thermal analysis conducted to support embankment, facility design; stability analysis for slope and water crossing design.

Information Request#: 5

Issue: Impact of climate change and variability

Reference:
TOR 2.1, 6.2, 6.5. 7.1, 7.13, 7.3, 8.1 (8.1.4, 8.1.7)
NPC NBRLUP App. J,K
NWB Table 4.0, 5.0
EIS Vol. 6, section 2; Vol. 1, sections 2, 5.2, 6, 8; Vol. 3, sections 2, 3; Vol. 5 section 1, App. 5A; Vol. 9 section 2

Conclusion: The Proponent has provided some discussion regarding the potential impact that climate change may have on the project. However, this is a generalized discussion and there is no information provided to demonstrate that climate change and variability have been adequately incorporated in the project design. It is difficult to assess whether climate change and variability will adversely affect project components and if this will result in environmental impacts.

Rationale: Understanding past and potential environmental trends in the region is essential for adequate assessment of environmental impacts (TOR 2.1). Consideration of how climate change could affect permafrost (particularly high ice-content soils) and the implication for the project is required in TOR 6.2, 8.1.7.1. For example, implications of a changing climate on the physical environment need to be considered in design of railway embankments to ensure their stability (TOR 6.5.6.2).

Warming has been observed in the eastern Arctic and there is evidence that permafrost has warmed in the region especially since the 1990s with accompanying changes in thaw depth (e.g. Smith et al. 2005, 2010a,b; Throop et al., 2010). In addition, climate variability including extreme warm years, can result in short term variability in thaw depth (e.g. Smith et al. 2001; Atkinson et al., 2006; Smith et al. 2009). It is therefore essential that the range in ground thermal and active layer conditions that may occur over the life of the project be considered in project design to ensure structures maintain their

integrity and environmental impacts are minimized. The Proponent has provided a general discussion on the predicted increases in air temperature expected for the region and potential increases in thaw depth (Vol. 6, Vol. 3). There is however no specific discussion related to the project area and design of project components such as road, railway embankments, bridges, waste rock piles. In Vol. 3 section 8, the Proponent indicates that climate change is expected to have little impact on very cold deep permafrost and possible impacts include thermokarst, mass wasting on sensitive slopes. Conservative design for permafrost protection is to ensure climate change has little impact. No specific information on any analysis has been provided to demonstrate that the design adequately incorporates climate change and variability. In Vol 6 (p. 43) the Proponent indicates that thermal modelling will incorporate potential warming trends as proposed by ACIA but it is unclear whether any thermal modelling has been conducted to date (see also IR4). It is therefore difficult for NRCan to determine if the project design will ensure project components perform adequately under the range of climate conditions expected over the project life and that impacts on the environment will be minimized.

Request: NRCan requests that additional information be provided to demonstrate adequate inclusion of climate change and variability in project design and impact assessment. This may include for example reports documenting analysis (e.g. thermal analysis) incorporating climate change and variability to support design of project components (e.g. embankments, bridges and water crossings, waste rock piles etc.)

References:

Atkinson, D.E., Brown, R., Alt, B., Agnew, T., Bourgeois, J., Burgess, M., Duguay, C., Henry, G., Jeffers, S., Koerner, R., Lewkowicz, A.G., McCourt, S., Melling, H., Sharp, M., Smith, S., Walker, A., Wilson, K., Wolfe, S., Woo, M.-k., and Young, K. 2006. Canadian cryospheric response to an anomalous warm summer: a synthesis of the Climate Change Action Fund Project "The state of the Arctic Cryosphere during the extreme warm summer of 1998". Atmosphere-Ocean, 44(4): 347-375.

Smith, S.L., Lewkowicz, A.G., Burn, C.R., Allard, M. and Throop, J., 2010. The thermal state of permafrost in Canada - Results from the International Polar Year, GEO2010, 63rd Canadian Geotechnical Conference and the 6th Canadian Permafrost Conference. GEO2010 Calgary Organizing Committee, Calgary, Sept 2010, pp. 1214-1221.

Smith, S.L., Romanovsky, V.E., Lewkowicz, A.G., Burn, C.R., Allard, M., Clow, G.D., Yoshikawa, K., and Throop, J. 2010. Thermal state of permafrost in North America - A contribution to the International Polar Year. Permafrost and Periglacial Processes, **21**: 117-135.

Smith, S.L., Burgess, M.M., Riseborough, D., and Nixon, F.M. 2005. Recent trends from Canadian permafrost thermal monitoring network sites. Permafrost and Periglacial Processes 16: 19-30.

Smith, S.L., Burgess, M.M., and Nixon, F.M. 2001. Response of active-layer and permafrost temperatures to warming during 1998 in the Mackenzie Delta, Northwest Territories and at Canadian Forces Station Alert and Baker Lake, Nunavut, Report Current Research 1001-E5.

Smith, S.L., Wolfe, S.A., Riseborough, D.W., and Nixon, F.M. 2009. Active-layer characteristics and summer climatic indices, Mackenzie Valley, Northwest Territories, Canada. Permafrost and Periglacial Processes, 20(2): 201-220.

Throop, J.L., Smith, S.L., and Lewkowicz, A.G. 2010. Observed recent changes in climate and permafrost temperatures at four sites in northern Canada. In GEO2010, 63rd Canadian Geotechnical Conference and the 6th Canadian Permafrost Conference. Calgary, Sept 2010. GEO2010 Calgary Organizing Committee, pp. 1265-1272.

Information Request#: 6

Issue: Uncertainty in prediction of extreme events and implications for project design and impact assessment

Reference:
TOR 2.1, 6.2, 6.5. 7.1 (7.12, 7.13), 7.3, 8.1 (8.1.7, 8.1.5.2)
NPC NBRLUP App. J,K
NWB Table 4.0, 5.0
EIS Vol. 6, section 2; Vol. 1, sections 2, 5.2, 6, 8; Vol. 3, sections 2, 3; Vol. 5 section 1, App. 5A; Vol. 7, section 2, App. 7A, Vol. 9 section 2

Conclusion: Extreme precipitation events can result in high runoff which can have implications for integrity of structures (including those at water crossings), hydraulic structures (culverts) and the aquatic environment due to increased erosion and sediment loads. Limited baseline rainfall and hydrologic data are available for the project site to adequately characterize extreme events. Regional data must be used to develop the baseline for the project area but there can be uncertainties associated with this that need to be addressed in project design and impact assessment.

Rational: The impact of extreme events needs to be considered in the design of project components and in the impact assessment (e.g. TOR 6.2, 7.1, 7.13, 8.1.1, 8.1.5.2). Extreme rainfall and runoff events can potentially exceed design values for project infrastructure including bridges and culvers and can also lead to increased erosion which not only has impacts on infrastructure but can lead to increased sediment loads having implications for aquatic ecosystems. The Proponent has indicated for example, Tote Road and the railway will be designed utilizing design values of 1:100 year and 1:200 year storm respectively (e.g. Vol. 9 sec. 2). The determination of return periods is a common and acceptable approach. However, there are difficulties in determining these values when there are limited climate and hydrological data available for the project site. Short records are available for on-site meteorological and stream gauging stations. The proponent has utilized regional data to develop the baseline conditions for the project area and this is a necessary and acceptable approach. Precipitation however, is highly variable and there will be uncertainties in the characterization of baseline precipitation, including variability for the project area. Hydrological records are only available for stations that are several hundred kilometres away from the project site and of these stations only one has a complete record longer than 10 years (15 year record, Sylvia

Grinell River). There will therefore be significant uncertainty in the determination of events with return periods of 100-200 years. Although the EIS provides documentation describing the development of the baseline climatology and hydrology, and the potential impacts of high flows, there is little discussion of how uncertainty in this information are dealt with in both project design and impact assessments as is required by TOR 7.12. Information on how uncertainty will be dealt with (i.e. design, contingency plans, sensitivity analysis etc.) is required for NRCan to adequately review and assess the Proponent's conclusions regarding impacts on the terrestrial and aquatic environments.

Request: Please provide documentation describing the level of uncertainty in the prediction of extreme precipitation and flow/runoff events and how this has been dealt with in the project design (e.g. culverts, bridges, railway, road) and the impact assessment.

Information Request#: 7

Issue: Impacts related to borrow resource extraction

Reference:
TOR 6.5.9
NPC NBRLUP App. J,K
NWB Table 4.0, 5.0
EIS Vol. 6, section 2

Conclusion: There is a lack of information on characterization of the sediments, including ice content, at proposed borrow sites. This information is required for estimates of the amount of material that may need to be extracted and the area that will be disturbed to meet aggregate needs.

Rationale: Sand and gravel will be required for construction of project facilities such as roads. A number of borrow sources have been identified. If deposits are ice-rich, disturbance of the ground surface associated with excavation can result in ground subsidence. The amount of ice will also influence the volume of material that will need to be extracted to meet the requirements for aggregate and therefore affect the size of the area to be disturbed and the impacts associated with aggregate extraction. Baseline information on sediment characteristics and ice content (including occurrence of massive ice) is therefore required for proposed borrow sites (TOR 6.5.9). There has be little detailed information provided in the EIS regarding the sediment characteristics and ground ice contents at proposed borrow sites (see also IRs 1,2). The Proponent has indicated in Vol. 6 (sec. 2.1.3) that field investigations at borrow and quarry locations included 29 geotechnical boreholes and 19 test plots (with additional test pits for potential borrow areas along the Tote Road). The Proponent also indicates that geophysical investigations were conducted but it is unclear if these were conducted at potential borrow sites. There is no detailed information provided on the results of the site investigations. This information however may be provided in a series of consultant reports (see also IR#1). Additional information is therefore required regarding sediment

characteristics (including ice contents) to conduct an adequate review of the Proponent's conclusions regarding impacts on the terrain.

Request: NRCan requests that reports be provided that present detailed information on sediment properties and ice contents determined from results from geotechnical field investigations conducted at proposed borrow sites. These should include results from geotechnical borehole drilling programs, test pits and geophysical investigations at borrow sites.

Reviewer#: 3

Area of Expertise: nearshore and shoreline processes, climate change in coastal Arctic environments

Documents Reviewed:

- Nunavut Impact Review Board Guidelines for Preparation of EIS for Mary River Project (NIRB File No. 08MN053) and Addendum to Guidelines for Preparation of EIS
- Environmental Impact Statement for Baffinland Iron Mines Corp. Mary River Project:
    - Vol. 1 Main Document, section 2
    - Vol. 3 Project Description and Appendices
    - Vol. 5 Atmospheric Environment – mainly material on baseline climate and climate change (section 1, App. 5A)
    - Vol. 6 Terrestrial Environment – material on physical environment including landform, soils and permafrost (section 2)
    - Vol. 8 Marine Environment
    - Vol. 9 Cumulative Effects Assessment (section 1, 2, 3)
    - Vol. 10 Environmental Health and Safety Management

Information Request#: 8

Issue: Impacts of relative sea-level change on the project

Reference: TOR 8.1.1
EIS Vol 5, Section 1.2

Conclusion: NRCan notes that subsidence modelling was conducted by W.R. Peltier, University of Toronto. Model results were analysed by NRCan. Please correct.
The proponent provides projections for sea-level change (that fit within the range of uncertainty for the area) only for Steensby Inlet.

Rationale: It is important in the assessment of the potential effects of the environment on the project that appropriate sea-level rise data for the area are included in the design and operation of project infrastructure at Milne Inlet.

Request: NRCan requests that for Milne Inlet similar information on projected relative sea-level rise is provided as for Steensby Inlet since Milne Inlet is in a different area of glacio-isostatic vertical motion than Steensby Inlet, and it is proposed to have ongoing activity in that area during the project.

Information Request#: 9

Issue: Climate Change Scenarios

Reference: TOR 8.1.1
EIS Vol 5, Section 1.2

Conclusion: The proponent is to be commended on the use of multiple climate models; however, the choices of Scenarios A2 and B1 can only be considered optimistic in favour of the more realistic A1FI scenario which recent studies show we are currently tracking globally.

Rationale: Conservative design is based on relatively less optimistic climate change projections. If designs are based on Scenarios A2 and B1, not the most conservative design base has been selected.

Request: NRCan requests climate change projections based on the A1FI scenario.

Information Request#: 10

Issue: Extreme events
Reference: TOR 8.1.1
EIS Vol 5, Section 1.2.4

Conclusion: While information on extreme temperature events has been provided, many other types of extreme events might affect the project.

Rationale: The proponent provides information on extreme temperature events; however, many other types of extreme events might affect the project. In particular the coastal infrastructure may be subject to storm surges, extreme wave events, and ice ride-up or pile-up. These are not addressed in the EIS. In particular the coastal infrastructure may be subject to storm surges, extreme wave events, and ice ride-up or pile-up. These are not addressed in the EIS.

Request: Could the proponent provide return periods, or similar risk assessments, of these important phenomena that affect the proposed port infrastructure?

Information Request#: 11

Issue: Sea ice integrity and marine transport

Reference: TOR 8.1.12
EIS Vol 8, Section 2.5.4

Conclusion: The proponent's conclusion of little impact by the project on the integrity of landfast sea ice is based on information on sea ice integrity after a single passage of one ship.

Rationale: The project effects on landfast sea ice integrity may be different after multiple passes from multiple ships, than after a single passage of one ship.

Request: NRCan requests that data be provided on sea ice integrity from multiple passes from multiple ships. Additional information is requested on how multiple passes from multiple ships could affect traditional Inuit travel. Provide this information for both Steensby Inlet and Milne Inlet.

Information Request#: 12

Issue: Post-closure monitoring – Steensby Inlet and Milne Inlet Ports

Reference: TOR 9.6
EIS Vol 1, Figure 1-2.1

Conclusion: The proponent suggests that 4-5 years following closure of the mine is an adequate time for monitoring the Steensby and Milne Inlet coastal areas.

Rationale: The suggested post-closure monitoring time frame may not be long enough to establish project effects on coastal areas post mine closure.

Request: NRCan requests an explanation for the determination of adequacy of this post-closure monitoring time frame.