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**Re: Information Requests from Environment Canada Regarding the Mary River Iron Ore Project Final Environmental Impact Statement and Water Licence Application.**

Environment Canada (EC) would like to thank the Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB) for the opportunity to comment on Baffinland's Final Environmental Impact Statement (Final EIS) and Type A Water Licence application.

All Information Requests presented in this letter are directed to Baffinland Iron Ore Corporation.

If you require clarification of any of the above, please contact Mark Dahl at (204) 983 4815 or via email at [mark.dahl@ec.gc.ca](mailto:mark.dahl@ec.gc.ca).

Sincerely,

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Environment Canada Mary River Review Team  
Mark Dahl, Senior Environmental Assessment Coordinator



## **Appendix 1 - Environment Canada Information Requests**

### **IR # EC-1**

**Subject:** Incorporation of new data from recovered wave sensor in Steensby Inlet

**Reference:** FEIS Volume 1 – Appendix 1B-5 - Concordance with PHC Appendix 1 – Commitment 48  
FEIS Volume 8 – Appendix 8D-2

#### **Preamble:**

Commitment #48 states that Baffinland will “Incorporate any new data on the wave regime in Steensby Inlet as available from the recovered wave sensor into baseline data description and impact assessment for ship wakes along the southern shipping route.”

According to the table concordance provided for commitments outlined in NIRB’s Pre-hearing Conference report, this information was to be found in Appendix 8D-2 of Volume 8. EC could find no evidence of additional data from this recovered wave sensor presented in this Appendix.

#### **Request EC-1:**

EC requests that the Proponent provide a quantitative summary of the wave height data from the recovered wave sensor. The summary should be similar (e.g. mean, range, percentage of time waves are above different height categories) to that provided for wave sensors deployed in Milne Inlet described in the Draft EIS (DEIS).

### **IR # EC-2**

**Subject:** Calculations of expected wake heights from ore carriers and the natural wave regime in Steensby Inlet, Foxe Basin and Hudson Strait

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 -Commitments 14, 47, 48, 62 and 353  
FEIS Volume 8 – Appendix 8D-2

#### **Preamble:**

Baffinland has provided an updated assessment of potential impacts from ship wakes in Appendix 8D-2 of the FEIS. It is stated that the calculation of potential ship wakes from ore carriers was based on the method described by Kriebel et al. (2003). The report by Kriebel et al. (2003) describes many different methods and equations for calculating ship wakes, and since the equations used by Baffinland were not included in Appendix 8D-2 it is unclear which approach was taken.

Baffinland also states that their calculations of wind-generated wave heights based on fetch distance and wind speed were based on Figures II-2-23 and 24 of the US Army Corps of Engineers Coastal Engineering Manual. As an example, Baffinland states that a  $10 \text{ ms}^{-1}$  wind with a 10 km fetch would produce a 0.7 m wave. According to Figure II-2-23 (Fetch-limited wave heights) of the U.S. Army Corps of Engineers Coastal Engineering Manual, the wave height for a wind speed of  $10 \text{ ms}^{-1}$  and a 10 km fetch would be closer to 0.5 m. It is unclear whether the estimates provided in Table 1 of Appendix 8D-2 were based on these two figures or whether they were calculated from equation provided in the U.S. Army Corps document. It is thus difficult to follow how the numbers in Table 1 are derived.

#### **Request EC-2:**

EC requests that the Proponent:

- Clarify which equations presented in Kriebel et al. (2003) were used to calculate wake height, provide the equations used in wake height modeling, explain the meaning of each parameter used in the equation, and indicate the numerical values used for each parameter in the model.
- Provide the equations used to calculate wave heights and wave periods based on fetch distance and wind speed that are presented in Table 1 of Appendix 8D-2.



### **IR # EC-3**

**Subject:** Impact of Wake on Coastal Foraging and Nesting Habitat

**Reference:** FEIS Volume 1 – Appendix 1B-5 - Concordance with PHC Appendix 1 - Commitments 14, 47, 48, 62, 353  
EIS Vol. 6 – Section 4.12.8  
FEIS Volume 8 – Appendix 8D-2

#### **Preamble:**

Figures 2 and 3 in Appendix 8D-2 identify shoreline segments in Steensby Inlet that could be susceptible to impacts from ship wakes. Volume 6 - Section 4.12.8 states that ship wakes may exceed 0.5 m at the shoreline and islets immediately adjacent to Steensby Port, and at a small island near the mouth of Steensby Inlet. It is also indicated that nest searches will be conducted in 2012 along the Project shorelines expected to see the highest wakes. It is unclear whether "Project shorelines" would also include the small island near the mouth of Steensby Inlet.

#### **Request EC-3**

EC requests that the Proponent clarify if the nest searches to be conducted in 2012 will include the island near the mouth of Steensby Inlet indicated in Figure 3 of Appendix 8D-2 that may receive wakes in excess of 0.5 m in height, in addition to the shoreline segments adjacent to the Steensby Port site.

### **IR # EC-4**

**Subject:** Zone of influence from propeller wash at the southern port site and along the southern shipping lane

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 – Commitment 101  
FEIS Volume 8 – Section 3.4 – Propeller Wash (pg. 54)

#### **Preamble:**

As per Commitment #101, Baffinland has provided an updated assessment of how propeller wash and bathymetry may affect sediment redistribution at the port site and along the southern shipping lane. In Section 3.4 of Volume 8, Baffinland states that because sand can be mobilized by currents of 0.20-0.25 m/s, the seabed could be disturbed by propeller wash at depths up to 90-100 m. According to Table 8-3.7, seabed velocities due to propeller wash appear to exceed natural seabed velocities at depths of <40m. Sediment re-distribution in areas of shallow water may affect benthic productivity and therefore the quality of foraging habitat for bottom-feeding seabird species such as eiders, a selected VEC. It would thus be helpful to know the potential area within which foraging habitat for this VEC may be affected by propeller wash. It should be possible, based on the bathymetry of Foxe Basin and Steensby Inlet and the location of the projected southern shipping route, to identify areas where sediment distribution is most likely to occur as a result of shipping (i.e. areas <40 m deep).

#### **Request EC-4:**

EC requests that the Proponent:

- a. Provide a map of the zone of potential sediment redistribution due to propeller wash along the southern shipping route based on bathymetry. The map should include areas where ships are expected to maneuver while arriving and departing the Steensby Port.
- b. Provide a calculation of the total area within which sediment re-suspension due to propeller wash is expected to occur.

**IR # EC-5****Subject:** Ballast water dispersal model**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 – Commitment 20

FEIS Volume 8 – Appendix 8B-1

FEIS Volume 8 – Section 3.5.2.3 (pg. 62)

**Preamble:**

Commitment #20 stated that Baffinland would “Develop a model for ballast water dispersal”. Volume 8, Section 3.5.2.3 of the FEIS contains new information on the expected concentration ballast water concentration, movement of ballast water discharges and the thickness of the ballast water lens that would form in central and south-western parts of Steensby Inlet. Although this section of the FEIS makes specific reference to the results of modeling presented in Appendix 8B-1, EC could not locate any of the modeling results in the version of Appendix 8B-1 supplied with the FEIS. The copy of Appendix 8B-1 provided with the FEIS is dated October 20, 2010.

Bullet 7 on page 62 specifically states that “After 10 months of ballast water discharge, under ice-covered conditions at the port site, ballast water concentrations within Steensby Inlet are seen to be still rising. Open water, wind-driven, and especially estuarine circulation, however, intensifies the advection, nearly clearing ballast water from the northern part of the Steensby Inlet system. Some ballast water remains in Steensby Inlet at the beginning of the next ice-covered season.”

The last sentence seems to imply that the concentration of ballast water in Steensby Inlet could increase each year throughout the operational life of the project. The longer-term implications from potential changes in water temperature and salinity do not appear to have been considered in the impact assessment.

**Request EC-5:**

EC requests that the Proponent:

- a. Explain how the numerical estimates cited in Bullets 4, 6, and 9 on pages 63-64 and the final paragraph of Section 3.5.2.3 of Volume 8 were derived.
- b. Provide a copy of the updated appendix if a more recent version of Appendix 8B-1 exists that explains these calculations.
- c. Provide an assessment of the potential impact of the year-to-year accumulation of ballast water over the operational phase of the project.

**IR # EC-6****Subject:** Types of fuel used in shipping and specific requirements for clean-up in case of a spill**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 – Commitment 335

FEIS Volume 3, Appendix 3B, Attachment 3 - Fuel System Design

Criteria - Sec 3.8

FEIS Volume 9, Section 3.8.5

**Preamble:**

Commitment #335 states that Baffinland will “clarify the types of fuel it uses with the project and the types of fuel ships will be using for powering and whether an accidental spill would require specific clean-up”. In their compliance review the NIRB identified that information regarding the types of fuel that will be used on board ships was not found. Baffinland replied that fuel specifications were provided Volume 3, Appendix 3B, Attachment 3, however, EC could not locate any information in this appendix about the types or quantities of fuel that would be to power the various types of vessels used



for the shipping component of the project, nor if any specific considerations would be required for these types of fuel in the event of an accidental spill.

**Request EC-6:**

EC requests that the Proponent indicate the different types of fuel, oils and other lubricants that all marine vessels (ore carriers, fuel tankers, cargo vessels, tugs, etc.) associated the project will be carrying for the purpose of operating the vessels, the expected quantities, and any specific considerations required for the clean-up of these different products in the event of an accidental spill.

**IR # EC-7**

**Subject:** Presentation of bird survey results and habitat suitability modeling

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 – Commitment 152

FEIS Volume 6 – Section 4

FEIS Volume 6 – Appendix 6E

**Preamble:**

Commitment #152 states that Baffinland would “Provide all items identified under Section 6: Terrestrial Environment regarding EC’s comments”

Recommendation 6.4 of EC’s technical submission stated the following with respect to the presentation of bird survey results and habitat suitability modeling for VECs in the FEIS:

- a. The FEIS [should] include maps that adequately show the results of the bird surveys. Maps should indicate areas covered by the bird surveys and where low, moderate, and high densities of bird species were observed.
- b. Any habitat suitability maps presented in the FEIS should clearly outline how habitat suitability was determined and provide a visual overlay with actual observations of the species.
- c. Maps should be presented at a scale that allows reviewers to clearly visualize the distribution of habitat suitability categories relative to the project footprint and expected zones of influence.

No additional maps were provided in Volume 6 - Appendix 6E that indicated the areas covered by the bird surveys, nor were bird survey results presented using a relative density scale (high-med-low) that would facilitate an understanding of the variability in bird VEC distribution throughout the RSA.

A revised rating scheme was used in Volume 6 - Appendix 6E to reclassify the Habitat Suitability Models (HSI) for terrestrial bird VECs. The accuracy of the revised HSI models was not re-verified using actual observations of birds obtained during baseline surveys. Furthermore, EC specifically requested that actual observations of bird VECs be overlaid with the HSI classification maps to provide reviewers with a visual evaluation of the accuracy of such models, but no overlay was provided.

EC acknowledges that some HSI classification maps were presented at a more appropriate scale (e.g. Figure 13 and 14 for eiders in Appendix 6E), and recommends that the RSA be divided in this manner for maps provided for each terrestrial bird VEC.

**Request EC-7:**

EC requests that the Proponent:

- a. Provide revised maps for terrestrial bird VECs that indicate the areas covered by bird baseline surveys and a classification of surveyed areas into low, moderate, and high densities of each terrestrial bird VEC.

- b. Provide a quantitative assessment of the accuracy of the revised HSI models for terrestrial bird VECs based on bird observations made during baseline surveys.
- c. Provide new versions of the HSI classification maps for each bird VEC, that include an overlay of actual bird observations for bird VECs that were provided in the version of Appendix 6E of the DEIS, and clearly indicate the area covered by aerial and ground surveys during baseline studies. Please indicate clearly the project footprint and expected zone of influence around it. Since the study area boundaries for the HSI model includes areas of the marine environment, observations of the VECs in the marine environment should also be included.

**IR # EC-8**

**Subject:** Consideration of using seawater lubricated propeller shaft bearings in ore carriers

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 – Commitment 31

FEIS Volume 6 – Section 4.9.1 (pg. 112-113)

Volume 8, Section 2.6.2.2, p. 25

**Preamble:**

In EC's written submission for the technical meetings on Baffinland's DEIS, it was recommended (Recommendation 4.6b) that Baffinland provide an assessment of the feasibility of using seawater lubricated bearings in newly built vessels to reduce the potential for stern tube oil leakage.

In Volume 6 – Section 4.9.1 of the FEIS Baffinland states that ore carriers (not yet built) will incorporate what is considered to be best technology to limit operational oil leakage. Baffinland asserts that ship discharges from the ore carriers will be limited to a biodegradable lubricant such as Vickers Hydrox 68. Further Baffinland also asserts that there will be no measurable effect on receiving water quality because the lubricant is biodegradable and only minimal quantities will be released to the environment. EC is of the opinion that though the use of a biodegradable lubricant will reduce some of the environmental risks from stern tube leakage, the use of seawater lubricated bearings could completely eliminate it. Further it is unclear how long it will take for the lubricant to degrade under arctic conditions and what impacts it will have on marine birds in the mean time.

**Request EC-8:**

EC requests that the Proponent:

- a. Provide an assessment of whether seawater lubricated propeller shaft bearings would be a feasible alternative for the yet-to-be-built ore carriers.
- b. Provide a rationale for choosing oil-lubricated stern tube bearings as the current preferred alternative.
- c. Provide the half-life for this product in water and sediment under arctic conditions
- d. Provide an estimate of the amount of stern tube seal oil that will be released on a monthly/annual basis to qualify this statement.
- e. Provide a discussion of whether biodegradability changes the impact that the oil would have on birds exposed to it.



**IR # EC-9**

**Subject:** Wildlife protection in the event of an accidental fuel spill at sea

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 – Commitment 162

FEIS Volume 3 - Appendix 3B – Attachment 5 – Section 5.4 (Appendix 10C-1)

FEIS Volume 10 – Section 6.3.4 (pg. 38)

**Preamble:**

As per Commitment #162, Baffinland has included a section in their Emergency Response and Spill Contingency Plan (Appendix 3B – Attachment 5 – Section 5.4) that deals with wildlife protection procedures in the event of a spill. Although this section of the spill plan makes specific reference to the use of deterrents and hazing devices to prevent wildlife from becoming oiled or contaminated, and it is stated that all emergency response vessels will be equipped with deterrent devices, spill response equipment lists provided in the OPEPs for Milne Inlet and Steensby Inlet (provided in Volume 3 - Appendix 3B – Attachment 5 – dated January 2012) do not include any deterrent or hazing equipment for wildlife.

Volume 10, Section 6.3.4 (pg. 38) specifically states that Baffinland will:

- Maintain necessary equipment and trained personnel at the Steensby Port at all times to enable the Company to respond effectively to SAR or sea borne environmental emergencies; and
- Provide adequate resources to implement and maintain the Emergency Response and Spill Contingency Plan, including the necessary human, material, and financial resources.

Commitment #162 also states “The plan should include, but not be limited to, a description, with maps, of the migratory bird resources at risk (including CWS Key Terrestrial and Marine Habitat Sites for Migratory Birds, Migratory Bird Sanctuaries, National Wildlife Areas and National Parks).”

Although a description of migratory bird resources at risk and associated maps are provided in other sections and appendices of the FEIS, they have not been incorporated into the spill response plan. For the sake of efficiency during response to an emergency, these descriptions and maps should be incorporated directly into the spill contingency plan(s).

**Requests EC-9:**

EC requests that the Proponent:

- a. Provide a list of the type and quantity of deterrent/hazing equipment for wildlife that will be maintained at the Milne Inlet and Steensby Inlet port sites as well as deterrent/hazing equipment that will be kept on board ships and/or emergency response vessels.
- b. Update the Emergency Response and Spill Contingency Plan with a description of migratory bird resources at risk and maps that indicate CWS Key Terrestrial and Marine Habitat Sites for Migratory Birds, Migratory Bird Sanctuaries, National Wildlife Areas and National Parks.



**IR # EC-10**

**Subject:** Response gap for major spills along the north and south shipping routes

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 – Commitment 89  
FEIS Volume 9 – Section 3.8.5

**Preamble:**

As requested by EC at the DEIS PHC held in Igloolik (Nov. 07, 2011) Baffinland endeavored to incorporate knowledge from the study entitled "Spill Response Gap Study for the Canadian Beaufort Sea and the Canadian Davis Strait" (S.L. Ross Environmental Research Limited, 2011) into their assessment of recovery methods for spills. In Section 3.8.5 of Volume 9, Baffinland states that this study concluded "that for the months of June, July, August and September, at least one method of response intervention is applicable 100 %, 100 %, 99 % and 95 % of the time respectively (on the basis of wind and wave data). The effectiveness of the recovery methods can drop to the low 80 % by November."

These numbers are substantially higher than those provided in the report. Table 14 from the report is reproduced below:

**Table 14: Percentage of Time When At Least One Countermeasure Option is Favourable for Central Davis Strait During Periods of Open Water**

Month	At Least One Countermeasure Option Favourable	At Least One Countermeasure Option Favourable or Marginal	No Countermeasure Option Possible
July	73	73	27
August	63	63	37
September	54	56	44
October	39	41	59
November	15	17	83
December	0	0	100

For periods of freeze-up and winter (December through July), response deferred to spring-time melt season.

(S.L. Ross Environmental Research Limited, 2011 – pg. 26)

The information presented in the FEIS seems to greatly overestimate the percentage of time that at least one spill countermeasures would be applicable.

**Request EC-10:**

EC requests that the Proponent clarify the discrepancies between the results cited from the "Spill Response Gap Study for the Canadian Beaufort Sea and the Canadian Davis Strait" in the FEIS and those that are actually provided in the report.

**References:**

S.L. Ross Environmental Research Limited. 2011. Spill Response Gap Study for the Canadian Beaufort Sea and the Canadian Davis Strait. 37 pp. Available at:

<http://www.alutiansriskassessment.com/documents/A2A6V0 - SL Ross Environmental Research Limited - Spill Response Gap Study for the Canadian Beaufort Sea and the Canadian Davis Strait.pdf>

**IR # EC-11**

**Subject:** Freshwater Quantity VEC Parameters and Thresholds.

**Reference:** Volume 7 Section 2.3.1.1

Guideline Section 8.1.6.2 "Potential Impacts on surface water, groundwater and sediment quality in relation to other site waste management activities"

**Preamble:**

In Volume 7 Section 2.3.1.1, Table 7-2.3 defines the water withdrawal or diversion thresholds adopted by the Proponent. These thresholds were set following the industry standard of maintaining withdrawal or diversion levels below 10% of average total monthly streamflow volume. However, the data expressed in Appendix 3B Attachment 5 Appendix 10D-3 refers to a series of diagrams that only provide annual averages (e.g., Mine Site – Water Supply Balance Block Flow Diagram document # H337697-4210-10-002-0001). It is unclear from the information and data provided how the Proponent reached the conclusion that they were in compliance with the 10% goal as shown in Tables 7.2-14 through 7.2-22.

Further it should be noted that the use of average conditions will not result in a conservative estimate of potential impacts, especially when the high degree of uncertainty in estimating streamflow across the project area is considered. When using a mean there is an equally good chance that conditions will be drier than "normal" which could result in greater impacts particularly during construction when water usage is highest. In order to be conservative it would be more appropriate to use a 1:10 year dry condition to estimate impacts rather than a mean as used in the Volume 7 Appendix 7A Hydrology Baseline Report. The use of a 1:10 year dry condition approach would ensure a thorough assessment of effects of the project on the freshwater environment, and perhaps should be encouraged for future proposals.

**Request EC-11:**

**EC requests that the Proponent:**

- a. Provide monthly flow diagrams comparable to the annual flow diagrams found in Volume 3 Appendix 3B Attachment 5 Appendix 10D-2 Figures 1 through 7.
- b. Complete the assessment of water diversion and withdrawal using the 1:10 year dry period to determine if the 10% threshold will be exceeded when the area is subject to typical dry conditions.

**IR # EC-12**

**Subject:** Waste Rock Runoff Collection Pond Capacity

**Reference:** Volume 3 Attachment 5, Appendix 10D-2, Attachment 5: Appendix 10D-5

Guideline Section 6.5.3.2 "The permeability of the impoundment structures and the effectiveness of seepage containment, including the needs for control or retention structures if applicable."

Guideline Section 6.5.3.3 "Description of the physical and chemical characteristics of seepage and runoff from the waste rock piles and appropriate control measures"

**Preamble:**

The details of the runoff rates used to design the two collection basins around the waste rock dump (Figure 3-3) found in "Stormwater management and drainage system design" (H337697-0000-10-122-0001) state that these rates were defined based upon rainfall-runoff modeling using the rational method of monthly precipitation values and intensity – precipitation – duration curves provided in the Baseline Hydrology Report (Volume 7 Appendix 7A). While rainfall can cause high runoff in this region, it is clear from the regional Water Survey of Canada and project hydrometric site hydrographs that the



peak flow every year is generated during the spring freshet. The assumptions used in designing the collection basin capacities are appropriate if rainfall is the primary input source, but in cold regions, snowmelt should be used.

**Request EC-12:**

EC request that the Proponent provide a comparison between the current estimated pond design capacity and the capacity of the ponds if they were designed to meet the same safety standards using a comparable return period but incorporating snowmelt rates.

**IR # EC-13**

**Subject:** Environmental Monitoring Plan

**Reference:** Volume 10 Appendix 10D-10 Section 8.1.2, Commitment 87

**Preamble:**

Commitment 87 states that the Proponent will "Provide information on the weather conditions that are likely to be experienced and the influence this can and will have on ship movements and subsequent noise impacts". Some limited information is provided on weather and the FEIS indicates that the "Ship's Master is responsible at all times for the operation and safe navigation of the ship, the safety of lives, and the preservation of the environment. Among the actions available to the Master included adjusting speed, seeking shelter, accepting assistance or deviating to save life." The FEIS does not however appear to contain sufficient information on either the average or extreme weather conditions that are likely to be experienced in the marine environment to fulfil commitment #87.

**Request EC-13:**

Environment Canada requests that the Proponent provide and discuss the information on marine winds and waves available along the shipping route. Emphasis should be placed on the frequency and duration of wind speeds and wave heights that could pose operational difficulties for ships.

**IR # EC-14**

**Subject:** Potential Impacts of Shipping on Polar Bear Habitat and Prey

**Reference:** Volume 8 – 5.11.2.1 ; Volume 10 – Appendix 10D-10

**Preamble**

The Proponent has examined the availability of sea ice habitat and the potential impact of ship tracks (~17 per month) and has come to the reasonable conclusion that project related shipping activity will not significantly impact the availability of polar bear habitat in the RSA (Volume 8 – 5.11.2.1). However, the direct impacts of shipping on the distribution of polar bears and their prey remains less clear (i.e. will species be attracted to or avoid of ship tracks). The Proponent has developed a Shipping and Marine Wildlife Management Plan (Volume 10 – Appendix 10D-10) that includes both mitigation measures as well as a marine mammal monitoring plan to collect information on the occurrence and distribution of marine mammals along the shipping routes. Given the unprecedented nature of this project, this information will be invaluable in determining the impacts of ice-breaking vessels on marine mammal distribution. The value of this data would increase significantly if there were surveys along the shipping route to get baseline data on the distribution of marine mammals prior to year round shipping activity.

**Request EC-14:**

EC requests that the Proponent commit to carrying out surveys to assess polar bear and prey species distributions along the shipping routes prior to the onset of year round shipping activity.

**IR # EC-15**

**Subject:** Impact assessment for sea ice roughness and converging wakes

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 - Commitment #14  
FEIS Volume 8 – Sections 2.5.4, 2.6, 5.11

**Preamble:**

Commitment 14 states that “Additional oceanographic data will be collected as required to support detailed design. These data needs will be described in the FEIS. The final EIS will further consider the issues of ice roughness, converging wakes and effects on coastal areas, including walrus haulout sites.” Neither ice roughness nor converging wakes are discussed in the response sections identified by the Proponent.

**Request EC-15:**

EC requests that the Proponent provide an assessment of the:

- a. Impact of ice breaking in pack ice and landfast ice on ice roughness and a discussion of the potential implications for ice habitat, polar bear movements, and prey distribution.
- b. Potential impacts from converging wakes from passing vessels and the additive effects of ship wakes and wind-generated waves.

**IR # EC-16**

**Subject:** Cumulative impact of annual vessel transits on pack ice and implications for polar bear and ringed seals

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 - Commitment #24  
FEIS Volume 8 – Sections 2.5.4, 5.6, 5.11

**Preamble:**

Commitment #24 states that “The integrated VEC assessment (as requested in the above commitment) will include a more explicit discussion on the interactions between polar bears, seals and ice.”

The Proponent has focused primarily on the impacts of habitat alterations in Steensby Inlet as it relates to polar bears and ringed seal availability in relation to landfast ice. There is no discussion in Volume 8 Sec 5.11.2.1 in regards to bearded seals or the potential cumulative impacts of habitat alteration in the pack ice and how that may influence polar bears and seals. The Proponent needs to clearly state what the cumulative area of habitat alteration is likely to be in relation to ships transiting the marine study area on an annual basis, not just for a single ship transit (i.e. the repeatedly reported value of 76.5 km<sup>2</sup> Volume 8 pages 161,179,248,249 & 261).

Because pack ice is constantly moving with the wind, tides and ocean currents there is the potential that each time a ship transits through Hudson Strait and Foxe Basin it will be encounter new and previously un-impacted floes and therefore the cumulative habitat alteration may be much greater than 76.5 km<sup>2</sup>. The Proponent should clearly state what the potential for cumulative habitat alteration could be and whether this exceeds the limits identified for polar bears and ringed seals in Volume 8.

**Request EC-16:**

**EC requests that the Proponent provide:**

- a. An estimate of the cumulative area of pack ice disturbed by ore carriers on an annual basis, and an indication of whether this area would exceed thresholds for significance identified in the FEIS.



- b. An estimate of the cumulative proportion (%) of ice pans in the marine RSA that would be affected on an annual basis.

**IR # EC-17**

**Subject:** Monitoring framework for polar bear and ringed seal

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 - Commitment #63  
FEIS Volume 10 – Appendix 10D-13

**Preamble:**

It was requested that the Proponent provide a monitoring framework that will outline a commitment to collect additional baseline sampling to verify the predication of the impact assessment of vessel traffic and icebreaking on marine mammals. Neither polar bears nor bearded seals are identified in Volume 10, Appendix D-13, Table 2.

The polar bear was listed as a species of Special Concern under SARA in October 2011.

Section 79(2) of SARA also requires that measures are taken to monitor the adverse effects of a project on listed wildlife species and their critical habitat after the project is implemented. This section applies to all species listed on Schedule 1 of SARA.

The Proponent should provide a justification for the exclusion of these species given that the Polar Bear is now listed on Schedule 1 of SARA, and that relatively little is know about the response of either both species to vessel traffic.

**Request EC-17:**

EC requests that the Proponent provide a monitoring framework to assess project effects from vessel traffic on polar bear and bearded seal or a detailed justification for the exclusion of the species from the marine monitoring program.

**IR # EC-18**

**Subject:** Air quality assessment for ships in transit.

**Reference:** FEIS Volume 1 – Appendix 1B-5 – Concordance with PHC Appendix 1 – Commitment #141

**Preamble:**

During the review process the Proponent made the following commitment (NIRB Compliance Review Table Commitment #141)

*Assess the potential ambient air quality impacts from ship emissions. A new transient CALPUFF model scenario will be completed using the Steensby Port model domain, CALMET data, and emissions from all sources at the port. In addition, emissions from a fully loaded ore ship pulling away from the port will be included. **The ship emissions will be estimated assuming that fuel containing 3.5%.** Since the ship emissions will be infrequent and transient only short term (1-hr) ambient concentrations of as sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and nitrogen dioxide (NO<sub>2</sub>) will be analysed. The emission input data will be reviewed by Environment Canada prior to completing this model simulation.*

In the FEIS, the Proponent has provided a new transient CALPUFF model scenario (Volume 5, Section 2.6.3.3, and Appendix 5C-5). However, instead of assuming that the fuel for ship will contain 3.5% sulphur, the Proponent estimated ship emissions based on fuel containing 1.5% sulphur. The selection of fuels can have a significant impact on ship emissions and on the ambient concentration of SO<sub>2</sub>. The Proponent has stated that it will use fuel with 1.5% sulphur (Volume 5, Section 2.6.3.3), however, this would be hard to verify and enforce. Currently ships in the north are permitted to use fuels containing

3.5% sulphur. The Proponent should provide a discussion of any changes that would result in the model predictions for SO<sub>2</sub> if fuel containing 3.5% sulphur were used.

The modeling of ship emissions while in transit is not trivial. The Proponent should provide a detailed discussion of the methodology used to model ship emissions.

To allow for a full review, the Proponent should submit to the Board all input and output model data files in a model-ready format.

**Request EC-18:**

EC requests that the Proponent provide:

- a. A qualitative discussion of the changes in model predicted ambient SO<sub>2</sub> concentrations assuming that ships will use fuel containing 3.5% sulphur;
- b. A detailed discussion of the methodology used to model air emissions from the ships in transit;
- c. The model input and output data used to generate the new transient CALPUFF model scenario in a model-ready format.

**IR # EC-19**

**Subject:** GHG assessment.

**Reference:** Volume 5 - Appendix 5B

**Preamble:**

The DEIS included a Greenhouse Gas Assessment in Appendix 5B. The title of the report was "Final Report: Greenhouse Gas Emissions, December 2010". Appendix 5B of the FEIS is still titled Greenhouse Gas Assessment, however the report in Appendix 5B has changed and is now titled "Revised Final Report: Climate Change Assessment, August 2011". Appendix 5B of the FEIS no longer addresses GHG emissions from the project. It appears that the GHG assessment in DEIS was changed by mistake.

**Request EC-19:**

EC requests that the Proponent provide the Greenhouse Assessment for the FEIS.

**IR # EC-20**

**Subject:** Level of Confidence in Predictions

**Reference:** Volume 2, Section 3.8.1 Rating of Residual Biophysical Effects, Qualifier 1 – Level of Confidence, p. 52.

**Preamble:**

The explanatory text in this section describes what it means if the level of confidence associated with a prediction is assigned a low or high confidence rating as follows: "**Low**" is assigned where there is a high degree of confidence in the inputs and "**High**" when there is a low degree of confidence in the inputs. This was also stated in the DEIS.

**Request EC-20:**

EC requests that the Proponent clarify the confidence rating system applied to predictions. The text, as stated, is counter-intuitive and could be misleading.



**IR # EC-21****Subject:** Magnitude ratings for Residual Impacts**Reference:** Volume 7, Table 7-3.10, Section 3.4.1.5, p. 113**Preamble:**

Table 7-3.10 indicates the residual water and sediment quality effects will be assigned a rating of "negligible", I, II or III for magnitude depending on how much the measured concentration exceeds the threshold value. The Level I, II and III ratings translate into concentrations that are less than 10X greater, 10-100X greater and more than 100X greater than the threshold concentration, respectively. In contrast the 4<sup>th</sup> paragraph under Section 3.4.1.5 suggests that Level II and III ratings correspond with concentrations 1-10X greater and 10X greater than the threshold concentration, respectively when it states the following: "Where residual effects were considered likely and there was a lack of reliable data available to quantify the contaminant source, a conservative approach was employed by assuming that the concentration of the key indicator(s) for that particular effect would exceed the respective threshold(s) (Table 7-3.8), resulting in a Level II magnitude effect. For these cases, it was further assumed that the magnitude could be maintained below a Level III effect (i.e., less than an order of magnitude greater than the threshold)."

It would appear that the table and the text conflict and that the reworked magnitude assessment scale is less conservative than the scale used in the Draft EIS.

**Request EC-21:**

Given the critical importance of magnitude in assessing the overall rating for residual effects, EC requests that the Proponent clarify what is meant by Level I, II and III magnitude ratings and demonstrate that the reworked magnitude rating system represents a conservative assessment of residual impacts.

**IR # EC-22****Subject:** Mixing Zones**Reference:** Volume 7, Section 3.4.1.6, p. 114-118, 142-161

Concordance with PHC Appendix 1 – Commitment # 243

**Preamble:**

In commitment 243 the Proponent indicated they would define minimum mixing zones for the receiving environment and revisit discharge quality criteria for mine contact water and sewage discharges using worst case assumptions (i.e. 90<sup>th</sup> percentile baseline concentrations, low flow conditions). Further, the Proponent also committed to provide the raw data (including flows and baseline concentrations) used to facilitate verification of calculated concentrations.

With respect to defining minimum mixing zones, the Proponent has provided some distances at which the discharge plume is expected to be discernible in the receiving waters for various mine contact water discharges. However, no information has been provided with respect to the relative strength of the plume in either its vertical or horizontal dimensions. Environmental concentrations were calculated for waters receiving mine contact water discharges using average and 90<sup>th</sup> percentile baseline concentrations at average and low flows. However, the resulting receiving water concentrations from sewage discharges were not revisited because according to the Proponent "the mass balance approach taken was appropriate to the assessment, and while an alternate, more confined mixing zone (VR) was considered, this review did not result in a change to the assessment methods." (p. 118).

EC also notes that the raw data in Appendix 7A and 7B is provided in pdf format rather in a modifiable excel format making verification difficult.



**Request EC-22:**

EC requests that the Proponent:

- a. Provide sample calculations to show what values were substituted into the equation listed on p. 114 (e.g.  $C_D$ ,  $Q_D$ ,  $C_R$ ,  $Q_R$ ) to arrive at the mean and 90<sup>th</sup> percentile concentrations in the receiving environments presented in Tables 7-3.16 – 7.3-22.
- b. Provide the raw baseline concentration and flow data in a modifiable excel format to facilitate EC's verification of calculated concentrations in mine contact water and sewage discharges.

**IR # EC-23**

**Subject:** Derivation of site specific water quality objectives

**Reference:** Volume 7, Appendix 7B-2

Concordance with PHC Appendix 1 – Commitment# 242, 268

**Preamble:**

The Proponent has derived site-specific water quality objectives (SSWQOs) for Al, Cr, Cu and Fe following the background concentration method outlined by CCME (2003) on the basis that these metals are naturally elevated in the study area. The SSWQO for Cr (0.0047 mg/L) and Fe (1.2 mg/L) were based on the 95<sup>th</sup> percentile of baseline concentration data derived from drainages off the deposit while the SSWQO for Al (0.94 mg/L) was based on the 95<sup>th</sup> percentile upstream of the deposits. Lastly, the Cu threshold (0.00467 mg/L) was determined using the hardness-dependent equation developed for copper by substituting the hardness from the drainages off the deposit. In general, the sites used in the derivation procedure resulted in the highest metal concentration being selected to represent the SSWQO for each respective metal.

EC questions the validity of the SSWQOs recommended by Baffinland as the derivation does not appear to conform to CCME guidance which outlines 3 general approaches for defining background concentrations of water quality variables: The CCME approaches are as follows:

- i) Use of historically-collected water quality data for the site (i.e., prior to the commencement of activities that could have substantially altered water quality conditions);
- ii) Monitoring contemporary water quality conditions at one or more stations located upstream of contaminant sources; and,
- iii) Monitoring contemporary water quality conditions at one or more reference areas, which are generally located nearby the site under consideration but have not been adversely affected by human activities.

The samples used in the derivation of the SSWQOs were collected from various sites including upstream of the deposits, downstream of the deposits, drainages off deposits, Tom River area, Mary River background tributary, Camp Lake tributaries and Shear Lake tributaries. It is EC's opinion that of these samples only those collected upstream of the deposits and possibly the Tom River area represent background concentrations. The other sites used were all within the catchment area of deposit 1 and are likely biased by bulk sampling activities. EC therefore questions the validity of the SSWQO for Cr and Fe since they were based on concentrations measured in drainages off the deposit which likely have elevated Fe and Cr concentrations based on their origins.

The site-specific guideline for Cu is also problematic. In the case of Cu, the hardness-dependent equation for Cu was used to derive a SSWQO for Cu. Water hardness provides protection against metals toxicity, with an inverse relationship between hardness and toxicity. The Proponent selected the highest hardness concentration (from drainages off the deposit) to derive the SSWQO for Cu raising the threshold to 4X more than the respective generic CCME guideline for Cu. This is of concern since the hardness for water bodies receiving drainages off the deposits are not representative of the hardness of



other sampling areas. Thus, the SSWQO suggested for Cu will not likely be protective for other water bodies (of lower natural hardness) receiving mine contact discharges in the mine area.

Lastly, EC does not support the use of the 95<sup>th</sup> percentile for establishing SSWQO since using the 95<sup>th</sup> percentile is a biased predictor of central tendency and will result in underprotection of the environment.

**Request EC-23:**

EC requests that the Proponent provide revised estimates of their SSWQOs using data that is representative of background concentrations and using a less biased estimator of central tendency to establish each respective SSQWO so that more protection is afforded to the environment. A conservative approach would be to use the 25<sup>th</sup> percentile.

**IR # EC-24**

**Subject:** Explosives management

**Reference:** Volume 3 – Appendix 3B – Attachment 8

Concordance with PHC Appendix 1 – Commitment # 245

**Preamble:**

EC is pleased to see that the Proponent developed an explosives management plan as described in commitment 245. However EC noted the following:

- a. **Section 2.1.2, p. 5** of the plan indicates “Assembly of the manufacturing plant will be based on mine site demand and will be subject to formal notice of commencement submission through the Canadian Environmental Assessment Registry.”

**Request EC-24a:**

The CEEA and thus the CEA Registry does not apply to northern environmental assessment processes. The next iteration of this Plan should be updated to reflect the Nunavut context.

- b. **Section 2.5.1, p.6** suggests that the temporary magazines established along the railway corridor will likely need to be heated to ensure performance of explosives and the energy source for heating will be on-site generators. The Plan states, “In the event a generator is required, appropriately sized spill kits will be located on site.”

**Request EC-24b:**

Given that on-site generators will be the only source of energy at the magazines EC requests that the Proponent update the plan to include a commitment to equip all the temporary magazines with appropriate spill kits.

**IR # EC-25**

**Subject:** Propylene Glycol management

**Reference:** Volume 3 – Appendix 3B – Attachment 8 - Section 6.6.1, pg. 29

Volume 3 – Appendix 3B – Attachment 5 – 10D-3 - Sections 6.2.1, 6.2.2, p. 20-21,

Concordance with PHC Appendix 1 – Commitment # 230

**Preamble:**

In commitment 230 the Proponent states that they will “Clarify how propylene glycol used for aircraft de-icing is to be managed and how downstream receivers will be protected against potential dissolved oxygen depletion.” Sections 6.2.1 and 6.2.2 indicate that a drainage system will ensure collection of oil and propylene glycol from airstrips. Further, these Sections also indicate that to reduce the volume of

waste generated, some of the propylene glycol will undergo interim treatment. However the design of the collection system is not provided. EC also noted that the Plan indicates “de-icing facilities, provided at the airstrip, will consist of a portable discharge pump for the application of deicing fluid from 200 L drums. De-icing will be carried out to the side of the runway, with propylene glycol, a biodegradable fluid which requires no treatment.” This information runs contrary to Fresh Water Supply, Sewage, and Wastewater Management Plan which states on p. 20 that propylene glycol will undergo interim treatment.

**Request EC-25:**

EC Requests that the Proponent:

- a. Clarify the treatment and fate of propylene glycol used in de-icing operations.
- b. Provide more information on the design of the drainage system for collecting oil and propylene glycol from airstrips (for example it is unclear if the airport perimeter will be surrounded by a ditch and the ditch water reclaimed).
- c. Clarify what is meant by “interim treatment for propylene glycol”, and whether recycling will be used.

**IR # EC-26**

**Subject:** Discharge Thresholds

**Reference:** Volume 3- Appendix 3b – Attachment 5 - Appendix 10D-2

**Preamble:**

Table 9.2 (pg. 40) provides thresholds to which all discharges will be compared to for acceptability. The thresholds presented represent those derived from the MMER and are only acceptable for mine contact water discharges with respect to compliance with these regulations. The list is limited to only the Schedule 2 regulated substances of the MMER. Thresholds and limits for metals and nutrients that are not regulated by the MMER should also be established.

**Request EC-26:**

The Plan should be updated to reflect the thresholds that will be applied to each respective discharge taking into consideration whether the MMER limits apply, and noting that these are minimum national standards; more stringent discharge criteria may be warranted for various receiving environments.

**IR # EC-27**

**Subject:** Brine disposal

**Reference:** Volume 3, Appendix 3B, Attachment 5 - Section 4.2 & 6.2.3

Concordance with PHC Appendix 1 – Commitment # 247

**Preamble:**

In commitment 247 the Proponent indicated that they would “provide a discussion on alternative disposal methods for brine (leftover from tunneling activities) and alternatives to the use of brine for dust suppression.” However Section 6.2.3 indicates that calcium chloride brine solution used for tunneling along the railway will be collected and disposed of as per the Waste Management Plan. The Plan also states that some brine will be used for drilling activities.

**Request EC-27:**

EC requests that the Proponent clarify if the brine recovered from tunneling activities will be re-used for drilling purposes and provide a discussion of the alternatives available for brine disposal including the final disposal method.



## **IR # EC-28**

**Subject:** Environmental Monitoring plan

**Reference:** Volume 3, Appendix 3B, Attachment 5 -Appendix 10D-12

### **Preamble:**

Several information requests related to the content of the Environmental Monitoring plan are outlined below:

- a. **Section 1.1, p.3** indicates the EHS Management System also includes Aquatic Effects Monitoring Plan (AEMP) as per the *Metal Mining Effluent Regulation* (MMER) Schedule 5 requirements. The Plan goes on to say that the AEMP will be finalized once feedback is received from Environment Canada.

### **Request EC-28 a:**

This Section should be revised to state that the EHS Management System also includes Environmental Effects Monitoring (EEM) as per the *Metal Mining Effluent Regulation* (MMER) Schedule 5 requirements. The EEM conducted under the MMER does qualify and cannot be substituted for the Aquatic Effects Monitoring Plan (AEMP). The AEMP is a requirement of the Type A water licence and is a more comprehensive Plan that typically covers additional monitoring requirements beyond what is required by EEM under MMER. However, EC supports the inclusion of the MMER EEM as a sub-component of the mine's AEMP. To this end, EC encourages the Proponent consult the following Guideline, *Guidelines for Developing and Implementing Aquatic Effects Monitoring Programs for Development Projects in NWT*, to assist them with harmonizing the EEM MMER and AEMP requirements under one Plan. When this Plan has been developed, EC would be pleased to review it. EC requests that a coordinated framework outlining the various monitoring components, including study design, be provided in advance of the technical meetings.

- b. **Section 4.2, p. 22** indicates monitoring and reporting requirements under regulatory approvals such as the water licence, QIA land lease, land use permits and fisheries authorization will include:
  - Routine inspections and monitoring of various aspects of the operations;
  - Surface Water Quality Monitoring;
  - Wastewater Treatment Facility Discharge Monitoring;
  - Bulk Fuel Storage Facility Discharge Monitoring (Oils and Greases); and
  - Vehicle Maintenance Shops Wastewater Monitoring (Oils and Greases).

### **Request EC-28b:**

EC understands there will also be a wastewater treatment facility associated with the emulsion plant (p. 21 of Fresh Water Supply, Sewage and Wastewater Management Plan). EC seeks clarification on what level of discharge monitoring will be conducted on discharges from this treatment plant.

- c. **4.2.1.2, p.24** indicates "monitoring of the Landfarm involves inspection of physical integrity of the berm and has work contact water monitoring."

### **Request EC-28c:**

As stated, the sentence above is incomprehensible. EC seeks clarification regarding the proposed inspections and monitoring.

- d. **Section 4.5.1, p.30** states again that the MMER EEM Framework will serve as the basis for the Aquatic Effects Monitoring Plan (AEMP) and that "once this study program is reviewed and approved by Environment Canada, the AEMP will be finalized."

**Request EC-28d:**

As noted above, the AEMP is a requirement of the Type A water licence for which the EEM requirements can be incorporated. Therefore, the EEM Framework provided in Appendix 10D-14 cannot serve as the AEMP. EC requests the Proponent provide a broader AEMP framework that includes both the Type A water licence and MMER EEM requirements.

- e. **Table 4-9, p. 30** - As noted in comments related to the MMER Environmental Effects Monitoring Study Design Framework, EC questions the defensibility of the mine Reference sites suggested in the Table.

**Request EC-28e:**

EC requests that the Proponent revisit reference site selection and demonstrate that the reference sites are outside the mine's zone of influence. To corroborate reference site selection, EC recommends the maps identifying reference/exposure site locations provide all other contextual information, including the location of other site infrastructure and overlay Total Suspended Particulate contour maps to demonstrate the sites are clearly outside the influence of mine activities.

**IR # EC-29**

**Subject:** Biophysical Environmental Effects Monitoring Framework

**Reference:** Volume 10, Appendix 10D-13

**Preamble:**

In **Appendix 1, Table 1, Table 5** the monitoring programs for freshwater and sediment quality lack detail with the majority of items being tagged as TBD. Most notably sample sizes have not been determined and neither has the early warning indicator (i.e.,  $d_o$ ) been selected. In addition, hypothesis testing has been expressed as a 2-tailed test when a one-tailed test would be more appropriate and yield more power to the test. The study design does not provide the statistical test that will be used to test differences or provide any data structure description (e.g. distribution of the baseline data). Accordingly, no consideration has been given for what level of alpha (i.e. Type I error) or beta (i.e., Type II error) will be assigned to the test nor a discussion of the power afforded by the statistical test used to detect change.

**Request EC-29:**

EC requests that the Proponent revise their freshwater and sediment monitoring plans to include more details related to the statistical design of the program, including sample size, early warning indicators, alpha, beta and power analysis.

**IR # EC-30**

**Subject:** MMER

**Reference:** Appendix 3, Table 1, Fish (MMER Biological Studies)

**Preamble:**

The monitoring program indicates that a fish population survey will be conducted (with arctic char), for the receiving environment associated with the final discharge point with potentially the most adverse environmental impact.

**Request EC-30:**

As per Schedule 5, 9(b) of the MMER, a fish population survey will be required for each discharge point whose effluent is >1% concentration within 250 m of the final discharge point.



**IR # EC-31****Subject:** Reference Sites**Reference:** Volume 3 – Appendix 3 – Attachment 5 – 10D-12 Appendix 3, Tables 1-5  
Concordance with PHC Appendix 1 – Commitment # 240

EC notes that a BACI study design has been chosen for monitoring programs described in Tables 1-5 to test whether mine effluent is causing effects in the receiving environment. In commitment 240 the Proponent indicated that they would “provide information on the reference sites selected for sediment and water quality in order to aid in providing a true picture of baseline and provide a framework for the aquatic effects monitoring plan by 2012.” While some information on reference sites is provided in the FEIS it would appear that many of the selected sites may have been impacted by previous industrial activity and therefore may not be representative of predevelopment conditions. The BACI design will be compromised if the reference sites do not provide a true picture of the original environment.

**Request EC-31:**

EC requests the Proponent provide defensible Reference sites prior to the technical meetings.

**IR# EC-32****Subject:** MMER Environmental Effects Monitoring Study Design Framework**Reference:** Volume 10, Appendix 10D-14,  
Concordance with PHC Appendix 1 – Commitment # 240

**Preamble:** In commitment 240 the Proponent stated that they would provide an MMER Environmental Effects Monitoring Study Design Framework in the FEIS. While EC is pleased to see that much of our input to the previous iteration of the framework have been incorporated, there will need to be further work on the study design regarding sites where biological monitoring may be required. The MMER EEM Technical Guidance Document, Chapter 2 recommends that biological monitoring be carried out in the exposure area where the effluent has the greatest potential to adversely effect the receiving environment. EC notes that a good understanding of the effluent quality and the environmental sensitivity is necessary to determine which site is appropriate and chronic toxicity test results will inform this determination. EC was pleased to note chronic toxicity testing is proposed for both freshwater and marine discharges. If there are site-specific differences in effluent quality and/or differences in the receiving environment, it may be appropriate to carry out biological monitoring at more than one final discharge point (e.g. freshwater plus marine).

With respect to reference sites, the Framework does not demonstrate that the proposed reference sites are outside the zone of influence of mine activities. EC notes proposed reference sites F0-05 and L1-06 are 500 m east and less than 1 km west of the main deposit, respectively, while G0-03 is 3.5 km east of deposit 1 and less than 1 km south of deposits 2, 3 and 3B, where project activities have already been carried out, and where we may potentially expect future development. Wind borne contamination should be considered when selecting reference sites, windrose data from Appendix 5C-1 confirms that the predominant wind direction in the study area is southeast indicating F0-05 and G0-03 are down wind of historical development activity at the site will likely to be subject to windborne pollution. Further, the contour plot for predicted annual average total suspended particulate (TSP) concentrations indicates all 3 proposed mine reference sites will be within the zone of influence for particulate deposition and, in all likelihood, will exceed Nunavut’s 24-hr and annual TSP thresholds which are  $120 \mu\text{g}/\text{m}^3$  and  $60 \text{ g}/\text{m}^3$ , respectively.

**Request EC-32:**

EC requests that the Proponent make the following changes to the Framework:



- a. Include maps that provide location of exposure and reference areas.
- b. Revisit reference site selection and provide justification that reference sites are outside mine's zone of influence. To corroborate reference site selection, EC recommends the maps identifying reference/exposure site locations provide all other contextual information, including the location of other site infrastructure and overlay TSP contour maps to demonstrate the sites are clearly outside the influence of mine activities.
- c. Remove the reference to 'aquaculture facilities' from list of anthropogenic influence in Section 6.1.3.
- d. Revise Section 6.1.5 to include the plume delineation for each discharge point. Specifically, EC requests that the Proponent address the question of whether it's anticipated the effluent will be 1% or greater at a point 250 m downstream of each respective discharge point.
- e. Remove the extra French bullet (i.e. (d)ii in the list of tests under Section 6.2.1.2.

#### **IR # EC-33**

**Subject:** Marine Dredging - Disposal of Dredge Spoil

**Reference:** Final EIS, Volume 8, Section 4.5.2.1 (pg. 102 and 110) New information

#### **Preamble:**

The Proponent has previously stated that disposal at sea will not be considered as a sediment disposal option for the Mary River Project and as a result Environment Canada is not currently identified as a Responsible Minister. However it is unclear if this is still the case as the Final EIS describes the dredging of a substantial amount of sediment in the ore carrier turning basin at Steensby Inlet but does not describe the fate of the dredged sediment. Further the FEIS briefly mentions a compensation concept (Vol 8 pg 110) that involves the "deposition of fine grain dredge spoils in nearshore, low energy habitats". While it is possible that such an activity may not constitute disposal at sea it is incumbent upon the Proponent to provide sufficient information to allow such a determination to be made. This is particularly true given that Environment Canada would become a regulator under the Canadian Environmental Protection Act (1999) if disposal at sea became part of the project.

More detailed information on what is involved in the disposal at sea regulatory process can be found at:

<http://www.ec.gc.ca/iem-das/default.asp?lang=En&n=BEFB35FC-1>

#### **Request EC-33:**

EC requests that the Proponent:

- a. Clarify whether disposal at sea is being considered as a disposal option for project generated dredge spoil.
- b. Provide the following information if disposal at sea is being contemplated as a disposal option:
  - i) identify and characterize potential disposal sites.
  - ii) characterize the material to be disposed.
  - iii) demonstrate that disposal at sea is the appropriate disposal option.