Environment Canada Information Requests
for Baffinland Mary River Project
NIRB 08MN053

General Comment:

When the draft EIS was written, Baffinland was the sole proprietor of the Mary River Project but the company/project was recently sold and is now owned by AcelorMittal and Nunavut Iron. The draft EIS should reflect this change in ownership and the information required by Section 5.1 of the EIS Guidelines vis-à-vis AcelorMittal and Nunavut Iron.

Specific Information Requests:

IR # EC - 1
Subject: Potential impacts of shipping in the Arctic
Sections:
EIS Guidelines:

- Sections 8.1.11, 8.1.12, 8.1.13

DEIS
Volume 3 - Sections 2.1.8, 3.2.2.1, 3.6.3
Volume 6 - Section 4.10
Volume 8
Volume 10 - Appendix 10D-10 – section 3.2.2.3

Preamble :

The draft EIS provides an inadequate review of the potential impacts associated with the specifics of shipping for the project, both the year-round shipping in ice covered waters to/from Steensby Port and the open water season shipping to/from Steensby Port and Milne Port. The proponent has indicated that the actual shipping will be carried out by various companies or consortiums with "Arctic experience" which it plans to charter (Volume 3, sections 2.1.8 for fuel tankers; 3.2.2.1 for shipping out of Milne Port; 3.6.3 for shipping out of Steensby Port). Though the proponent will be chartering the various vessels and indicates that the ship masters have responsibility for the protection of the environment (Volume 10, Appendix 10D-10, section 3.2.2.3), the requirement for year-round shipping and the number of ship transits is clearly a critical aspect of the project. Potential environmental and cumulative impacts of shipping are thus very relevant for the EIS.

The 2009 *Arctic Marine Shipping Assessment* report released by the Ministers of the Arctic Council[1] provides an extensive overview of potential concerns associated with shipping in Arctic waters. The main points of interest are included below. The proponent is requested to provide additional information on how it proposes to address, mitigate, and/or monitor for, the following issues, as well as evaluate the potential cumulative impacts:

[1] http://www.pame.is/amsa/amsa-2009-report

Requests:

1) Safe navigation in ice-covered waters depends on the experience, knowledge and skill of the ice navigator. Currently, most ice navigator training programs are ad hoc and there are no uniform international training standards. The project is proposing to have 10-12 large (cape class) icebreaking ships working year-round to transport ore through waters that are ice covered for a major part of the year. How will the proponent ensure safe navigation in these waters?

2) The accidental release of oil or toxic chemicals can be considered one of the most serious threats to Arctic ecosystems as a result of shipping. Concentrated aggregations of birds and mammals, often in confined spaces such as leads and polynyas, increase the risk to the animals in the case of an oil spill in the Arctic. Even small spills can have large consequences if they occur where species are concentrated. How will the proponent identify and monitor various locations where marine birds and mammals may concentrate? How will the proponent mitigate impacts on wildlife in the event of an oil spill, for example will the proponent have oil spill response capability and equipment in strategic locations along both shipping routes, and if so where?

3) The introduction of invasive species into the Arctic marine environment from shipping can occur and the risk may be enhanced due to changing climate, possibly making conditions more favourable to some species. The most risk exists where a transfer of organisms from ecosystems of similar latitudes and conditions can occur. Introduction can occur through both ballast water and hull fouling. The proponent has explained that ballast water will be exchanged offshore (in the mid-Atlantic) before the ships come into port. What precautions are being considered with respect to hull fouling? Please describe the likelihood that invasive species (including parasites) would also be transported in the bilge water of ships, and the potential negative impact that this could have on the marine food web and marine mammals.

4) Ship emissions to the air (i.e. CO2, NOx, CFCs, methane, particulate matter, etc.) have been associated with climate change effects and in the Arctic could have significant regional impacts on both human and environmental health. For example, black carbon, a component of particulate matter produced by marine vessels through the incomplete oxidation of diesel fuel, has been shown to accelerate ice melt. Effective reduction of ship emissions can be achieved through the application of feasible and best available technologies, through air emissions reduction techniques and through effective implementation of relevant IMO regulations. What is the proponent proposing to do to evaluate, mitigate and monitor these potential effects?

5) Ice-breaking may result in earlier spring break-up and later fall freeze-up and regular ship movements at the end of either season may change ice regimes along both the southern and northern shipping routes. Ice regimes affect the entire arctic marine food web, from primary productivity up to marine mammals, birds and top predators. How is the

ice regime along the southern and northern shipping routes predicted to change as a result of marine shipping over the life of the project? How will changes in the ice regime influence the marine food web and the distribution and abundance of marine mammals and birds? How is the open water season defined for Milne Inlet?

IR # EC - 2
Subject: Species at Risk
Section:
EIS guidelines - 8.1.11.1, 8.1.12.1
DEIS Volume 6 – Section 4.10.4
Appendix 6E-1 & 6E2

Preamble:

Section 79 (2) of the *Species at Risk Act* (SARA) states that during an assessment of effects of a project, the potential adverse effects of the project on listed wildlife species must be identified, regardless of whether they are deemed significant or not, and if the project is carried out that measures are taken to avoid or lessen those effects, and that the effects need to be monitored. This requirement is also reflected in the following excerpt from the EIS Guidelines issued by NIRB for the Mary River Project:

8.1.11.1
- An overview of bird species, populations, distributions and ecologies in the RSA, with emphasis on identified bird VECs and species with special designations by the COSEWIC). This description should include reference to the significance of ecological functions, and/or the importance for Inuit life and culture of bird VECs;

8.1.12.1
- Description of the potential loss, alteration or alienation of habitat (e.g. staging and nesting habitats) as results of Project development. Special consideration should be give to Species at Risk, species with designations by the COSEWIC, species having significant ecological functions, and /or of importance for Inuit life and culture;

Volume 6 – Section 4.0 identified that Red Knot, a COSEWIC species of Special Concern could be in the RSA but that no Red Knot were seen in any of the three years of surveys. However, in Appendix 6E-1 Sections 4.2 it is stated that Red Knots were seen in the RSA in 2007 and 2008 and again in Section 4.5 that Red Knot were seen during surveys along the transportation survey routes.

In Volume 6 – Section 4.10 it is stated that “Harlequin Duck, Ivory Gull, Ross’s Gulls, and Short-eared Owl were all seen in very low numbers (total count from 2006–2008 surveys was 3, 11, 48, and 6, respectively) and none were seen breeding within the LSA, nor have they ever been reported to breed in the area by other studies. Therefore, based on data collected over three years and discussions with local experts, it is unlikely that project

facilities will have any effect on the behaviour or population dynamics of these species."

Although the total count of each Species at Risk during surveys conducted from 2006-2008 may be low relative to other species, for species such as Ivory Gull and Ross's Gull these numbers may be quite significant when considered against total national populations estimated for these species. Furthermore, since all of the Species at Risk that could potentially occur within the project RSA were detected (either on land or long the proposed shipping routes), it is reasonable to assume that the project will interact with theses species and that these species could be exposed to potentially adverse effects from the project which must be identified as per Section 79 (2) of the *Species at Risk Act*.

Requests:

1) Please specify the number and location (including a map or geospatial coordinates) of all Red Knot sightings recorded during surveys from 2006-2008 as well as any recorded signs of breeding or nesting.

2) For each Species at Risk encountered during surveys, please identify potential adverse effects of the project on each species, how they will be mitigated and how the efficacy of mitigation measures will be monitored as required under S. 79 of SARA.

IR # EC - 3
Subject: Selection of the Shipping Route – proximity to key habitat sites
Sections:
DEIS Volume 3 Section 3.6.3
DEIS Volume 3 Section 6.5.10
DEIS Volume 8 Figure 8-2.1

EIS Guidelines – Section 8.1.11.1

- Description of current habitat use by VECs, including the use of Migratory Bird Sanctuaries, Key Migratory Bird Sites, and other important habitats (e.g. breeding and nesting sites and staging areas) in the RSA and along the proposed shipping routes.
- Identification of key migratory bird sites and important bird areas along the shipping route, including those which could potentially be affected by marine spills as a result of current and/or wind patterns; and

EIS Guidelines – Section 8.1.11.2

- Potential disruption or alteration of migration routes due to the Project;
- Potential impacts on birds and bird habitat use from air contamination, ground contaminants or degraded water quality;
- Potential disturbances to birds from noise and vibrations as a result of blasting, and land and marine transportation;
- Potential effects of shipping and port operation on coastal birds and habitat, as well as potential disturbance on key migratory bird habitat areas and sanctuaries in proximity of shipping routes in the NSA.

Preamble:

Shore leads and polynyas are used by significant numbers of seabirds, ducks and other marine birds during spring migration to their breeding colonies. Migratory marine mammals such as bowhead, beluga, narwhal and walrus also have wintering areas in the southern extent of the sea ice and spring migration routes into the Arctic through systems of leads and polynyas. These migration corridors correspond broadly to the current main shipping routes and travel through geographic chokepoints. For example, the proposed year-round southern shipping route passes within 5 km of Resolution Island (Volume 8, Figure 8-2.1, page 7) which is found within an area identified as a Key Marine Habitat Site for Migratory Birds (#28 – Frobisher Bay) that extends 30 km offshore from the island. Hantzsch Island, just to the north of Resolution Island, is also considered a Key Terrestrial Habitat Site. This island is home to a colony of Thick-billed Murres estimated at roughly 50,000 individuals. The polynyas that form around Resolution Island, particularly the zone south of Resolution Island is recognized as a critical feeding and staging area for migratory birds between May and October, but Black Guillemots, eiders and Glaucous Gulls may overwinter in this area. Groups of more than 100 Ivory Gull, a Species at Risk in Canada, have been observed in this vicinity. This marine area is also important for many marine mammals including bearded seal, ringed seal, and is a key wintering area for beluga.

Requests:

1) As per the bullets outlined above from Section 8.1.11.2 of the EIS Guidelines issued by the NIRB, please describe potential impacts to migratory birds from year-round shipping within this Key Habitat Site, mitigation measures that are proposed to address these potential impacts and monitoring programs to evaluate residual impacts and the efficacy of mitigation measures.

2) Please provide a rationale as to why it is necessary for the shipping route to pass in such close proximity to Resolution Island, and describe any feasible alternative shipping routes that could be used in this area.

IR # EC - 4
Subject: Marine shipping discharges – volume, frequency, contaminants concentrations for bilge water, grey water, and treated sewage

Sections:
DEIS Volume 3 – Section 3.6.4.1, 3.6.4.2

EIS Guidelines:
Section 6.5.8 - Applicable environmental legislation, including:

- International legislation, such as: MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO, 2008);

- Canadian legislation, such as: *Canada Shipping Act, Arctic Waters Pollution Prevention Act* (e.g. the Zone/Date System, the Arctic Ice Regime Shipping System, Ice Navigators if applicable); and
- How the Proponent and its shipping contractors/partners intend to either meet or exceed these requirements.
- Disposal plans for onboard solid waste and waste water (*i.e.*, onboard sewage and grey water);
- Ballast water management plan for all Project shipping, with indication of the proposed ballast water exchange locations in mid-ocean, at the port site in Steensby Inlet, and alternative exchange zones within waters under Canadian jurisdiction;

Section 8.1.12.2
- Potential impacts on birds and bird habitat use from air contamination, ground contaminants or degraded water quality;

Section 9.4.15
- Ballast water management plan;
- Onboard waste management plan (including solid waste, sewage, and other domestic waste);

Preamble:

Regular discharges from ships such as oily bilge water, grey water and treated sewage have the potential to release contaminants into the marine environment that can affect migratory birds either through direct contact or contamination of the food chain in important feeding areas. Direct contact with oily substances released in regular discharges is likely to be greater during periods of extensive ice cover (spring and fall) when birds are concentrated in polynyas and shore leads or if they are attracted to open water created by ice breaking ships.

Requests:

1) Please describe the frequency and volume of grey water, treated sewage, and bilge water discharges from vessels anticipated to be used throughout the project within Steensby Port and Milne Inlet Port and during a typical transit to and from Steensby Port and Milne Inlet along the northern and southern shipping routes to Davis Strait (including passage through Hudson's Strait). Please include in these discharges expected releases of marine lubricants, fuel oils, gear oils, hydraulic oils, greases and cleaning oils.

2) Please describe how grey water, treated sewage, bilge water and other discharges are likely to disperse within the shipping lane under open water and ice cover conditions. Provide the estimated concentration of oily substances in various discharges, how ship design will assure compliance with applicable regulations on discharges and how discharges will be monitored for compliance.

Subject: Disruption or alteration of migration routes due to the project and selection of VECs

Sections:
EIS Guidelines:
7.2.1 Valued Ecosystem Components
- Migratory birds and habitat (nesting areas);
- Marine and coastal habitats including sea ice and seabed sediments;

8.1.11.1
- Description of current habitat use by VECs, including the use of Migratory Bird Sanctuaries, Key Migratory Bird Sites, and other important habitats (e.g. breeding and nesting sites and staging areas) in the RSA and along the proposed shipping routes.
- Description of migratory patterns and routes of VECs potentially impacted by the Project, with a discussion of corresponding sensitive periods;
- Identification of key migratory bird sites and important bird areas along the shipping route, including those which could potentially be affected by marine spills as a result of current and/or wind patterns; and

8.1.12.1
- Potential disruption or alteration of migration routes due to the Project;
- Potential impacts on birds and bird habitat use from air contamination, ground contaminants or degraded water quality;
- Potential disturbances to birds from noise and vibrations as a result of blasting, and land and marine transportation;
- Potential effects of shipping and port operation on coastal birds and habitat, as well as potential disturbance on key migratory bird habitat areas and sanctuaries in proximity of shipping routes in the NSA.

8.1.13.1
- An overview of the marine biological communities occurring within Steensby Inlet and Milne Inlet, and along shipping routes to a lesser extent, including benthic and plankton communities (infauna, and epifauna), pelagic fish, benthic invertebrates, marine fish, coastal birds, and marine mammals.
- Description of habitat of marine VECs, including fish habitat as defined by the Fisheries Act, and existing and proposed areas with special designation (*i.e.*, Sirmilik National Park of Canada, potential National Marine Conservation Areas in the North Baffin region, and Key Marine Habitat Sites for Migratory Birds). Emphasis should be placed on those habitats identified as important to the natural life cycle of a species, and also to Inuit harvesting activities potentially impacted by port and shipping operation;

9.4.16
- Selection criteria and rationales for wildlife species selected for monitoring and mitigation

DEIS
Volume 6 – Section 4.10.2, 4.10.3, 4.10.4

Appendix 6E-1 & 6E2

Preamble:

The EIS Guidelines issued by NIRB for the Mary River Project requested that (Section 8.1.12.1) the proponent assess the potential impacts from disruption or alteration of migration routes due to the Project as well as impacts on birds and bird habitat use from noise and vibrations and degraded water quality. In the proponent's concordance table it is stated in response to the first bullet under the EIS Guidelines 8.1.12.1 (migration routes) that it was "Not scoped in as a project interaction", however no justification of this statement is provided.

Both the proposed northern and southern shipping routes are likely to interact with both spring and fall seabird migrations within Foxe Basin, Hudson Strait and Davis Strait. This includes species such as Ivory Gull, Ross's Gull and Harlequin Duck that are listed federally as Species at Risk. In the spring, migrating seabirds depend on and concentrate in shore leads and polynyas as they make northward migration to breeding sites and major seabird colonies. During spring migration these birds may be attracted to areas of open water created by icebreaking container ships along the southern shipping route. Birds concentrated within these open water areas are more likely to be exposed to oily discharges and other contaminants released from ships within the shipping lanes. In the fall, hundreds of thousands of Thick-billed Murres undertake a flightless swimming migration to overwinter of the coast of Labrador, meaning that significant concentrations of birds occur within Hudson Strait and Davis Strait. Flightless migrating Thick-billed Murres are more likely to be exposed to contaminants from chronic ship-based discharges and accidental spills and are more likely to be disturbed by ship traffic as they will be slower to move out of a ship's path. In Volume 6 it is stated that:

"…it is thought that ship movements along shipping lanes will have inconsequential effects on foraging marine birds along the shipping lanes as bird collisions with ships is unlikely and the periodic requirement to move out of a ship's path will not be a major energetic stress to birds."

There is no literature or data provided to support this statement. Moving out of a ship's may represent a significantly greater energetic stress to flightless migrating birds. Given the frequency and duration of marine shipping, and the proximity of both shipping routes to areas identified as Key Terrestrial and Marine Habitat Sites for migratory birds, it is likely that significant proportions of Canadian populations of more than one species of migratory bird will be exposed to disturbance and pollution from shipping. An assessment of the impacts from shipping on migratory birds thus merits further attention.

Requests:

1. Please expand the assessment of marine shipping impacts to include marine birds (e.g Thick-billed Murres) as a VEC.

2. Please provide information on the potential disruption or alteration of spring and fall migrations of seabirds and seaducks from marine shipping, including location, timing, species and estimated numbers of birds along both the northern and southern shipping routes that may be affected or provide a clear rationale backed by supporting information as to why this was not scoped in as a potential project interaction.

3. Please describe mitigation measures to reduce disturbance to birds from ship vessels along the shipping lanes, measures to avoid vessel collisions with birds, and measures to reduce the release of contaminants into the marine environment from operational and accidental discharges, and how the success of these mitigation measures and impacts to birds will be monitored.

IR # EC - 6
Subject: Cumulative impacts – inclusion of Kiggavik Uranium Project
Sections:
EIS Guidelines:
7.8
DEIS Sections:
Volume 9 – Section 1.3.2, 1.4, 3.6, 3.8

Preamble:

Section 7.8 of the NIRB's EIS Guidelines requires the proponent to consider cumulative effects from shipping activities from reasonably foreseeable future projects and activities. This includes an assessment of:

- Effects on the distribution, abundance and harvesting of both terrestrial and marine wildlife (including migratory birds), in terms of habitat loss, changes to migration patterns, population health, etc. from escalated project activities, establishment of a longterm transportation network and marine shipping routes with ice breaking at the proposed rate;"

- Effects on "Species at Risk;

The proposed Kiggavik Uranium Project constitutes a reasonably foreseeable project according to the definition provided in Section 1.3.2 of Volume 9, yet it is not included in the list of Reasonably Foreseeable Future Mines provided in Section 1.3.2.6. Marine shipping through Hudson Strait is anticipated for the Kiggavik project.

Request:

Please update the analysis of cumulative effects from marine shipping according to the bullets from the NIRB EIS guidelines highlighted above, accounting for the expected shipping activities associated with the Kiggavik Uranium project.

IR # EC - 7
Subject: Shorebirds and songbirds
Sections:
EIS Guidelines:
8.1.11.1

- An overview of bird species, populations, distributions and ecologies in the RSA, with emphasis on identified bird VECs and species with special designations by the COSEWIC). This description should include reference to the significance of ecological functions, and/or the importance for Inuit life and culture of bird VECs;

8.1.12.1

- Description of the potential loss, alteration or alienation of habitat (e.g. staging and nesting habitats) as results of Project development. Special consideration should be give to Species at Risk, species with designations by the COSEWIC, species having significant ecological functions, and /or of importance for Inuit life and culture;
- Potential impacts on birds and bird habitat use from air contamination, ground contaminants or degraded water quality;
- Potential disturbances to birds from noise and vibrations as a result of blasting, and land and marine transportation;

DEIS - Volume 6 – Section 4.0
Appendix 6E-1

Preamble:

In Volume 6 – Section 4.0 it is stated that "relatively low densities of songbirds and shorebirds were recorded in comparison to studies carried out on mainland Nunavut, N.W.T., Yukon, and Alaska (summarized in Weider and Hobaek 2000 and in Morrison et al. 2001)" and in Section 4.2 of the draft EIS it is stated that Songbirds and Shorebirds were therefore not determined to be Key Indicator's (KIs) because they are "not considered ecologically important to this ecosystem", that "they are of low enough densities that it is unlikely that measurable indicators of change in their distribution and abundances will be detected in a monitoring program" and that "population levels are not likely to change as a result of the Project".

No quantitative data are provided to support the statement that songbirds and shorebirds occur at low densities and the density estimates from existing studies (Weider and Hobaek 2000 and Morrison et al. 2001) upon which this conclusion was based are not provided. However, Volume 6 – Section 4.0 states that 18 species of songbirds and shorebirds were seen in the RSA, 15 of which nested in the area, and that higher densities of songbirds and shorebirds were seen along the transportation routes, including the endangered Red Knot (*rufa* subspecies). Songbirds and shorebirds are a conspicuous and vital part of northern ecosystems, and for many shorebirds the Canadian Arctic is of special importance, providing a highly significant proportion of their breeding range in North America. Species from both groups may be exposed to disturbance and habitat degradation along the transportation corridors due to noise and human disturbance during

construction and operation, habitat loss and destruction/disturbance of nests during construction activities, dust deposition, accidental spills, altered drainage affecting habitat quality, etc. Without the quantitative data to support the statement that songbird and shorebird densities are significantly lower than reported elsewhere in the Arctic, it is impossible to assess the validity of this claim or support for the dismissal of songbirds and shorebirds as a VEC. Without this information it is also difficult to objectively assess the potential impacts of the project on these two groups of migratory birds. The Canadian Wildlife Service of EC has a responsibility for the management and conservation of migratory songbirds and shorebirds under the *Migratory Birds Convention Act.* EC-CWS therefore requests that potential impacts to these species to be fully evaluated, that the potential significance of those impacts be determined and that appropriate mitigation measures be identified and put in place.

Requests:

1) Please provide information on the density (number of individuals or detections) of each species of shorebird and songbird detected in surveys broken down by habitat type. Please indicate the sample size of survey plots and point counts in each habitat type and each year, provide the number of active nests recorded for each species by habitat type.

2) Please provide the density estimates for songbirds and shorebirds from the two studies that were cited in Volume 6 – Section 4 and Appendix 6E-1 (Weider and Hobaek 2000 and Morrison et al. 2001) for comparison with densities estimated from the baseline surveys.

3) Please provide an assessment of the potential impacts to songbirds and shorebirds from construction and operations along the proposed transportation corridors linking the mine site to the two ports.

IR # EC - 8
Subject: Aircraft disturbance – Zone of Influence
Sections:
EIS Guidelines:
6.5.4 Air Traffic
Estimated flight impact zones, based on flight routes, types of aircraft and traffic volumes.
8.1.11.2 Impact Assessment
Potential impact from pre-determined Flight Impact Zones, and potential for collision with aircraft;

DEIS Sections:
Volume 3 – Section 2.7 – Figure 3-2.10, Table 3-1.1
Volume 6 – Section 4.0

Preamble :

The EIS Guidelines issued by NIRB requested that potential Flight Impact Zones for airstrips be calculated and that potential for bird collision with

aircraft be discussed. In Volume 6 – Section 4.3 a generic zone of influence is applied to all project infrastructure which extends 500 m beyond the project development area (direct footprint). Areas beyond 500 m were considered to be beyond the zone of influence. Effects on habitat suitability were estimated by assuming that areas within 250 m of the project footprint dropped to a suitability of nil and areas between 250-500 m dropped by one suitability category. No specific ZOI were provided for airstrips. The ZOI for airstrips is likely to vary according to the size and level of noise generated by aircraft anticipated to use the strip. Nesting, staging and moulting birds can be quite sensitive to disturbance from aircraft. Section 4.0 of Volume 6.0 states that tens of thousands of snow geese use the Milne Inlet and Steensby Inlet portions of the LSA as a spring migratory stopover and as moulting sites in the fall. In EC's submission to the Joint Review Panel for the Mackenzie Gas Project (J-EC-00136)[2], EC calculated that an airstrip 1060 m long and 68 m wide would have a zone of influence for a Dash 7 aircraft (which is smaller than aircraft proposed for use at the Mine Site and Steensby Port) of 8 km long on either end of the runway, taking into account approach and take-off altitudes of <650 m, and a 1.5 km wide buffer (58 km^2 total ZOI) on either side of the run-way for disturbance during the nesting season and a 3 km wide buffer during fall staging (131 km^2 total ZOI). The ZOI for a 2000 m long airstrip calculated by the proponent with a 500 m buffer would only be 2 km^2. The zones of influence calculated for the airstrips by the proponent clearly underestimate the potential habitat disruption and disturbance and effective habitat loss estimated for the project may be much higher than predicted.

Requests:

1) Please calculate Zones of Influence for each of the airstrips based on the expected aircraft types using each airstrip, the noise levels generated by each type of aircraft during take-off and landing and the area during which aircraft will be below an altitude of 650 m during take-off and landing.

2) Based on this information, please update estimates of the changes in habitat effectiveness for each of the bird VECs based on revised estimates for airstips.

IR # EC - 9
Subject: Attraction of predators to project sites – impact on birds
Sections:
EIS Guidelines:
8.1.11.2 Impact Assessment

- Potential for Project facilities to attract wildlife such as foxes, ravens and gulls that may prey upon migratory birds and resulting impacts on the migratory bird populations;

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2 http://www.ngps.nt.ca/Upload/Interveners/Environment%20Canada/061108_EC_Mack%20Delta_KIBS%20JRP%20Submission%20Final_Protected-REVISED%20(2)b.pdf

- Potential attraction of birds by domestic waste at camp sites; and

DEIS Sections:
Volume 6 – Section 4.0

Preamble:

Section 8.1.11.2 of the NIRB's EIS Guidelines required the proponent to assess the potential for project facilities to attract wildlife such as foxes, ravens and gulls that may prey upon migratory birds and resulting impacts on the migratory bird populations and the potential attraction of birds by domestic waste at camp sites. In the concordance table provided by the proponent it is stated for both of the bullets outlined above that these potential impacts were "Not scoped as a project interaction".

Food waste can lead to the attraction of scavengers, notably gulls and ravens, but also fox, wolverine and polar bears. Increased local densities of predators and scavengers may in turn lead to more predation of local songbirds, shorebirds, waterfowl and their nests. Predation of eggs and chicks is a key factor that limits the productivity of many species of birds. Individuals moulting their flight feathers may be particularly vulnerable to predators. Although predation is a natural process, artificial increases in predator abundance from human activities can readily alter any existing balance between predators and birds. Attraction of scavengers and predators to project sites also increases the potential for dangerous interactions between predators and people, with the possibility of negative outcomes for both parties involved. This is of particular concern for polar bear and wolverine, which are both listed as "special concern" by COSEWIC.

Requests:

1) Please include attraction of predators and scavengers to project facilities and domestic waste at camp sites in the assessment of project interactions.

2) Please describe how all waste streams will be segregated, stored, treated and disposed of, and how waste management systems will be designed to minimize attraction of predators, scavengers and other migratory birds.

3) Please describe how the success of waste management activities in reducing the attraction of predators, scavengers and other migratory birds will be monitored.

IR # EC - 10
Subject: Polar Bear
Sections:
EIS Guidelines:
Sections 8.1.11.2, 8.1.12.2, 8.1.13.1, 8.1.13.2

DEIS
Volume 9 – Section 5.11

Preamble:
Given the duration of the project, it is likely that sea ice conditions in Foxe Basin will change significantly during the operational phase. Decreases in the availability of sea ice as a result of climate warming are likely to increase the amount of time bears spend on land and increase the potential for human polar bear interactions. Changes in the availability of polar bear habitat as a result of development and climate warming along with the increased potential for human-polar bear interactions could result in cumulative impacts that stress polar bears in the Foxe Basin and Baffin Bay subpopulations. There is also insufficient information provided on the potential impacts of accidental fuel spills on polar bears, as well as what measures will be taken to identify polar bear maternity denning areas near project infrastructure and along shipping routes and what measures will be taken to avoid the disturbance of female bears in maternity dens.

Requests:

1) Please describe mitigation measures that will be put in place to reduce human-polar bear interactions over the life of the project (from construction to closure and reclamation).

2) Please describe what mitigation measures are in place to contain accidental fuel spills from ships at port facilities as well as along shipping routes and how wildlife protection is incorporated into spill response plans.

3) Please describe what mitigation measures will be used to identify polar bear maternity denning areas and avoid the disturbance of female bears in maternity dens.

IR # EC - 11
Subject: Climate change forecasts
Section:
DEIS Volume 5 – page 7; pages 9-11

Preamble:

The draft EIS compares a number of climate variables from 5 different Global Climate Models (GCMs) to historical climate data at several locations to assess how well the models replicate the baseline climate record. The draft EIS also summarizes the seasonal and annual comparisons in Table 5-1.1. and climate scenario projections in Tables 5-1.2 to 5-1.4. However the methodology used to make these comparisons is not provided.

Requests:

In order to better understand the methodology employed by the proponent and to properly assess how climate change could affect the Project over its lifespan, Environment Canada requests the following clarifications:

1) Were the model outputs for the GCM grid cells closest to each meteorological station used in the comparison or was areal grid averaging used in the derivation of the seasonal and annual GCM-predicted values (in Table 5-1.1) or climate projections (in Tables 5-1.2 – 5-1.5)?

2) Each GCM has a different grid resolution. In the comparisons, were all model grids set to a common grid?

3) Are the seasonal/annual predicted baseline values presented in Table 5-1.1 from a specific scenario, or are the values an average of both of the modeled scenarios?

IR # EC – 12
Subject: Storage of CEPA-regulated substances
Section: Volume 10 Appendices 10C-1, 10C-2, 10C-3.

Preamble:

Emergency Plans are required when CEPA regulated substances are stored in quantities above the threshold noted in Environment Canada's Environmental Emergencies Regulations.

References:
1) The current list of CEPA regulated substances can be found at:https://cepae2-lcpeue.ec.gc.ca/cepae2.cfm?screen=Help/SubstanceList&sort=name&&Language=en

2) The applicable regulations can be found at: Ehttp://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=D6ADAD2D-1&offset=11&toc=show

3) Environment Canada's *Environmental Emergency Plans Implementation Guide* can be found at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=D6ADAD2D-1

Request:

Please provide an inventory of stored CEPA-regulated substances. The inventory listing should include the type and maximum quantity of regulated materials stored at each location.

IR # EC – 13
Subject: Waste Management
Section: Volume 3 **-** Section 2.1.10

Preamble:

The waste management section of volume 3 (p. 25) indicates that permanent waste management facilities will be constructed at the mine site and each port site. However, p. 13 of the *Waste Management Plan* (Vol. 10, Appendix

D-4) states that permanent waste facilities will only be located at the mine site and Steensby Inlet.

Requests:

1) Please clarify if a waste management facility is going be constructed at Milne Inlet.

2) Please update the *Waste Management Plan* to provide information regarding waste management at Milne Inlet.

IR # EC – 14
Subject: Waste Management
Section: Volume 3 - Section 2.1.10 Hydrocarbon Contaminated Materials

Preamble:

Insufficient information is provided in the draft EIS to assess the proposed management of hydrocarbon contaminated soils and snow/ice.

Requests:

1) Page 26 of the draft EIS indicates that remediated hydrocarbon-contaminated soils from landfarms will be transferred to landfill when the hydrocarbon levels meet the applicable Nunavut remediation standards. However the applicable levels and the supporting information for them are not provided. Please provide the levels and reference for these standards.

2) Hydrocarbon contaminated snow and ice will be placed in a containment area at the landfarm but no information is provided on what measures will be taken to prevent bird landings during unfrozen conditions. Please outline how wildlife will be kept away from this contaminated material.

IR # EC – 15
Subject: Waste Management
Section: Volume 3 - Section 2.5.4

Preamble:

Page 58 of the draft EIS indicates that waste brine may be applied as a dust suppressant on the construction access road but does not discuss the potential impacts of such a practice or if any alternatives for waste brine management or dust suppression were considered.

Requests:

1) Please provide an assessment of the potential impacts and alternatives to using CaCl brine as a dust suppressant.

2) Please describe what alternatives were examined for the management of waste brine.

IR # EC – 16
Subject: Waste Management
Section: Volume 3 - Section 2.5.11

Preamble:

Page 61 of the draft EIS indicates that the Mid-rail Camp will have a dedicated sewage treatment system employing a rotating biological contactor and sand filtration with year-round land discharge to a nearby drainage system. However the EIS does not outline what monitoring will be carried out to ensure that the discharge from the plant is of acceptable quality.

Requests:

1) Please describe what routine monitoring will be carried out on the discharge water.

2) Please update the *Wastewater Management Plan* (Appendix 10D-3) to include this treatment system.

IR # EC – 17
Subject: Waste Management
Section: Volume 3 - Section 2.6.9

Preamble:

Page 68 of the draft EIS indicates sewage discharged from Steensby Port will meet effluent requirements for discharge to marine waters; however, we note that the water licence will not regulate discharges to marine waters, and that effluent requirements will not be set in the regulatory process. We also note that the wastewater treatment system for Steensby Inlet is not included in Appendix 10D-3.

Requests:

1) Please describe how the effluent will be treated to ensure compliance with the *Fisheries Act.*

2) Please provide estimates of best achievable effluent quality.

3) Please revise The *Wastewater Management Plan* to include the treatment system at Steensby Port.

IR # EC – 18
Subject: Ore Handling
Section: Volume 3 **-** Section 3.6.1

Preamble:

Page 104 of the draft EIS indicates ore at Steensby Inlet will be transferred to Steensby Island via conveyor but it is unclear how spillage and dust will be minimized. All efforts should be made to minimize impacts on the environment, dust and spillage prevention will help to minimize impacts to waters of Steensby Inlet.

Request:

Please clarify if the conveyer at Steensby Inlet will be covered and equipped with dust control equipment at all transfer points, similar to the conveyer at Milne Inlet (p. 76) and mine site (p. 87).

IR # EC – 19
Subject: Waste Management
Section: Volume 3 – Section 4.3.9

Preamble:

Page 120 of Volume 3 indicates that once incinerators are no longer required they will be managed as described in Section 4.4.3 however this section is missing.

Request:

Please describe how the incinerators will be decommissioned and their ultimate fate.

IR # EC – 20
Subject: Baseline Information
Section: Appendix 7B Table 2.4

Preamble:

According to Table 2.4 no lake water quality sampling was conducted to ascertain baseline conditions along the Milne Tote Road or at Milne Inlet and only one site (Mid-rail Camp Lake) was sampled for the whole railway corridor. Limited baseline data in these areas will make it difficult to discern what impact, if any, project activities are having on lake water quality along the road and rail lines and at Milne Inlet.

Request:
Environment Canada requests that baseline sampling be carried out to characterize the lake water quality along the Milne Tote Road and the rail corridor as well as around Milne Inlet

IR # EC – 21
Subject: Baseline Information
Section: Appendix 7B - Tables 3.2 and 3.3

Preamble:

Stream water quality summary statistics reveal that the majority of sites sampled between the mine site and Steensby Port and the mine site and Milne Inlet were sampled only 4 times (Table 3.2) and 3 times, respectively (Table 3.3). Limited sampling in these areas is likely insufficient to capture natural variation in these study areas and will make changes that result from project related impacts difficult to identify.

Request:

Please describe how a realistic water quality baseline can be developed from the available data and any supplemental sampling, comparisons to baseline made and changes detected.

IR # EC – 22
Subject: Baseline Information
Section: Appendix 7B - Table 2.5

Preamble:

According to Table 2.5 of Appendix 7B, no sediment samples were taken from lakes or streams for the railway corridor, Milne Tote Road or the Milne Inlet areas. Lack of this baseline data will make it difficult to discern what impacts, if any, project activities are having on sediment quality in these areas when construction and operation activities are underway.

Request:

Please describe how a realistic picture of baseline sediment quality for the project area can be developed from the available information and/or further sampling.

IR # EC – 23
Subject: Baseline Information
Section: Appendix 7B – Table 3.5

Preamble:

The data presented in Table 3.5 of Appendix 7B indicate that a very small number of samples were collected at the sampling stations near the mine and near the Steensby Port Site. As a result, sediment sampling likely lacks sufficient sample size to characterize the variability of the mine and Steensby Port areas.

Requests:

1) Please explain how a realistic picture of baseline sediment quality for these areas can be developed from the available information.

2) Environment Canada requests that further baseline information be gathered to ensure the data is representative of natural conditions and is useful for comparison to post development monitoring data.

IR # EC – 24
Subject: Baseline Information
Section: Appendix 7B – Page 3

Preamble:

Page 3 of Appendix 7B indicates that samples were collected on a weekly basis in the mine site area (i.e. at sites, A0-10, C0-10, E0-03, E3-01, E4-01, F0-01, G0-01, G0-09, and L0-01) in 2007 and 2008 but that the 2008 results were not included in the draft EIS submission because they were collected to meet regulatory requirements. However we note that these locations are identified in Figure 1.2 which is entitled "Stream Water Quality Sample locations Mine Site 2005 -2008". It is unclear if the results for these samples were included when the summary statistics for the mine area were calculated (Table 3.1). From the information presented, the 2008 data would be a useful addition to the data used to develop the water quality baseline for the mine site area.

Requests:

1) Please clarify if the 2008 samples were included in the stream water quality summary statistics for the mine area (Table 3.1)?

2) Please provide the data collected during 2008 along with the relevant summary statistics.

IR # EC – 25
Subject: Baseline Information
Section: Appendix 7B – Page 1

Preamble:

Page 1 of Appendix 7B indicates that baseline sampling at the mine site, along the tote road and at Milne Port was undertaken concurrent to exploration activities and mining of the bulk sample. Given the proximity to industrial activity the samples may not provide a true indication of baseline conditions. To detect/correct for these impacts it is customary to collect samples from reference sites comparable to the study area (e.g., in terms of bedrock composition, hydrology, nutrient status) with the number of reference sites being commensurate with the size of the project being undertaken. To that end, the proponent identified one reference lake, *Candidate Reference Lake,* located south of the mine site and east of Mary Lake (see Figure 4.1-11 of Appendix 7C for location). Unfortunately it would appear that only 2 water quality samples and that no sediment quality samples have been collected from the reference site. This sampling effort is insufficient for comparison to existing and future water and sediment monitoring results in the project area.

Request:

Environment Canada requests that the proponent collect sufficient reference samples to ensure that a true baseline is determined. Water quality and sediment samples from both under ice and open water conditions should be collected from this reference site and from additional stream and lake reference sites outside the local study area.

Volume 7: Freshwater Environment
Appendix 7C

IR # EC – 26
Subject: Baseline Information
Section: Appendix 7C – Pages 25 - 61

Preamble:

It would appear that all primary (e.g. phytoplankton, periphyton) and secondary producer (zooplankton, invertebrate drift, benthic macroinvertebrate) surveys in freshwater environments were restricted to the mine site area (i.e., Mary Lake, Sheardown Lake NE and SW, Camp Lake, Tom River, Mary River and tributaries of Sheardown and Mary Lakes). As a result, there is insufficient baseline information on primary and secondary producers at Steensby and Milne ports and along the two transportation corridors. The lack of baseline data will make it difficult to discern what impacts, if any, project activities are having on primary and secondary producers in these areas.

The draft EIS also indicates that the primary and secondary surveys that were conducted were carried out following exploration and bulk sample activities and, therefore, may not be representative of baseline conditions. While one chlorophyll a measurement was taken for *Candidate Reference Lake* in August 2008, this is insufficient to characterize baseline conditions and is thus inadequate for use in detecting project related impacts. .

Request:

Environment Canada requests that the proponent collect sufficient reference samples to ensure that a true baseline is determined. To better characterize reference conditions, more primary and secondary producer surveys in *Candidate Reference Lake* and other reference freshwater lakes and streams should be undertaken.

Volume 8: Marine Environment

IR # EC -27
Subject: Waste Management
Section: Volume 8 **-** section 2.5.2

Preamble:

According to page 11 of Section 2.5.2, sewage effluent modeling results for Steensby Inlet show that when released at 35 m below the surface

wastewater effluent will not rise beyond water depths of 20 m and would therefore not come into contact with sea ice. This statement conflicts with Section 3.5.2.5 which indicates that the effluent would be released at a 20 metre depth. Further a review of the modeling in Appendix 8B-3 reveals that: 1) the modeled scenarios were only conducted during ice-free conditions (i.e., June and September); 2) the effluent in the scenarios was discharged at 20 m below sea level not 35 m as indicated in Volume 8 and 3) the effluent was expected to equilibrate, on average, at 12 m and 7.5 m below sea level in September and June, respectively not at 20 m as stated.

Requests:

1) Environment Canada requests that the conflicts between sections 2.5.2 and 3.5.2.5 be clarified.

2) Environment Canada requests clarification of how the modeling results in Appendix 8G-3 lead to the conclusions presented in section 2.5.2.

3) Environment Canada requests that additional modeling be carried out using the correct input parameters including release depth and under ice conditions.

IR # EC – 28
Subject: Waste Management
Section: Volume 8 section 3.5.2.5

Preamble:

Milne Port will have a wastewater treatment system discharging to Milne Inlet. Similar to Steensby Inlet, wastewater discharges should also be modeled for Milne Inlet to predict the fate of sewage wastewater discharges in the receiving environment.

Request:

Environment Canada requests that wastewater discharges to Milne Inlet be modeled to determine the fate of the effluent and its potential impacts

IR # EC – 29
Subject: Baseline data
Section: Volume 8 Section 3.2.1

Preamble:

Marine water quality summary statistics for metals and ions are missing for Milne Inlet and Steensby Inlet. In addition to the boxplots provided in Figures 8-3.5 and 8-3.6, it would be useful to have all metals and ion data summarized in tabular format for near and offshore sample sites as was provided for sediment samples in Tables 8-3.4 and 8-3.6.

Request:

Please provide the summary statistics for metals and ions in Milne and Steensby Inlets for nearshore and offshore sites.

Appendix 10D-2: Surface Water and Aquatic Ecosystems Management Plan

IR # EC – 30
Subject: Spill Management
Section: Appendix 10D-2 – Page 8

Preamble:

Page 8 of the Plan indicates salt-mixing stations that produce brine for use in exploratory drilling will be located at various locations near exploratory sites. Brine is problematic in the terrestrial environment but no brine spill management plans are included in the draft EIS.

Request:

Environment Canada requests that the proponent provide brine spill management plans to ensure that impacts are minimized should a spill occur.

IR # EC – 31
Subject: Dust suppression
Section: Appendix 10D-2 - Table 4.4

Preamble:

In Table 4.4, the proponent proposes the use of a 35% calcium chloride solution for dust suppression on roads from July to October at Milne Port, on the tote road, at the mine site, Steensby Port and during railway construction.

Request:

Environment Canada requests that the proponent provide a discussion of alternatives to calcium chloride for dust suppression.

IR # EC – 32
Subject: Waste Management
Section: Appendix 10D-2 – Page 36

Preamble:

Page 36 of the Surface Water and Aquatic Ecosystems Management Plan indicates wastewater from the railway construction camps will be transported to either the mine site WWTP or Steensby WWTP for treatment, this conflicts with the facilities that are described for the Mid-rail Camp in the Project Description (see Volume 3, p. 61).

Request:

Environment Canada requests that the proponent clarify the discrepancy between the two statements and update the plan as appropriate.

IR # EC – 33
Subject: Storage of Hazardous materials
Section: Appendix 10D-2 – Page 36

Preamble:

Page 36 of the Plan indicates the refuge stations at km 33 and 68 along the Milne Tote Road will be equipped with a fuel storage area for four fuel drums (no berms or liners).

Request:

Environment Canada requests clarification of how fuel will be managed at the refuge stations.

IR # EC – 34
Subject: Water quality
Section: Appendix 10D-2 – Page 38

Preamble:

Page 38 of the Plan indicates surface water north of Katiktok Lake ultimately discharges into Milne Inlet via Phillips Creek and surface water south of Katiktok Lake eventually flows into Mary River via Camp, Sheardown and Mary River Lakes. However it is difficult to locate Katiktok Lake on the map

Request:

Please label Katiktok lake on Figure 4.6.

IR # EC – 35
Subject: Waste Management
Section: Appendix 10D-2 – Page 39

Preamble:

According to Sections 5.6, 5.7 and 5.8 of the Plan, the proponent plans to discharge drill water to the receiving environment using mitigation measures discussed in Section 3. However it is unclear which of the mitigation measures discussed in Section 3 will be applied to the drill water.

Request:

Please specify which specific measures might be implemented.

IR # EC – 36

Subject: Project Description
Section: Appendix 10D-2 – Section 5.12

Preamble:

In Section 5.12 (p. 42) the proponent indicates that there will be a hydroelectric site somewhere along the railway corridor. However, with the exception of Section 1.5 (Potential for Future Development) of Volume 3, this project component was not discussed in the project description. Further, this section of the Plan refers the reader to Figure 3.2-4 of Appendix 10H for location of the hydroelectric site. However, the hydroelectric site is not labeled on Figure 10H.

Requests:

1) Please clarify if the "proposed hydroelectric facility" will be constructed at a site along the rail corridor.

2) If the facility is part of the project please add it to Figure 10H and describe the facility and the site.

3) If the hydroelectric facility is not a part of the project references to it should be removed from the draft EIS.

IR # EC – 37
Subject: Water Quality Monitoring
Section: Appendix 10D-2 – Section 10.2.4

Preamble:

Section 10.2.4 indicates that sewage discharges to Mary River will be tested annually using *D. magna* and Rainbow trout acute toxicity tests. The section further indicates that the tests will be conducted during the open-water season but the timing is not specified. Similar sampling should occur for sewage discharges from Steensby, Milne Inlets and Mid-rail Camp using appropriate species and these locations should also be captured in the Plan.

Requests:

1) Please indicate when these tests will be carried out.

2) Please amend the plan to include testing at Steensby and Milne Inlets and at the Mid-rail Camp.

Appendix 10D-3: Wastewater Management Plan
IR # EC – 38
Section: Section 2.

Preamble:

Page 5 of this Plan makes reference to Appendices A.1, A.2 and A.3. These appendices are missing from the electronic submission.

Request:

Please provide appendices A.1, A.2 and A.3

Appendix 10D-4: Waste Management Plan
IR # EC – 49
Subject: Waste Management
Section: Appendix 10D-4

Preamble:

Page 14 of the Plan indicates incinerators (0.5-tonne capacity) may be located at the construction camps along the railway corridor. These incinerators were not mentioned anywhere in the project description. Further, the Plan also indicates incineration of some plastics is unavoidable.

Request:

Please provide more detail regarding the construction camp incinerators and amend the project description to include them.

IR # EC – 40
Subject: Waste Management
Section: Appendix 10D-4 Section 3.5

Preamble:

The Plan indicates ash from incinerators will only be disposed of at the project landfill sites after receipt of TCLP analysis that meets acceptable standards but no standards are provided.

Request:

Please provide these standards and the reference on which these standards are based.

IR # EC – 41
Subject: Waste Management
Section: Appendix 10D-4 Section 3.5.3

Preamble:

The Plan indicates periodic surface water monitoring will ensure any leachate from landfills is detected. However “periodic” is not defined.

Request:

Please indicate how frequently sampling will occur at monitoring sites for drainage from landfills.

IR # EC – 42
Subject: Waste Management
Section: Appendix 10D-4 Table 3.4

Preamble:

The Plan indicates there will be chemical waste stored at onsite laboratory facilities and offices.

Request:

Please provide an inventory of the chemicals that will be stored at these sites.

IR # EC – 43
Subject: Waste Management
Section: Appendix 10D-4 Section 3.8

Preamble:

The Plan indicates that routine inspections and sampling will be done to assess the soil and water conditions of onsite landfarms used to treat hydrocarbon-contaminated material. Further the plan states “soil that has reached sufficiently reduced hydrocarbon concentrations as per applicable guidelines will be disposed of appropriately, or used elsewhere”.

Request:

How frequent will this monitoring occur and what guidelines, including reference, will be used to assess the acceptability of soil for disposal or use outside the landfarm?

IR # EC – 44
Subject: Air quality model input and output data
Section:

Preamble:

The quality of model predictions is dependant on the quality of the input data used in the model. The selection of model options and the configuration of model domains and grids can also affect the quality of predictions.

To provide confidence in the air quality model predictions provided in the draft EIS, all input data and selected model options and configurations must be reviewed.

Request:

Environment Canada requests that the proponent provide all input and control files used in the CALPUFF model to generate the air quality predictions presented in the draft EIS. All files should be in a format that can be used directly into CALPUFF. Please include all output files in the raw CALPUFF format.

IR # EC – 45
Subject: Air quality model emissions
Section: Volume 5, Section 2.3 and Section 2.4

Preamble:

Air emissions are a crucial component of air quality modelling. If the air emissions are uncertain then the model predictions are uncertain. Volume 5, Section 2.3 and Section 2.4 provide a qualitative description of the types of emission sources considered in the modelling assessment and aggregated emissions are provided in Tables 5-2.11, 5-2.12, and 5-2.13. To gain confidence in the emissions and thereby the model predictions, further details on the methodology used to calculate the emissions are required. The additional information should include all assumptions, emissions factors, load factors, types of fuels, and any other details used to calculate the air emissions for each source type.

The mobile fleet will be a significant source of air emissions. Volume 5, Section 2.6.1, states that mine trucks emissions were estimated using the US EPA Tier II/III non-road emission standards. There are large differences in the emission rates from Tier II to Tier III. What is the assumed composition of the mine fleet – Tier II vs. Tier III. Has the Proponent committed to purchasing trucks that meet a certain emission standard? The Proponent should be aware of the Regulations Amending the Off-Road Compression-Ignition Engine Emissions Regulations. This amendment will require the use of Tier IV trucks. Further details can be found on the Canadian Gazette website:

http://canadagazette.gc.ca/rp-pr/p1/2011/2011-02-12/html/reg1-eng.html

Ship emissions from “hotel” engines were included in the assessment but it appears that ship emissions during the transport of the ore were not included.

Requests:

1) Please provide detailed information regarding the calculation of air emissions used in the air quality assessment for each source type. Include all assumptions, emission factors, load factors, types of fuels and any other information used in the emission calculations.

2) Please provide information on the composition of the mine truck fleet and the emission Tier standards that the trucks are capable of achieving.

3) Please provide emission estimates for ships transporting ore and supplies. Include the type of fuel expected to be used by the ships.

IR # EC – 46
Subject: Air quality model predictions
Section: Volume 5, Section 2.6

Preamble:

In Volume 5, Section 2.6 of the draft EIS, model results are provided for pollutants that are predicted to exceed ambient air quality standards. To complete a full review of the potential impacts to air quality, all model predictions need to be provided.

Potential acid input loading thresholds were presented in Table 5-2.8, however no model predictions were provided in Volume 5 of the draft EIS.

The concept of Potential Development Areas (PDA) is introduced in Volume 5 but not defined or justified. It would appear that the PDA are to be interpreted as a “fence line” for each of the project locations.

The ships used to transport the ore can be significant sources air emissions. It does not appear that the draft EIS has considered potential air quality impacts from the shipping emissions along the coastline.

Requests:

1) Please provide a table with maximum predicted ambient concentrations for all of the pollutants modelled with applicable time averaging corresponding to the ambient air quality standards listed in Table 5-2.5. Include the total area of exceedance of relevant ambient air quality standards for each pollutant.

2) Please provide spatial plots of the predicted ambient concentrations for each pollutant for each of the project locations.

3) Please provide the predicted acid input for each of the project locations including maximum values and the area of exceedances. Please also indicate the sensitivity levels of local soils and lakes.

4) Please define and justify the concept and use of Potential Development Areas.

5) Please provide an analysis of the potential for ship emissions from the transport of ore and supplies to impact air quality along the coastline.

IR # EC – 47
Subject: Air Quality and Noise Abatement Management Plan
Section: Appendix 10D-1

Preamble:

Appendix 10D-1 describes the Air Quality and Noise Abatement Management Plan (AQNAMP). The annual report should include all air quality monitoring data, year-to-year emission tracking of air pollutants and GHGs and fuel consumption.

Further details on the air quality monitoring program should be provided. Information on the type and number of monitors, location of monitoring sites, the frequency and duration of the monitoring should be provided.

Passive monitoring is proposed for SO_2, NO_2, and O_3. Ambient standards for SO_2 and NO_2 are based on 1-hour, 24-hour and annual averages and the O_3 ambient standard is based on an 8-hour average. Note that NO_2 is predicted to exceed 1-hour ambient standards. Passive monitors typically measure integrated concentrations over a 30-day period. How will the 30-day integrated concentrations be used to compare to the 1-hour, 8-hour, and 24-hour ambient standards?

Section 6.2.1 of the AQNAMP states that the monitoring program will focus on TSP and $PM_{2.5}$ concentrations. The first line in the next paragraph states that TSP and PM_{10} will be monitored using active sampling methods and does not mention $PM_{2.5}$. Will PM_{10} or $PM_{2.5}$ be monitored or will both be monitored?

Requests:

1) Please provide additional information regarding the air quality monitoring plan. Please provide the type of monitoring planned for each parameter and the number and location of the monitoring sites.

2) Please provide the objectives of the proposed passive monitoring of SO_2, NO_2 and O_3.

IR # EC – 48
Subject: Incineration Management Plan
Section: Various

References:
CCME Policy Statement for the Management of Toxic Substances, Canadian Council of Ministers of the Environment, 1998.
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Government of Canada, Chemicals Management Plan, 2006. http://www.chemicalsubstanceschimiques.gc.ca/plan/index-eng.php

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Lanfranco, Emissions Compliance Survey Monitoring Report: Fort Smith Health Centre, Prepared by A. Lanfranco & Associates INC. for GNWT, 2006.

McLachlan, M.S.; Hutzinger, O. Accumulation of organochlorine compounds in agricultural food chains. Organohalogen Compounds 1:479-484, 1990.

Muir, D.C.G.; Lawrence, S.; Holoka, M; Fairchild, W.L.; Segstro, M.D.; Webster, G.R.B.; Servos, M.R. Partitioning of polychlorinated dioxins and furans between water, sediments and biota in lake mesocosms. Chemosphere 25(1-2):199-124, 1992.

Stockholm Convention on Persistent Organic Pollutants, adopted in 2001. http://chm.pops.int/

UNEP Standardized Toolkit for Identification and Quantification of Dioxins and Furans Releases, Second Edition, United Nations Environment Programme, 2005. http://paginas.fe.up.pt/~jotace/legislacao/toolkit.pdf

Webster, E.; Mackay, D., Modelling the Environmental Fate of Dioxins and Furans Released to the Atmosphere During Incineration, Prepared for Environment Canada by the Canadian Environmental Modelling Centre, CEMC Report No. 200701, 2007. http://www.trentu.ca/academic/aminss/envmodel/CEMC200701.pdf

Wilson, A., Linking Incineration to Dioxins and Furans in Lakebed Sediments, Presentation to the 2009 Monitoring Workshop and Annual Meeting of the Canadian Society of Environmental Biologists, 2009. http://www.cseb-scbe.org/page39/page39.html

Preamble:

Environment Canada recognizes that timely disposal of camp waste - specifically food waste - is of critical importance to minimize safety risks associated with wildlife attraction. Timely disposal is usually achieved through incineration. However, there are some important potential environmental concerns associated with waste incineration that can be addressed through proper equipment selection, operation, maintenance and

record keeping. These include potential releases of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, commonly known as dioxins and furans, to the environment. Dioxins and furans are toxic, persistent, bioaccumulate, and result predominantly from human activity (CEPA, 1990).

Canada has participated in initiatives to reduce dioxins and furans in the environment. Canada is a Party to the Stockholm Convention on Persistent Organic Pollutants (POPs). Incineration was identified as a potential source of the POPs listed in Article 5 of the Stockholm Convention. Article 5 of the Convention requires Parties to take measures to reduce, and where feasible, eliminate releases of unintentionally produced POPs, including dioxins, furans, hexachlorobenzene (HCB) and dioxin-like polychlorinated biphenyls (PCBs) which are "*unintentionally formed and released from thermal processes involving organic matter and chlorine as a result of incomplete combustion or chemical reactions*". Article 5 also requires that Best Available Techniques (BAT) and Best Environmental Practices (BEP) be applied for both new and substantially modified sources.

Dixons and furans were designated as Track 1 substances and scheduled for virtual elimination from the Canadian environment under the 1995 federal *Toxic Substances Management Policy* and the 1998 CCME *Policy from the Management of Toxic Substances*. Dioxins and furans are on the List of Toxic Substances in Schedule 1 of the *Canadian Environmental Protection Act (CEPA), 1999*.

The Canadian Council of Ministers of the Environment (CCME) examined the incidental release of dioxins and furans in emissions from various combustion systems. This led to the development of the *Canada-wide Standards (CWS) for Dioxins and Furans*, which were adopted by the CCME in 2001. The standards identify incineration for action to reduce emissions, and include specific air emission standards.

Canada's efforts to improve the environment have also led to new measures under the Chemicals Management Plan (CMP), which was first brought forward in 2006. The CMP develops measures to better protect human health and the environment from the risks posed by chemical substances. The Waste Sector has been identified as a sector under the CMP due to potential releases to the environment from incinerators and landfills.

The *Technical Document for Batch Waste Incineration* was developed by EC under the CMP to provide guidance for owners and operators of batch waste incinerators regarding appropriate incineration technology, operation, maintenance and record keeping, with the goals of assisting them in achieving the intent of the Canada-wide Standards (CWS) for dioxins/furans and mercury, and reducing releases of other toxic substances. This technical document focuses on batch waste incinerators ranging in size from 50 to 3,000 kg of waste/batch.

Although incineration contaminants are released to the atmosphere the dominant exposure pathways for wildlife are through vegetation, water column and sediments. Deposition onto vegetation and subsequent ingestion

of that plant material by animals is the primary mechanism by which dioxins and furans enter the terrestrial food chain (McLachlan and Hutzinger 1990). Deposition onto soil with subsequent erosion and runoff into water bodies with subsequent uptake by benthic organisms is the primary mechanism by which dioxins and furans enter the aquatic food chain (Muir et al. 1992). Therefore incineration is a land and water issue. Air is simply a pathway from the incinerator to the other media.

The type of incineration technology and the management practices can greatly affect the amount of dioxins and furans released to the environment. Incinerators capable of meeting the Canada-wide Standards for Dioxins and Furans (controlled incineration) will release about 9.5 µg TEQ of dioxins and furan per tonne of waste combusted (Chandler 2006, Lanfranco 2006). Poor incineration equipment (uncontrolled burning) can release much greater amount of dioxins and furans, 3500 µg TEQ per tonne of waste combusted (UNEP, 2005). EC commissioned a study (Webster and Mackay, 2007) to investigate potential environmental impacts from waste incineration at a typical northern remote work camp. The study used an environmental fate model to predict contaminant concentrations in air, soil, water, sediment, aquatic and terrestrial wildlife (including fish, birds and terrestrial herbivores and carnivores) resulting from the emission rates listed above. The conclusions from the study are quoted below.

It is concluded that uncontrolled burning of waste could result in substantial accumulations of dioxins and furans in the local ecosystem, some of which will persist for some 8.5-years with exposure levels approaching those considered to be of toxicological concern. The use of controlled incineration will substantially reduce the expected contamination levels and correspondingly reduce the likely exposure and effects.

In 2008, EC collected sediment samples from an impacted lake near the Ekati Diamond Mine camp incinerator and from a control lake, 15 km from the incinerator. The concentration of dioxins and furans in the sediments from the impacted lake were of the order of 5 to 10 times greater than the concentration of dioxins and furans in sediments from the control lake. The concentrations in the impacted lake exceed the CCME Interim Freshwater Sediment Quality Guidelines for dioxins and furans. Analyzing various depths within the sediments indicates that the concentration of dioxins and furans in the sediments were greater during the period the mine was in operation compared to predevelopment levels (Wilson, 2009).

Incineration can be an environmentally sound method of disposing of camp waste. However, if appropriate incineration technologies and operating practices are not used, there is potential for the formation and release of contaminants which can adversely impact water, sediments, fish and wildlife. To minimize the release of contaminants and thereby minimize the risk of potential impacts, EC recommends that the proponent develop and implement an incineration management plan that is consistent with the advice provided in the *Technical Document for Batch Waste Incineration*. The incineration management plan could be incorporated into the current Waste Management Plan.

The incineration management plan should include, but not be limited to, the following:

- Waste audit -- quantities and types of waste incinerated
- Selection of incineration technology
- Operational and maintenance records
- Operator training
- Incinerator ash disposal
- Annual Report

The Proponent is proposing to incinerate sewage sludge. Sewage sludge should not be burn in batch incinerators that are typically used in the north. Sewage sludge has high moisture content and low heat content that will increase operating costs dramatically and lead to poor incinerator performance. It is unlikely that the sewage will be completely combusted and could lead to the release of pathogens into the environment. The high moisture materials can leak from the incinerator hearth and lead to equipment damage and present health hazards to workers. Sewage sludge should only be burned in incineration equipment designed for this type of waste. If the Proponent decides to pursue sewage sludge incineration, it should provide the Board with the design specifications of the incinerator and a letter from the manufacturer stating that this equipment is suitable for burning this type of waste. Any emissions from sewage sludge incineration must be reported to the National Pollutant Release Inventory (NPRI), under the authority of the Canadian Environmental Protection Act, 1999 (CEPA 1999).
http://www.ec.gc.ca/npri

Requests:

1) EC requests that the proponent develop an incineration management plan that is consistent with the advice provided in the *Technical Document for Batch Waste Incineration.*

2) EC requests that the proponent provide a list alternative non-incineration methods for the disposal of sewage sludge. If the Proponent decides to incinerate sewage sludge, a letter from the incinerator manufacturer stating that this equipment is suitable for burning this type of waste, should be submitted to the board.