## MHBL response to:

**Doris North Project - Natural Resources Canada (NRCan) Conformity Analysis of Final Environmental Impact Statement**

**General Comments**

The concordance table prepared by Miramar was at a very high level, and did not clearly point reviewers to appropriate supporting documents or main EIS chapter(s), for each sub-element of the Guidelines, only for the main guideline headings. Occasionally, even at this higher level, the references given were not correct. In addition, the concordance table should have included the pre-hearing decisions and pointed the reviewers to those sections and documents where the Pre-hearing Conference decisions were addressed. Material related to one issue/topic was often distributed throughout more than one supporting document. In summary, it was not easy to follow.

MHBL comment:
Please see an updated and more comprehensive concordance table attached to cover letter.

The main EIS document contains very little detail and most detailed descriptions of the environment and analysis are found in the supporting documents. The EIS does not adequately synthesize and summarize the information contained within the supporting documents. This is especially true for assessment of impacts.

**Specific Comments**

**Guideline item 4.3 Baseline Data Collection and 4.12 Description of Physical Environment**

***Climate Data***

Climate and hydrogeological baseline data are presented in AMEC (2003 - Meteorology and Hydrology Baseline Report B1). No data for Doris North site are presented as limited data collected on site (and presented by Golder 2003 in Air Quality and Noise Document B3) since May 2003 was likely not available at the time the report was produced. Data collected since 1993 at the Boston site is used to represent climatic conditions at Doris North. Multiple regression between Boston air temperature and rainfall and that at MSC stations (Kugluktuk, Cambridge Bay and Lupin) is used to extend the Boston record and determine the climatic normals at the Doris North site. Poor goodness of fit for the rainfall relationship is found and calculations of normal rainfall at Doris North may be unreliable. In addition, inadequate "on site" snowfall data were available to derive a relationship with MSC stations and the relationship developed for rainfall is used which may not be valid (Doris North is only 5 km from the coast and this may be an important influence on precipitation). No snow depth data are available for Doris North (or Boston) and therefore the distribution of snow within the Tail/Doris lake drainage basin, which is required for water balance calculations and also for geothermal modelling, is unknown. Inadequate site data exists to estimate evaporation. Estimates of evaporation at the project site are based on data from several 100 km away and may not be valid.

*Information Requirements:*

*Inadequate/unreliable baseline climate data, in particular precipitation (rainfall, snowfall and snow depth) and evaporation, is available for the project site - data is required to adequately determine water balance and is also required for geothermal modelling.*

***Note:*** *Environment Canada (EC) has produced gridded data sets but NRCan is not sure if EC has made this available to the general public. There was a draft report (Seglenieks and Soulis) describing the generation of the grid but NRCan is unaware if this has been published. Multiple regression is used to fill in gaps between stations but physiographic characteristics as elevation and distance from the coast were used in the analysis.*

MHBL comment:
The proponent acknowledges the shortcomings of the climate data, and has consequently built in substantial conservatism into the tailings impoundment water balance, to ensure that the proponent's objectives are met. These are documented in SD B5.

**Climate Data Collection**
A climate station was installed at Doris North in 2003. Power problems caused the station to collect data intermittently over the winter months but it was serviced in February 2004 and is currently operating. Miramar is committed to continued collection of baseline climate data at Doris North.

The ongoing baseline data collection program includes plans for snow course surveys at Doris North during the late winter of 2004. These surveys will include measurements of snow depth, density and snow water equivalent for sample plots representative of lake, flat upland, flat lowland and north, east, south and west aspect slopes.

There are currently no plans for installing instrumentation to measure pan evaporation at Doris North. These are difficult to operate and require skilled personnel to ensure that the data collected are of adequate quality. It would be possible to derive lake evaporation using the WREVAP program (Morton et al. 1985), based on temperature, insolation, humidity and altitude data. To do this effectively, it is recommended that sensors for measuring relative humidity and global solar radiation be added to the existing temperature and precipitation sensors at the Doris North climate station.

**References**
Morton, F.I., F. Ricard and S. Fogarisi. 1985. Operational Estimates of Areal Evapotranspiration and Lake Evaporation – Program WREVAP. Environment Canada, Inland Waters Directorate, National Hydrologic Research Institute, NHRI Paper No. 24, 15 p. + appendices.

***Geomorphology***
A brief description was given which does not provide much information and in fact, provides more a description of geology. There is no description of landforms (eskers, kames, etc.) possibly because glacial sediments are overlain by marine sediments as described in surficial geology report SRK (2003 - A4).

***Surficial Geology and permafrost conditions***

The main EIS document does not provide an adequate description of surficial materials (in particular, the spatial distribution of various sediment types and no map is provided), ground ice or permafrost thermal conditions. Information, including a surficial geology map and borehole log is provided, however, in SRK (2003, A4, A5).

Several more geotechnical boreholes were drilled in 2003 to augment the information provided in the draft EIS. Additional ground temperature data are also available. The quality of ground ice information provided on geotechnical logs is variable. For most boreholes (especially those drilled in 2002), no visible ice contents are provided and NRC codes have only been provided for boreholes drilled in 2003. Visible ground ice content, along with moisture contents are required to assess thaw sensitivity of frozen material. Ice lens thickness has been recorded on the logs but is not adequate for thaw strain calculations. Ice content information is lacking in most boreholes drilled at the dam sites of the tailing containment site.

*Information Requirements:*
Most borehole logs, in particular those at dam sites, do not contain information on ground ice content.

Ground temperatures have been measured at a number of sites, generally to depths of about 10 m although 3 deeper (-50m) boreholes have been instrumented. Generally less than 1 year of data are available and in some cases, drilling effects may not have dissipated. (Note: Temperature measurements are not deep enough to determine permafrost thickness and estimates of permafrost thickness are based on deep temperatures at Boston site).

MHBL comment:
We recognised the importance of the ice content in our report, in particular the potential for differential settlement when the talik will eventually develop by the presence of the stored water (see Section 10.10 of the Tailings Impoundment Preliminary Design). We also recognised that final design will require further investigations and laboratory testing (see Section 10.11 of the same report).

The winter 2002 investigation did not include logging of the overburden, it was conceptual exploratory drilling. The description of the ice content using the NRC codes was only used for the Winter 2003 investigation, however ice content was logged for all the other drilling programmes, even though the NRC codes was not explicitly used. We are confidant that we have a clear picture of the ice conditions.

*Information Requirements:*
*Ground temperature data may not be adequate at all locations to define the ground temperature envelope.*

MBHL comment:
The deepest temperature data available for Doris North goes down to about 70 m but is not deep enough to adequately analyse the thermal regime. The only deep temperature profile for the Hope Bay belt is at the Boston site and is about 240 m deep. Although the ground temperatures measured at Doris North are consistent with those at Boston, we recognise that deep temperature measurements are required at Doris North (please see response to INAC conformity review).

Although the drilling effects may not have completely dissipated at the time of the ground temperature measurements, the trend is usually warmer, thus conservative when assessing the ground temperature.

The configuration of the talik beneath Tail and Doris Lakes is not adequately described. The extent of the talik beyond the lake shore should be provided as well as a better description of the talik at the outflow of Tail Lake and at proposed dam sites. SRK (2003 - A5) indicates that the talik is confined to the lake footprint but does not adequately describe the lateral extent. Thermal modelling results provided in SRK (2003 - A5) indicate that no permafrost exists beneath either Doris or Tail lake but the lateral extent of the talik is not described well.

*Information Requirements:*
*A clear description of the lateral extent of taliks associated with Tail and Doris lakes is required.*

MHBL comment:
The geological setting, the quality of the bedrock at depth and the distance between Doris and Tail Lakes are such that it is unlikely that both lakes are hydraulically connected. The presence of the permafrost simply lowers further an already very low risk condition. The permafrost would be similar to a cutoff wall of about 400m wide and 130m deep. We feel that the level of details presented in the report is sufficient to illustrate that there will be permafrost present between Doris and Tail Lakes for a relatively long time.

*Note: Existence of through talik beneath Doris and Tail Lakes may be important in assessment of hydrogeological conditions. In addition, if mining is to occur beneath Doris Lake in future, shafts will be in unfrozen material.*

MHBL comment:
Please see note on seepage versus talik under Doris Lake in the response to INAC conformity review.

**Guideline item 4.21 Impacts (focus on 4.21.1.1, 4.21.1.2, 4.21.1.5, 4.21.1.10,. 4.21.2.1, 4.21.2.3)**
The main EIS document generally does not provide an adequate assessment of impacts or summary of the information related to impacts on the physical environment provided in the various supporting documents. The EIS indicates that the impact of climate change is not relevant as the Doris North mine will only operate for 24 months. The dams at Tail Lake, however, must retain water for a longer period and climate change and variability must be considered. The impact of climate change on water retaining structures has been considered in the Tailing Impoundment Design Report (SRK, 2003 - A5) but the results of this analysis are not assessed in the EIS. In addition, some surface infrastructure (eg. road and airstrip) will remain following closure of Doris North and the impact of climate change and variability should be considered.

MBHL comment:
Please see notes on climate change and the importance of the ice-rich marine materials in the response to the INAC conformity review.

**Climate Change Effects on Hydrology:**
**Introduction**

If climate change is anticipated to significantly increase flood flows, it may be necessary to design dam spillway channels for larger discharges and increase dam structure freeboard for larger storage. Similarly, if climate change is expected to significantly increase water yields, this may also increase flood flows, depending on the seasonal distribution of the increased precipitation. To assess whether these design changes are required, it is first necessary to assess whether significant increases in flood flows or water yields are anticipated due to climate change.

The following discussion is based primarily on two sources: the Intergovernmental Panel on Climate Change Third Assessment Report (IPCC 2001) and the Geological Survey of Canada Bulletin 555 (Ashmore and Church 2001). These documents formed the basis for proponent submissions to the Joint Panel (Alberta EUB and Government of Canada) hearings for the Canadian Natural Resources Ltd. Horizon Oil Sands Project in September 2003.

**Summary of Information from References**

GSC Bulletin 555, entitled The Impact of Climate Change on Rivers and River Processes in Canada, discusses potential changes to river systems due to climate change. Some key points made in this publication include:

- "The major effect on rivers will be through changes in precipitation amount, intensity and type";
- "The major concern is with climate wetting rather than climate warming because stream flow is much more sensitive to changes in precipitation than to changes in temperature";
- "The report neither attempts to predict change nor assumes a particular climate scenario. It is intended to promote awareness of the possibility of change and provides the basis for anticipating the consequences, at a regional scale";
- "General expectations, rather than particular atmospheric change or climate change scenarios, are used because current climate and hydrology models cannot produce the information that is of greatest relevance to rivers, such as changes to extreme flood conditions";
- "It is currently impossible to model the effect of climate change on stream flow";
- Figure 2 of this report is entitled "Fluvial Regions of Canada and Sensitivity to Climate Change". The Doris North area falls in the "Low Arctic Tundra" zone of the "Northern Shield" region and the figure notes that:
    - No major changes in precipitation regime anticipated;

  - Permafrost degradation may affect runoff in large areas of northern shield but this will be mitigated by lake and wetland storage;

  - Rivers are generally insensitive to change (bedrock and permafrost), but alluvial sections of rivers are sensitive to change, especially in southern shield and especially where they flow through fine-grained surficial material such as Quaternary glacial lake deposits;

  - Potential valley-side erosion along confined streams in erodible material.

- The foreword to the Bulletin notes that since its review manuscript was submitted in 1995, some aspects of the work have been superseded by subsequent work. It notes that more sophisticated predictions are available for the effects of climate change on stream flow, but does not provide any references.

Working Group II (WGII) of the IPCC's Third Assessment Report – Climate Change 2001 (IPCC 2001), addresses impacts, adaptation and vulnerability related to possible climate change. In particular, WGII addresses potential effects on hydrology and water resources, including river flows, lakes and flood and drought frequencies. Some key points made in this publication include:

- "Cold and cool temperature climes… are characterized by precipitation during the winter falling as snow and include mountainous and low-lying regions. A major proportion of annual stream flow is formed by snow melting in spring."

- "The most important climate change effect in these regions is a change in the timing of stream flow through the year. A smaller proportion of precipitation during winter falls as snow, so there is proportionately more runoff in winter and, as there is less snow to melt, less runoff during spring. Increased temperatures, in effect, reduce the size of the natural reservoir storing water during winter. In very cold climates (such as Siberia and northern Russia), there is little change in the timing of stream flow because winter precipitation continues to fall as snow with higher temperatures. The largest effects are in the most "marginal" snow-dominated regime areas."

- "The effects of climate change on the magnitude of annual runoff and flows through the year are much less consistent than the effect on stream flow timing because they depend not on the temperature increase but on the change in precipitation. In general, precipitation increases in high-latitude areas under most [climate change] scenarios."

- "The effects of fixed increases in temperature and precipitation [were examined] in 25 catchments in the Nordic region. They show that higher temperatures and higher precipitation increases flood magnitudes in parts of the region where floods tended to be generated from heavy rainfall in autumn but decrease flood magnitudes where floods are generated by spring snowmelt."

- Figures presented in this reference and also in Arnell (2002) show changes in annual water yield on percentage and absolute (mm/a) bases. These figures are attached. It must be noted that these plots are the result of just two of the many Global Circulation Models (GCM's) that are presented in the TAR. There are significant differences in the predictions of annual water yield for the year 2050 as presented in these model results, and relatively large differences in predictions of temperature and precipitation change exist across the suite of available models. The resolution of the figures is poor, but the predicted changes in annual water yield for the Doris North area appear to be:

  - HADCM2 Model: +25 to +50 mm/a; +20 to 30% change from to 1961-90 normal
  - HADCM3 Model: +25 to +150 mm/a; >30% change from to 1961-90 normal

- It must also be noted that during the Joint Panel hearings for the CNRL Horizon Project, predicted precipitation change was examined for a suite of available GCM's, and the HADCM3 model was one of the "wetter" models for northern Alberta.

***Conclusions***

The suite of available GCM's produces a wide range of predictions for future temperature and precipitation change. The changes reported in the popular media are commonly of the worst-case variety, with little mention of uncertainty. The source documents, as referenced here, acknowledge a wide variation in predictions across the suite of models and address uncertainty in changes to hydrological regime by discussing "possible" changes in a qualitative, rather than quantitative, fashion.

A qualitative summary of possible hydrological changes over the next 50 years at the Doris North area, based on the referenced material, includes predictions of:

- Some increase in annual precipitation on the order of 20-30%;
- Increased precipitation accompanied by increased temperature may not result in larger flood events, since warmer temperatures may decrease snow accumulation and result in a smaller spring snowmelt flood;
- Conversely, late summer floods may increase, but these are typically smaller than the spring snowmelt floods at the Doris North area; and
- Lake and wetland storage are expected to partially mitigate changes to water yield and flow regime.

Because peak annual flood discharges are not expected to increase significantly, it should not be necessary to increase the size of spillway channels to accommodate climate change effects. Predicted possible increase in water yield of 20-30% would likely be attributed to more summer flow. This could be due to more frequent or intense summer rainfall, but peak summer flows will still likely be smaller than spring snowmelt flood events. Therefore, snowmelt flood event should still govern and may be somewhat reduced from the existing conditions.

***References***

Arnell, N. 2002. Hydrology and Global Environmental Change. Prentice-Hall / Pearson Education, 346 p.

Ashmore, P. and M. Church. 2001. The Impact of Climate Change on Rivers and River Processes in Canada. Geological Survey of Canada Bulletin 555. Natural Resources Canada, Ottawa, 58 p.

IPCC 2001. Climate Change 2001: Working Group II: Impacts, Adaptation and Vulnerability. Technical Summary Section 4.1 – Water Resources and Chapter 4 – Hydrology and Water Resources, Section 4.3.6. River Flows. These documents are available via the world wide web at:

(http://www.grida.no/climate/ipcc_tar/wg2/031.htm)
(http://www.grida.no/climate/ipcc_tar/wg2/167.htm).

***Impacts on terrain related to surface infrastructure (buildings, road, airstrip etc.)***

Simple thermal analysis and thermal modelling have been conducted to determine the thickness of rockfill pads required to preserve permafrost beneath surface infrastructure. No details however are provided in the Surface Infrastructure Report (SRK 2003 - A4). Some information related to thermal modelling for design of containment dams is provide in SRK (2003 -A5) which indicates that similar model parameters are used for surface infrastructure design (Note: further comments related to modelling are provided in discussion of tailings impoundment design). Details of the thermal modelling including definition of parameters, input data and results are required to fully assess the adequacy of the infrastructure design to minimize impacts on the physical environment. Pore water salinity measurements (provided in SRK 2003 - A5) indicate tha the freezing depression is -2 C but it is not clear if this temperature has been used to define the active layer in the design of surface infrastructure.
*Information Required:*
*Details of thermal modelling used in surface infrastructure design as well as criteria used to define the active layer are required.*

MHBL comment:
The thickness of the active zone was estimated from the ground temperature measurements; previous reports and some thermal modeling (please see Section 2.7 SD A5).

Thermal modeling at the dam showed that the active zone in granular material would be in the order of 2 to 3 m thick, based on the -2 isotherm.

The thickness of the gravel pads discussed in Section 10.7.1 SD A5 were determined using the freezing index based on the warmest data and using 0 °C for the freezing point. This freezing point was selected over the -2 °C because the pore water in the granular material will not be saline. The remaining information required for the calculation is available in the report.

There was no thermal analysis to assess the impact of the various buildings on the permafrost. This would be addressed at the final design.

The EIS and supporting documents do not comment on impacts on permafrost terrain adjacent to proposed infrastructure that may be associated, for example, with changes in the distribution of snow or alterations to surface drainage. There is no discussion of the impacts on permafrost terrain associated with extraction of borrow resources, i.e. fine-grained material required for dam construction. In addition, the discussion of potential impacts of underground mining does not consider impacts on the permafrost thermal regime and potential effects of warming.

*Information Required:*
*The EIS should comment on other potential impacts on terrain related to surface infrastructure and also impacts of underground mining on the permafrost thermal regime.*

MHBL comment:
Please see notes on borrow sources (all within the footprint of Tail Lake) in the response to INAC conformity review.

The underground mining activities will be carried out at an ambient air temperature of -10 °C and should therefore have a minimal impact on the permafrost.

There is no consideration of the impact of climate change and variability will have on the terrain stability. The EIS indicates that the airstrip and road will remain after closure of Doris North (assuming 2 year operation) for use in future exploration and possible future development. Consideration of the impact of climate change and variability in infrastructure design is therefore required.

MHBL comment:
Please see notes on climate change in the response to INAC conformity review.
The timescales involved with climate change will be longer than the expected life of the mining operations. The reclamation and restoration plan for the site expects to remove the infrastructures but the earthfill structures will remain in place. Issues related to post-closure stability will be addressed in engineering the final design.

*Information Requirements:*
*Consideration of climate change and variability is required in design of surface infrastructure that remains after closure of Doris North.*

***Tailings Impoundment***

*As mentioned above, lack of information on ground ice content may result in inadequate predictions of differential settlement beneath the dam and its stability. Recommendations by SRK (2003 - A5) for further investigation with respect to stability and differential settlement* *should be carried out.*

MBHL comment:
Please see Sections 5.4, 10.10 and 10.11 of SD A5 - Tailings Impoundment Preliminary Design Report.

Some details of thermal modelling related to dam design are provided in SRK (2003 - A5) but further information is required. Variability in the thermal and physical properties of materials such as fine-grained marine sediment and till is not considered. Pore water salinity data indicates that the freezing point depression is -2 C but no information is provided on the relationship between unfrozen water content and temperature. Pore water will freeze over a range of temperature and significant amounts of unfrozen water will exist at temperatures below -2 C. The freezing characteristic curve is essential for the determination of thermal properties, hydraulic conductivity and strength properties of soils. Values for thermal properties are given for frozen and unfrozen state and there is no justification for these values. In addition, it is not clear if the variation in these properties with temperature and therefore unfrozen water content is considered or if pore water is considered to be bulk water.

MHBL comment:
Please see the figure showing unfrozen volumetric water content vs temperature below.

N-factors are used to determine ground surface temperatures from air temperatures. The winter n-factor is dependent on snow cover but no information is available for the project site. N-factor values provided are not justified and the winter n-factor in particular does not represent snow covered conditions.

MBHL comment:
It is agreed that the n-factor should be lowered but based on the nf and nt equal to 1.0, and using the MAAT of -10 °C (instead of -12) with an amplitude of 22 °C, the corresponding MAST is equal to -10 °C, thus similar to the ground measurements. Additional simulations were carried out using nf=0.5 and the active layer was slightly deeper but did not change the general conclusions of the thermal modeling. As stated in Section 10.11 SD A5, the final design will require further studies, including additional thermal modeling.

The impact of climate change has been considered but this impact can not be adequately assessed until the model parameters are adequately defined.

*Information Requirements:*
*The following information related to thermal modelling is required:*

- *Justification for simplification of material properties*
- *Freezing characteristic curve (i.e. unfrozen water content vs temperature) - In addition, consideration of unfrozen water content at lower temperature in determination of seepage and dam stability*
- *Justification for values used for thermal properties*
- *Justification for N-factors, in particular, winter n-factor (in addition, provide*

*information on snow depth and also consider changes in snow depth associated with climate warming and variability.*

MHBL comment:
It is felt that there is sufficient information and analyses of site specific physical conditions required for preliminary design purposes:

- the nf factor was originally based to obtain similar MAST but additional simulation did not change the conclusion of the thermal modeling.
- the final design will incorporate further information and more detailed thermal modeling.

Thermal modelling has been done to determine the extent of the talik beneath Tail and Doris Lakes (additional information as described above is also required). The results indicate that there is no permafrost beneath the lakes. Permafrost thickness between the lakes is estimated to be 130 m and beside the lakes, 300 m. As mentioned earlier, the lateral extent (including area beneath dams) of the talik is not clearly defined for present conditions or for conditions of higher water level associated with impoundment at Tail Lake.

*Information Requirements:*
*Clearly define lateral extent of talik under present water level and higher water level associated with impoundment.*

MHBL comment:
The issue of the potential unstable conditions for the ice-rich marine materials is acknowledged; options for mitigation are reviewed in the response to INAC conformity review INAC.

Erosion of shoreline (and resulting increase in lake sediment) associated with increasing water levels has not been considered. This is an additional impact of the tailing impoundment that must be assessed.
*Information Requirements:*

*Consider impact of rising water levels on shoreline stability of Tail Lake.*

MHBL comment:
Please see discussion on mitigation options in the response to INAC conformity review.

In addition to the several points raised above, the following would not appear to have been addressed or adequately addressed in the Final EIS:

- assessment of the impacts of potential mining expansion and continued exploration
- hydrogeology of the Tail Lake tailings containment area.

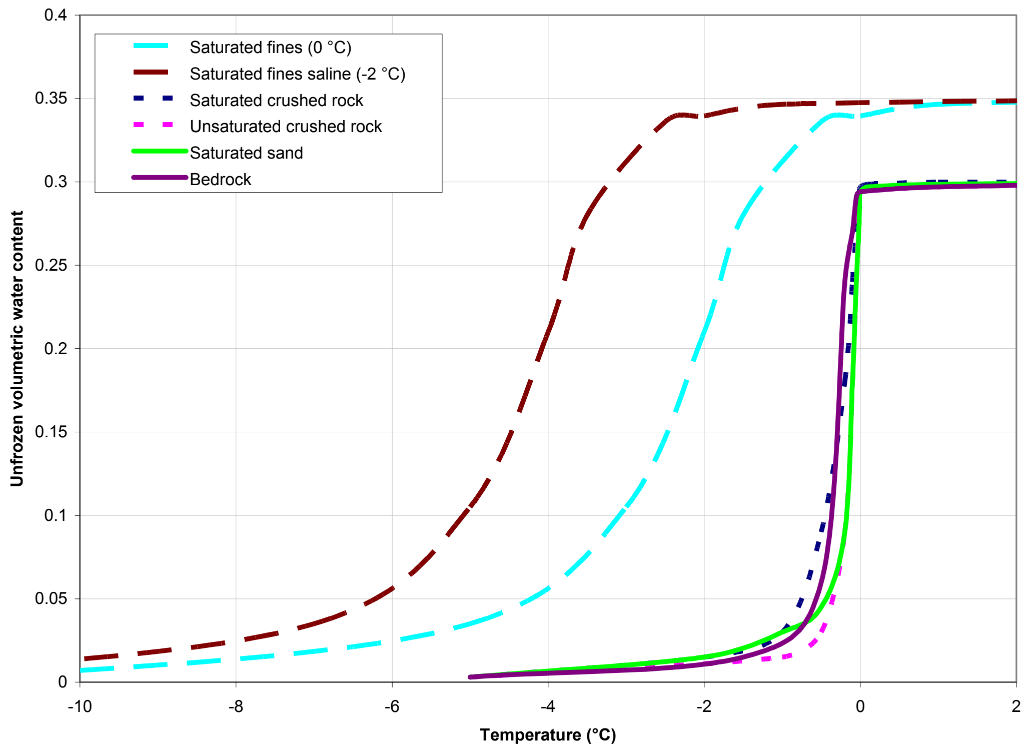
MHBL comment:
Please see discussion on Future Development in the response to INAC conformity review which also addresses ground water issues.

- sediment contaminant pathways
- potential seepage pathways from Tail Lake

MHBL comment:
Please see discussion in the response to INAC conformity review.

- ground thermal regime and its analysis in terms of permafrost encapsulation of waste rock in the underground mine; including climate change.

MHBL comment:
Please see discussion in the response to INAC conformity review.




WATER CONTENT RELATIVE TO TEMPERATURE IN SELECTED CONSTUCTION MATERIALS

***Explosives***
The proponent recognizes the need for a license and speaks of manufacture of ammonium nitrate and fuel oil (ANFO) underground. However, more information is required. The location of the proposed factory must be specified in addition to the quantities to be located there. NRCan does not favour underground manufacture of explosives because explosives manufacture should be

located a safe distance from those not directly involved in its manufacture. In the past, NRCan has allowed underground manufacture of explosives, but it was carried out on the off-shift when no one else was underground. The proponent needs to provide more information on this proposed activity. NRCan also recommends that in the event underground manufacture of explosives is not allowed, a second above-ground location should be identified. An explosives manufacturing facility requires a wash facility to decontaminate equipment. This has not been addressed.

Moreover, the proponent has not addressed well, situations involving spills of explosive. Typically, explosives do not have a Materials Safety Data Sheet (MSDS); these are not required. Clean-up procedures for ANFO are straightforward. A berm is usually not necessary.

The disposal of explosives and waste water from explosives manufacture has not been satisfactorily addressed. The storage of large quantities of AN is also an issue. It must not be located near vulnerable sites. The area for storage of large quantities of AN must be identified, specifying the quantity and the distances from other sites.

A worst case scenario involving an explosion at the factory or magazine, or AN storage, must be addressed. NRCan has not found this information, or information regarding an emergency plan for fires etc., at these same sites.

MHBL comment:
The proponent plans to mix the required explosives at the point of use, and therefore the terminology in the FEIS is not entirely correct. The proponent will revisit this aspect and respond more completely prior to the Technical Meetings planned for the Week of March 29 to April 2, 2004.

***Acidic drainage/metal leaching, tailings and waste rock management and disposal, effluent treatment and cyanide leaching processes***

All of the issues NRCan plans to provide comments on are referred to in the various documents associated with the Final EIS. The section on cyanide treatment using Caro's Acid will be examined in view of the cold climate conditions and potential toxicity.

NRCan found the discussion on the tailings impoundment preliminary design (Supporting Document - A5) difficult to interpret (e.g. lifespan of project). That information would be useful in the assessment of management and disposal options.

MHBL comment:
The tailings impoundment preliminary design has been presented with the understanding that the Doris North project life would be two years. The Proponent has however shown that there is potential for expansion which would expand the life of the mine to six years. The tailings impoundment design was therefore done for a six year mine life. Furthermore, the impoundment design is based on full containment until the water quality in the impoundment is of sufficiently good quality that it may be released. Conservatively, based on water quality modelling (SD F8) the impoundment has therefore been sized to allow 100% containment for an additional 4 years after a six year mine life. A water balance for the impoundment is presented in Section 7 SD A5, complete with sensitivity analysis to illustrate how these assumptions impact the impoundment design size.

With respect to the various integrated Acid Rock Drainage (ARD) reports (Doris Lake deposit plus Boston and Naartok), NRCan assumes that it can ignore the ARD characterization for the latter two deposits.

MHBL comment:

Supporting Document B4 was originally compiled in June of 2002 as a compilation of all prior Acid Rock Drainage and Metal Leaching characterization work conducted on the entire Hope Bay belt. Consequently it looked at data from the Boston, the Doris North, and Naartok mineralized resource areas. As indicated by NRCAN for the purposes of this review they should ignore the information from the Boston and Naartok resource areas as these are not part of the project covered by the current EIS review.