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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

May 16, 2003

By Email and Regular Mail

Mr. John Knapp
Site Manager
Teck Cominco Ltd., Polaris Operations
P.O. Box 188
Resolute Bay, NU
X0A 0E0

Subject: License NWB1POL0311
Proposal for Meltwater Disposal

Dear Mr. Knapp,

Upon receipt of TeckCominco's proposal outlining an alternative disposal option for on site meltwater, the NWB distributed the information to interested parties for comment. Comments were received from Environment Canada and are attached for your review and consideration. Prior to the NWB making a final decision, Teck Cominco shall provide clarification on how Environment Canada's and each of the following concerns will be addressed:

- 1) The introduction of water into the underground permafrost environment risks degradation of the thermal regime around the disposal chamber, at least temporarily.
- 2) Degradation of the thermal regime may result in some instability of the surrounding rock mass due to thawing propagating from the storage chamber to some distance into the rock. With design rationale and risk assessment for the proposed meltwater control procedures TeckCominco should provide additional details on the proposed ditching scheme and subsequent remediation to avoid degradation of the permafrost and erosion.
- 3) What is the risk that there may be more meltwater discharge than estimated? What is the volume and retention time of the proposed settlement/remediation containment sump and is there a risk that it could be overtopped? Is there a contingency plan for dealing with extreme flows?
- 4) What is the chemistry of the meltwater before and after remediation, including assessment of untreated water chemistry for direct underground disposal? This would include a check on the freezing point depression that may be associated with any contaminants.
- 5) The underground storage volume is about 17% greater than the expected volume of meltwater to be stored. Assuming a 10% expansion due to freezing, this leaves about 7% freeboard volume in the disposal chamber. Therefore the roof of the chamber may not have much benefit of ice support, contrary to the idea proposed. In fact the presence of water may destabilize the roof, due to thawing of the haunch area, associated with the propagation of a thawing from into the surrounding rock mass.

- 6) A thermal analysis should be carried out to assess the short-term effects of introducing the proposed volume of water into the underground permafrost environment, with regard to the following concerns:
- a. Effects of stability of the rock mass surrounding the disposal chamber;
 - b. Consequences of potential rockfalls and need for installation of supplementary rock support prior to disposal;
 - c. Time for freeze-back, based on meltwater chemistry, and estimated time for return to ambient conditions within the surrounding permafrost regime.
 - d. Confirmation that there is no risk of thaw bulb reaching adjacent talik zones, such as the ocean floor next to mine. What is the proximity of the disposal chamber to the nearest thawed zone, such as the adjacent ocean floor?
 - e. Confirmation that no geological structures may act as seepage paths, if and when thawed; Are there any major geological structures (i.e., faults, shear zones, etc.), that could act as a seepage conduit if and when thawed?
 - f. Confirmation that liquids will not migrate from the disposal chamber.
 - g. Consideration of risk to area designated for disposal of hydrocarbon contaminated soils; What is the proximity of the proposed disposal chamber to the area designated for underground disposal of hydrocarbon contaminated soils?
 - h. Consideration of appropriate factors to account for long-term global warming to confirm that the disposal area will remain frozen;
 - i. Installation and monitoring of thermistors around the disposal chamber to monitor the effects of water disposal and subsequent freeze-back, to confirm modeled predictions and verifies the assumed integrity.
- 7) Does TeckCominco have an alternative for disposal of meltwater than the one presented in the submission of March 20, 2003?

The Board requests that comments be submitted on or before 4:00 PM (MT) May 27, 2003.

Please contact me at your convenience if you have questions.

Sincerely,

Dionne Filiatrault
Senior Technical Advisor

Attachment: Environment Canada Comments dated
c.c. Distribution List
NWB Public Registry