



Giant Mine Environmental Assessment

IR Response

Round One: Information Request -Yellowknives Dene First Nation IR #21

May 31, 2011

INFORMATION REQUEST RESPONSE

EA No: 0809-001

Information Request No: YKDFN #21

Date Received:

February 28, 2011

Linkage to Other IRs:

City of Yellowknife IR #05

Date of this Response:

May 31, 2011

Request

Preamble:

It is noted that a thin oxic layer has formed in Yellowknife Bay sediments that has captured arsenic and limits arsenic from entering the water column. It is stated this oxic layer could be reduced during the summer months from addition of organic matter into Yellowknife Bay. This would release the captured arsenic into the water column.

It is stated (DAR, page 7-18) that the preservation of this oxic layer is paramount to preserving water quality in Yellowknife Bay; however, there is no discussion in the proposed remediation plan regarding the protection of the oxic layer.

Question:

1. It is requested that additional details be presented on the Proponent's plans, if any, on the protection of the oxic layer sediment in Yellowknife Bay.
2. It is requested that the risk of disturbing the oxic layer be discussed from the perspective of activities that should be limited/restricted in Yellowknife Bay and Back Bay to preserve this layer.
3. It is requested that the risk of disturbing the oxic layer due to natural environmental conditions be detailed (e.g., storm events, lake turnover, organic loading to the Bays) and the potential associated impacts to water quality.

Reference to DAR (relevant DAR Sections):

S.7.1.4 Sediment Quality

S.8.9 Assessment of Ecological and Human Health Risks





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Reference to the EA Terms of Reference

S.3.5.2 Fish and Aquatic Habitat

Response 1 Summary

INAC does not believe that any specific measures need to be taken to protect existing oxic conditions in Yellowknife Bay.

Response 1

Preservation of the oxic layer in the upper horizon of the sediments in Yellowknife Bay is largely dependent on there being oxygen in the overlying water column year round. In large lakes such as Great Slave Lake situated in a northern setting, it is extremely unlikely that anoxic (oxygen deficient) conditions would develop for several reasons: i) the cold water temperatures experienced most of the year are not conducive to high rates of oxygen consumption; ii) the short summer season means the lake stratifies for only a short period of time; iii) the productivity of the lake is low hence the organic load that deposits on the sediment is low. Furthermore, in the case of Yellowknife Bay there are no significant sources of organic or nutrient input to the bay. The only real source of nutrients is sewage from the City of Yellowknife, which is treated and discharged to Great Slave Lake via a series of small lakes that flow southward and drain into south Yellowknife Bay well removed from the Giant Mine site and the area in Yellowknife Bay with elevated arsenic levels. The Giant Mine Remediation Project Team does not believe that any specific measures need to be taken to protect existing oxic conditions in Yellowknife Bay.

Response 2 Summary

The risk of anoxic conditions developing in Yellowknife Bay is judged to be low as discussed below.

Response 2

The discharge of treated minewater to the bay will have minimal effect on oxidizing conditions, as it contains very low levels of oxygen demanding substances. Additionally, it is not anticipated that the water level in Great Slave Lake will change substantially, even considering the long term effects of climate change. The same conclusion applies to any future projects that result in the disturbance of lake sediments, primarily because the magnitude of such changes would be insufficient to affect the overall oxidizing condition in Yellowknife Bay. Thus, arsenic present in the sediments of Yellowknife Bay is anticipated to remain in a stable form as long as oxidizing conditions persist. In summary, the risk of anoxic conditions developing in Yellowknife Bay is judged to be low.





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Response 3 Summary

Extreme weather events are not anticipated to have a negative effect on oxygen levels in Yellowknife Bay and/or the stability of the oxic layer.

Response 3

It is not foreseen that extreme weather events would have a negative effect on oxygen levels in Yellowknife Bay and/or the stability of the oxic layer. If anything, such events would act to aerate the water column (i.e., add oxygen to the lake). Lake turnover also acts to introduce well oxygenated water from the surface of a lake into the deeper portion of the water column and thus has a positive effect.

