



Giant Mine Environmental Assessment

IR Response

Round One: Information Request - Yellowknives Dene First Nation #20

May 31, 2011

INFORMATION REQUEST RESPONSE

EA No: 0809-001

Information Request No: YKDFN #20

Date Received:

February 28, 2011

Linkage to Other IRs:

Date of this Response:

May 31, 2011

Request:

Preamble:

The sediments in Yellowknife Bay have been identified to be elevated with arsenic, and other metals, in a region ranging from the historical foreshore tailings to the marina. Sediment quality indicated that select locations exceed the CCME probable effects limit for aquatic life for arsenic, copper, lead and zinc.

There is no active, or intrusive, sediment remediation planned for sediments in Yellowknife Bay and Back Bay. The proposed plan is to reduce dissolved constituent (e.g., arsenic and other metals) loadings to Yellowknife Bay and Back Bay from various sources, this, in turn, may result in reduced sediment quality in Yellowknife Bay and Back Bay.

The concentration of arsenic in the sediment has been modeled¹ and predicted arsenic levels are above the suggested human health risk-based sediment quality objective² of 150 µg/g total arsenic derived for Yellowknife Bay sediments at non-residential, publicly-accessible areas in Back Bay through the year 2100 and in Yellowknife Bay through the year 2050. In Baker Creek the sediment will have a concentration above GNWT guideline, and is predicted to be approximately 1700 µg/g in the year 2100. The elevated sediment quality has potential to limit future land use and development in select regions of Back Bay, Yellowknife Bay, and Baker Creek.

Wildlife has been negatively affected by the sediment quality and will continue to be effected under the current remediation plan. There is no benthic life at sampling station 0-100, which is located 100 meters into Yellowknife Bay from the foreshore tailings. This is in contrast to site 4N-1000 on the Eastern Shore of North Yellowknife Bay, which contains 11,000 organisms/m². It has been identified that sediment that contains arsenic in exceedance of the 150 µg/g objective will negatively effect benthic life.

¹ SENES Consultants Limited, 2006. Tier 2 risk assessment. (Giant Mine Remediation Plan Supporting Document N1).

² Richardson, G.M. 2002. Determining Natural (Background) Arsenic Soil Concentrations in Yellowknife NWT, and Deriving Site-Specific Human Health-Based Remediation Objectives for Arsenic in the Yellowknife Area. Final report, submitted by Risklogic Scientific Services Inc. to the Yellowknife Arsenic Soils Remediation Committee (YSARC), Yellowknife. April 2002.





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Terrestrial wildlife (hare, mink and muskrat) and marine wildlife (bottom feeder fish) have been identified as containing arsenic levels in exceedance of the established concentration criteria downstream of Baker Creek after the proposed remediation has been completed. The sediment has been identified as a major source of the wildlife arsenic uptake.

Question:

It is requested that the sediment quality concentrations that are acceptable to the protection of aquatic life be provided. If the sediment quality that is protective of aquatic life is lower than the predicted concentrations of sediment quality in Back Bay, Yellowknife Bay, and Baker Creek, it is requested that:

1. Any limitations on future land and water uses be provided
2. Discussion is provided what additional remediation efforts will be implemented to ensure protection of aquatic life.
3. The proponent should prepare a response to the concerns associated with post-remediation impacts on flora and fauna, should the sediments outside the 'foreshore tailings' in Back Bay be disturbed.

Reference to DAR (relevant DAR Sections):

S.7.1.4 Sediment Quality

S.8.9 Assessment of Ecological and Human Health Risks

Reference to the EA Terms of Reference:

S.3.5.2 Fish and Aquatic Habitat

Response 1 Summary

Consideration of sediment quality guidelines for Great Slave Lake is beyond the scope of the Giant Mine Remediation Project (Remediation Project) and the Terms of Reference for the Environmental Assessment EA0809-001. Although some effects to benthic communities of Back Bay and Yellowknife Bay have been observed, data gathered on fish species has not shown an adverse effect on fish health or arsenic levels in fish tissue. There are foreseen limitations on recreational uses of Back Bay or Yellowknife Bay. With regard to Baker Creek, remediation planning will take into consideration input received through future consultation activities with the Department of Fisheries and Oceans Canada, Environment Canada and other interested parties. Regardless of the selected remediation approaches, a comprehensive monitoring framework will be put in place to verify the health of the environment.

Response 1





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The request to propose sediment quality guidelines for Back Bay and Yellowknife Bay is beyond the scope of the Project and the Terms of Reference for EA0809-001. While field studies in these water bodies have shown that the diversity and abundance of benthic communities has been impaired in some areas, data gathered on fish species has not shown an adverse effect on fish health or arsenic levels in fish tissue. Use of Back Bay and Yellowknife Bay for recreational purposes (i.e. for activities that result in contact with water or sediment) is not expected to be limited now or in the future.

With respect to remediation of Baker Creek, The Giant Mine Remediation Project Team (Project Team) proposes to seek input from all interested parties (including the YKDFN) via consultation workshops that will focus on the rehabilitation objectives for this system. A key component of this exercise will be consideration of future uses for the creek and any remedial approaches that may be required to facilitate such uses. Furthermore, monitoring of environmental conditions in Baker Creek is seen to form an important component of any future remediation plan for Baker Creek (as described in Chapter 14 of the Developer's Assessment Report (DAR)). Until monitoring demonstrates that the system has recovered, the Project Team supports the current ban on fishing for consumption and believes that the catch and release advisory should remain in effect until such time as fish monitoring data indicates fish caught in Baker Creek are safe to eat.

Response 2 Summary

Activities to directly remediate Great Slave Lake sediments are not within the scope of the Remediation Project. However, measures will be taken during installation of cover material on the foreshore tailings and during construction of the treated effluent outfall and diffuser to limit disturbance of lake sediments. Additionally, one of the key objectives of the Remediation Project is to reduce arsenic loadings to the lake. Over time, this is anticipated to result in gradual indirect improvements to sediment quality within Yellowknife Bay as discussed in detail in Supporting Document N1 (Section 6.1.2).

Response 2

The Site Study Area (SSA) represents the limits of the area in which historic contamination will be addressed by the Remediation Project. Therefore, consideration has not been given to actively remediating sediments within Great Slave Lake. Nonetheless, the Remediation Project is anticipated to result in indirect positive effects on the sediments of Great Slave Lake. Specifically, as shown in Table 8.4.3 of the DAR, a variety of measures will achieve a marked decrease in arsenic loadings to Yellowknife Bay relative to current conditions. Over time, the decrease in loading is anticipated to result in a gradual reduction of arsenic concentrations in surface sediments as discussed in detail in Section 6.1.2 of Supporting Document N1 of the DAR. In addition, during the active remediation phase, silt curtains or other protective measures will be taken during installation of cover material on the foreshore tailings and during construction of the treated effluent outfall and diffuser to limit disturbance of lake sediments. These measures will not only limit the area of disturbance but limit the effects of remediation activities on aquatic biota.





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Response 3 Summary

The DAR concluded that any disturbances of sediments caused by the Remediation Project can be effectively mitigated such that residual effects will not be significant. Other future projects may result in similar disturbances and effects that would be evaluated through separate regulatory approval processes.

Response 3

The only Remediation Project activities that will be undertaken that could potentially disturb sediments and have some effect on aquatic biota in Yellowknife Bay involve extension of the geosynthetic liner and riprap cover on the foreshore tailings area and the construction of an outfall/diffuser for discharge of treated minewater directly to the bay.

Installation of additional cover material on the foreshore tailings will affect a very small area and appropriate measures will be taken to minimize disturbance of sediments, such as use of a silt curtain, beyond the area affected by the placement of cover material. With respect to construction of the outfall/diffuser, it is proposed that silt curtains will be deployed to limit the effects of sediment disturbance to the area directly affected by the construction activity. At the completion of construction activities and after the suspended solids levels return to background levels within the confines of the silt curtains, the silt curtains will be removed. The diffuser will be designed to minimize disturbance of sediments within the mixing zone during the post-remediation period.

In addition to the Project, there is a potential that future projects requiring in-lake construction work will result in disturbances to the sediments of Yellowknife Bay. It is expected that any such projects will undergo an appropriate level of EA as part of regulatory approval processes. Depending on the nature of any interactions with the environment, those assessments will include an evaluation of effects on water and sediment quality, as well as on aquatic biota. Likewise, it is expected that appropriate mitigation measures would also be put in place to minimize residual effects.

