



# Giant Mine Environmental Assessment

## IR Response

Round One: Information Request - YKDFN #18

May 31, 2011

### INFORMATION REQUEST RESPONSE

**EA No: 0809-001**

**Information Request No: YKDFN #18**

**Date Received:**

February 28, 2011

**Linkage to Other IRs:**

YKDFN IR #14

Alternatives North IR #12

City of Yellowknife IR #11

**Date of this Response**

May 31, 2011

**Request**

***Preamble:***

Riprap and geotextile has been used as a cover over the historical foreshore tailings located on North Yellowknife Bay above the waterline. The proposed remediation plan is to extend the riprap and geotextile cover over the submerged tailings (i.e., below the waterline). The proposed spatial extent of rip rap and geotextile cover placed below the waterline is unclear. It is noted that within the Giant Mine Remediation Plan Supporting Document F2<sup>1</sup> (Appendix B of the DAR), mixed tailings and sediment is present over a large portion of Yellowknife Bay and includes the marina vicinity. The implication of a permanent cover in potential development areas, and use, along the shoreline and in Yellowknife Bay is unclear in the DAR.

The proposed riprap and geotextile cover aims to reduce tailings erosion and to reduce the amount of arsenic leaching into the water column. There are limited engineering design and construction details provided in the DAR regarding the riprap and geotextile cover. As such, there is uncertainty in whether the cover will be effective in achieving erosion control of the tailings below the waterline, limiting re-suspension of tailings below the waterline, and reduction in arsenic leaching from the tailings into the water column.

The DAR suggests that the riprap and geotextile cover will make a suitable environment for fish rearing, feeding, and spawning and invertebrate benthic life production. The water quality in near proximity to the cover, or on the cover, was not detailed in the DAR. As such, it is unclear if the cover environment is suitable or not for aquatic life.

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<sup>1</sup> Golder Associates 2005. Investigation of the Historical Distribution of the Tailings in North Yellowknife Bay. (Giant Mine Remediation Plan Supporting Document F2)





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### **Question 1:**

It is requested that additional details into the potential limitations on infrastructure development, and uses, along the shoreline and in Yellowknife Bay be provided for conditions post remediation (e.g., after riprap and geotextile cover placement). For example, if a dock/wharf is desired to be constructed in a region where riprap and geotextile cover has been placed, any foundation or tie-downs for the dock/wharf may disturb the cover. Details on the acceptability and risk associated with disturbance of the cover should be addressed in the Proponent's response.

### **Question 2:**

It is requested that additional details regarding the engineering design and construction of the riprap and geotextile cover be provided. Items of importance include, but are not limited to: cover placement locations on a map; spatial extent of cover placement and rationale; cover material characteristics; and, cover physical dimensions and rationale for thickness. The details provided are requested to demonstrate how the cover design will achieve the goals of: erosion control, limiting re-suspension of tailings, and reduction in arsenic leaching.

### **Question 3:**

It is requested that additional details regarding the monitoring that will be completed post remediation to demonstrate the riprap and geotextile cover is performing as designed. Should monitoring indicate cover performance is not achieving design performance, it is requested that additional discussion regarding the potential corrective actions and adaptive management be provided.

### **Question 4:**

It is requested that additional details be provided on the expected water quality in near proximity to the rip rap cover. It is requested that water quality criteria be applied to understand the risk of potential impacts to aquatic life that may interact with the cover or vicinity of the cover.

### **Reference to DAR:**

S. 5.6 Historic Foreshore Tailings  
S.6.7 Historic Foreshore Tailings  
S.8.4 Surface Water Environment

### **Reference to the EA Terms of Reference**

S.3.5.1 (Water – Biophysical Environment)

### **Response 1 Summary**

The various future projects identified in the IR were not within the scope of the Giant Mine Remediation Project (Remediation Project). However, if such projects involve activities similar to those that will be implemented as part of the Remediation Project (e.g., construction of the outfall / diffuser) any risks would likely be similar. This should be verified during regulatory reviews of any future projects.





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### Response 1

The various future projects identified in the IR were not within the scope of the Remediation Project. As a result, detailed evaluations of their risks associated with disturbance of the cover have not been performed.

Any future projects that disturb sediments (whether contaminated or not) should be subjected to an appropriate level of review as part of Environmental Assessment regulatory approval processes to determine whether adverse environmental effects are likely to occur, how they can be mitigated and whether any residual effects are likely to be significant. Depending on the nature of any interactions with the environment, those assessments will include an evaluation of cover disturbance. Mitigation requirements would also be put in place to ensure that the future projects do not cause significant residual effects.

The covered portion of the historical foreshore tailings area has not been designed for future developments.

### Response 2 Summary

The historical foreshore tailings area was subjected to erosion by wave action prior to the area being stabilized in 2001. The tailings erosion scarp on the beach was flattened to a 4 Horizontal: 1 Vertical slope. A geotextile was placed over the recontoured area (~11m wide) and covered with gravel. Coarse rock or rip rap was then placed over the gravel. The cover will be extended across the littoral zone.

### Response 2

Supporting Document F1 *Review of Yellowknife Bay Tailings Environmental Assessments* (SRK, 2004) of the Remediation Plan summarizes the restoration of Back Bay Historical Tailing Areas undertaken in 2001. As a temporary measure to stabilize, reduce leaching and limit re-suspension of tailings, the existing face of the foreshore tailings area was regraded and covered. The tailings erosion scarp on the beach was flattened to a 4 Horizontal: 1 Vertical slope. A geotextile was placed over the recontoured area (~11m wide). Base aggregate ranging in size from 75 mm to 100 mm was placed on the geotextile with a front-end loader to a thickness of approximately 20 to 30 cm. The material was thicker at the toe. Approximately 0.6 m of coarse rock (rip rap) was then placed over the gravel layer. The current design will be used to extend the cover below the lake surface to cover the tailings where they occur in the littoral zone as described in Section 6.7 of the DAR.

### Response 3 Summary

Key components for post remediation environmental monitoring will be developed through ongoing consultation. Inspection of the cover by a geotechnical engineer will be included.





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### Response 3

As presented in the response to YKDFN Information Request #14, selection of key components for environmental monitoring will be developed through ongoing Aboriginal and public consultation, as outlined in Section 13 of the DAR. It is also recognized that the elements and details of monitoring and reporting will be substantially governed by water license requirements established by the Mackenzie Valley Land and Water Board (MVLWB). In this regard, the Long-Term Environmental Monitoring Program discussed in Section 14 of the DAR is presented as a starting point from which to build through dialogue with Aboriginal communities, the public and regulators. Inspection of the tailings covers by a geotechnical engineer is anticipated to be a requirement of the water licence.

### Response 4 Summary

The extension of the riprap cover in the vicinity of the foreshore tailings will involve the placement of coarse granular rock to limit potential erosion of tailings present along the shoreline. Due to mixing effects and the design of the cover (which will include a geotextile layer), arsenic concentrations in the porewater of the riprap are anticipated to be similar to elsewhere in Yellowknife Bay. On this basis, it is expected that the riprap will serve as suitable habitat for aquatic biota.

### Response 4

To be clear, it is intended that the geotextile and riprap cover would be applied only on the area along the shoreline where tailings are exposed, that is, in the “foreshore tailings” area of Yellowknife Bay. The area to be covered comprises a very small area and is intended solely for the purpose of minimizing ongoing erosion of tailings in the area where the tailings were originally deposited during the early years of mining. It is not intended to cover tailings that have been distributed throughout Yellowknife Bay.

With reference to the question raised about the arsenic level in the porewater of the riprap, it is expected that it will be comparable to the level measured in the water column of Yellowknife Bay, which meets Canadian Water Quality Guidelines for the Protection of Water Aquatic Life (Canadian Council of Ministers of the Environment (CCME)). This is attributable to the fact that the riprap will be coarse granular rock and exchange of lake water with porewater in the riprap is expected to occur on an ongoing basis (e.g., due to wave action). In addition, the geotextile will serve to keep the tailings from migrating into the riprap cover layer, which in itself will limit the upward movement of arsenic into the riprap cover. Taking the above factors into consideration, it is expected that the riprap should serve as suitable habitat for aquatic biota.

