



Giant Mine Environmental Assessment IR Response Template

Round One: Information Request - Review Board IR #25

May 31, 2011

INFORMATION REQUEST RESPONSE

EA No: 0809-001

Information Request No: Review Board #25

Date Received:

February 14, 2011

Linkage to Other IRs:

Date of this Draft

May 31, 2011

Request

Preamble:

The release of mercury into aquatic food chains by the project could be relevant to the Review Board. In addition to the arsenic contamination of the Giant Mine it is important to consider the mercury amounts in the area as large quantities of the element were used in the mercury amalgamation process in the early history of the mine. The remediation project could remobilize the mercury by exposing it to the weather conditions. This may be relevant in of itself, or cumulatively in addition to other sources of mercury in food chains.

Question:

1. Please describe the fate of on-site mercury contamination in light of the rehabilitation project.
2. Please describe the potential effects of mercury on the aquatic environment and human health.
3. Please describe any efforts to measure mercury concentrations in the local aquatic food chain, and the results of these studies.
4. Please describe the potential of the remediation project to remobilize mercury by exposing it to weather conditions.

Reference to DAR (relevant DAR Sections):

DAR 4.3.3 Ore processing included mercury amalgamation.

DAR 7.4.2.2 Effluent from Giant Mine contributed elevated levels of mercury in Yellowknife Bay.

DAR 14.2.3 Fish tissue samples will be analyzed for mercury.

DAR 14.2.4.1 Vegetation and soil samples will be analyzed for mercury.





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Reference to the EA Terms of Reference

ToR s 3.5.2 Fish and Aquatic Habitat

ToR s 3.4.2.1 (1) Human Health and Safety

Response 1 Summary

Although mercury was used at the Giant Mine during the early years of operation, assessments of the environment indicate that mercury is typically present at concentrations that are well below levels at which adverse effects to humans and the environment might occur.

Response 1

Mercury amalgamation was used for the first decade of the Giant Mine's operational life (i.e., up to 1959). While significant effort would have been expended to recover mercury from process wastes (due to its high cost as a metallurgical input), some mercury would have been released to the environment, primarily in association with tailings. During this period, tailings were discharged to the area now referred to as the Historic Foreshore Tailings in Great Slave Lake (until 1951) and subsequently to land-based tailings containment areas. Mercury was also used in other industrial applications such as electrical equipment but this source is expected to be very small relative to mercury amalgamation.

Although mercury is known to have been released to the environment, initial Human Health and Risk Assessment studies conducted as part of remediation planning screened out mercury as a potential contaminant of concern. As a result, mercury has not been a focus of monitoring efforts. Nonetheless, mercury concentrations have been determined in a limited number of cases and were found to be generally low relative to applicable environmental quality standards. For example, comprehensive sampling within Yellowknife Bay (Golder 2005) determined that mercury concentrations in sediment are consistently below the Canadian Council of Ministers of the Environment (CCME 1999 and updates) Interim Sediment Quality Guidelines (ISQG) of 0.17 mg/kg and Probable Effect Level (PEL) of 0.486 mg/kg. The only exceptions were three samples collected from the Historic Foreshore Tailings area where maximum mercury concentrations were found to be 0.24 mg/kg. For reference, this maximum concentration is less than half of the concentration at which the most sensitive aquatic species are anticipated to show adverse effects (i.e., the PEL of 0.486 mg/kg). In surface water, groundwater, minewater and seepage samples, mercury concentrations have been found to be consistently lower than applicable guidelines for drinking water (1.0 µg/L) and protection of freshwater aquatic life (0.026 µg/L). Similarly, for surface soils on the Giant site, mercury concentrations are typically a small fraction of the most stringent land-use criteria (6.6 mg/kg for residential or parkland use) published by the Canadian Council of Ministers of the Environment (CCME 1999 and updates).

To summarize, the vast majority of data collected to date suggests that concentrations of mercury present in the environment on and near the Giant Mine are below levels at which adverse effects would occur.





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Response 2 Summary

Concentrations of mercury in the environment are typically well below levels at which adverse effects to humans and the environment might occur. The only potential exception is a relatively small area in the vicinity of the Historic Foreshore Tailings. However, such effects (if any) are anticipated to be relatively minor and localized.

Response 2

As noted in the response to Question 1, concentrations of mercury are consistently lower than applicable environmental quality guidelines for virtually all media and all locations. Research suggests mercury is not having an adverse effect on the aquatic environment or human health.

Response 3 Summary

There has been no monitoring of mercury within the local aquatic food chain.

Response 3

Based on the absence of mercury contamination in all relevant media (i.e., water and sediment) there has been no monitoring of mercury within the local aquatic food chain.

Response 4 Summary

The implementation of the Giant Mine Remediation Plan is not anticipated to result in measurable changes to mercury concentrations within the environment. This will be verified through a monitoring program of applicable media.

Response 4

As indicated in the responses to Questions 1, 2 and 3, the Giant Mine Site is not considered to be a significant source of mercury. This is supported by low concentrations observed in soils (which are below the most stringent criteria for land use) and low concentrations in downstream receiving environments. Based on the low concentrations at source, the implementation of the remediation plan is not anticipated to have any measureable effect on the concentrations of mercury in the receiving environment (i.e., any releases of mercury would be minor and no adverse impacts are expected). This assumption applies regardless of the extent to which weathering might occur.

Notwithstanding the above conclusion, long-term monitoring of the site and surrounding environment will involve analysis of relevant media to confirm that potential risks associated with mercury are not





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occurring. This will include sampling and analysis of treated mine water (DAR 14.2.2.1), treatment plant effluent (DAR 14.2.2.3), fish (DAR 14.2.3) as well as vegetation and soil (DAR 14.2.4.1).

