INFORMATION REQUEST RESPONSE

EA No: 0809-001 **Information Request No: Environment Canada #04**

Date Received:

February 28, 2011

Linkage to Other IRs

Review Board IR #3.6
Review Board IR #8.2
Review Board IR #15.1

Date of this Response:

May 31, 2011

Request

Preamble:
There are currently an estimated 27,000 boreholes such as exploration drillholes on the site, most of which are potential pathways for groundwater movement. As one of the goals of the remediation effort is to minimize the potential for groundwater movement in order to both prevent contaminant movement and maintain frozen conditions in the subsurface, effort should be aimed at sealing the boreholes.

Question:
Please provide information describing activities aimed at decommissioning and/or sealing existing boreholes or provide an explanation as to why this will not be done.

Reference to DAR (relevant DAR Sections):

S.5.2.6 Boreholes

Reference to the EA Terms of Reference

S.3.5.1 Water
The Review Board has identified water as a key valued component for this environmental assessment. The contaminated water at the Giant Mine must be treated before discharge to the environment to ensure the health and safety of the ecosystem and the local residents who depend on that ecosystem. . .

Summary

All known boreholes into the arsenic chambers and stopes have been sealed and any new holes in their vicinity will be sealed with grout once the activity in the area is completed. The likelihood that an unidentified borehole passing from the chamber to outside of the freeze wall will remain undetected and unsaturated is low. However, the slow moving water would eventually freeze and seal the borehole and any escaping water will be captured by the minewater collection system and treated.

Response

There are no plans to seal all boreholes in the mine area. There are numerous boreholes across the site for which there are no survey records. It is therefore impossible to guarantee that sealing the known holes will significantly reduce the potential for groundwater movement. Furthermore, the dominant flow paths through the flooded mine are expected to be the mine tunnels themselves, which are much larger and more laterally continuous than the drillholes.

All known boreholes into the arsenic chambers and stopes have been sealed with grout and any new holes in the vicinity will be sealed once all activities in the area are completed. The likelihood that an unidentified borehole passing from the chamber to outside of the freeze wall will remain undetected and unsaturated is low.

The possibility of water escape through such features is further discussed in the response to the Review Board's Information Request #8.2. If a borehole were present, there is a risk of a temporary increase in seepage rates of arsenic saturated water and release of arsenic trioxide sludge during the wetting of the dust. The quantity of seepage would be dependent on the chamber wetting method. Dissolved arsenic present in any seepage would be transported downward into the mine, collected in the mine-water system, and removed by the water treatment plant. As the rate of flow into the borehole would be governed by the dust hydraulic conductivity (measured to be $7x\ 10^{-7}$ m/s), the slow-moving water would freeze quickly and seal the borehole.

The response to Review Board's Information Request #15.1 adds "If unexpected leakage is detected and the frozen shell does not stop the flow, additional measures such as grouting may be reviewed and evaluated as part of the response plan. These cases will be addressed if they are encountered."

The response to the Review Board's Information Request #3.5 discusses the thermal loading from a long-term groundwater flowpath adjacent to a frozen block, and also indicates little or no risk.