INFORMATION REQUEST RESPONSE

EA No: 0809-001 **Information Request No: Review Board #06**

Date Received:

February 14, 2011

Linkage to Other IRs

Review Board IR #3

Date of this Response:

May 31, 2011

Request

Preamble:
In order to assess the impacts of this project, the Review Board needs to understand the extent of saturation proposed for the underground arsenic before freezing. The concept behind the non-saturated frozen block needs clarification. The following statements presented in the DAR seem to be contradictory with respect to the role of the frozen block and the immobilization of the arsenic trioxide:

- "[…] Immobilization of arsenic trioxide through ground freezing (the frozen block method)" (DAR, p. 2-3)
- "[…] The frozen conditions will be maintained over the long-term, and the large volume of ice in the frozen block will provide additional protection against thawing" (DAR, p. 6-11)
- "[…] Complete and uniform saturation of the dust is not required; the "frozen block" concept only requires that a large mass of frozen water be developed somewhere within each chamber or stope." (DAR, p. 6-29)
- "[…] However, the primary role of the frozen block is to provide a mass of frozen water that will resist any future increases in temperature." (DAR, p. 6-29)

Question:
Please clarify the above and confirm that these unsaturated conditions have been considered in all the thermal analysis, describing how these varying conditions, which influence thermal and hydraulic ground parameters, have been duly considered in project design.

Reference to DAR (relevant DAR Sections):

S. 5.1.2.2 Physical Properties
S. 6.2.6 Initial Freeze

Reference to the EA Terms of Reference:

S.3.3.1 Arsenic Containment – Detailed Description of Frozen Block, Point 2
"A detailed explanation on the saturation procedure of the arsenic trioxide dust before freezing and a demonstration that the frozen dust will be compact and ice saturated, (i.e. no loose cold regions and frozen bridges occur that could jeopardize the stability of the system)"

Summary

The frozen bedrock surrounding the chambers and stopes provides complete isolation regardless of the saturation condition within the dust itself.

Response

The four statements from the DAR are not contradictory when one considers that the surrounding frozen bedrock is a significant component of the frozen block. The frozen bedrock forms an impervious barrier surrounding the arsenic trioxide dust, and provides complete isolation regardless of the saturation condition within the dust itself. The benefit of wetting and freezing the dust is only that the latent heat stored in the frozen water would slow down any possible future warming.

Unsaturated conditions have been considered in the thermal modeling. The response to question 2 of the Review Board's Information Request #2 provides a summary of that work.