

DIAND acknowledges that EBML has been progressive in its studies used to characterize ARD on site, but has identified areas where additional work is required, including: waste rock, exposed tailing, underground workings and closure planning for the TCA.

Waste Rock

Given that it is unlikely that a clear division between waste rock (with less than .5% total sulphur) and adjacent ore (typically 3% total sulphur) has been made at all times in the underground workings, therefore DIAND recommended that the Board require EBML to perform a survey of the Acid Base Accounting (ABA) characteristics of waste rock used around the site that was used in the construction of roads, airstrips, building foundations, crown pillar backfill, pads and dams. Additionally, DIAND recommends that waste rock proposed for use in future construction be sampled on a regular basis and only non-potentially acid generating and low soluble metal material be used. Also, DIAND suggests a that EBML review kinetic test data should be used to set site specific criteria for selection of construction rock.

Exposed Tailings

There is a potential for oxidation to occur in the active tailings layer (prior to covering and under inadequate cover) and for those soluble products to be transported from the active layer. With the recent temporary shutdown there was an opportunity for uncovered, unfrozen tailings to oxidize, and produce soluble metals and therefore, potential for oxidation products to contaminate pooled water on the tailing surface which may drain into water storage ponds and adversely affect water quality. As such, DIAND recommends that EBML be directed to sample currently exposed tailings surfaced to track oxidation rates and developing loads of oxidation products within the TCA. Analysis may include field rinse pH, conductivity profiles and acid-base accounting and metal extraction tests on a modest number of samples from the TCA.

Underground Workings

Concerns associated with possible ARD issues related to the underground workings are minor given that workings below the ground surface are expected to eventually fill with water and freeze but given temporary closure of a mine allows for an extended period over which the workings are exposed to oxygen producing oxidation products which may result in increased contaminant loads in the mine water once mining resumes, with implication for water treatment. Therefore, DIAND recommends that EBML monitor mine water to gauge the extent of contaminant release underground. DIAND further recommends that as EBML draws closure to final abandonment of the underground workings, that they be directed to conduct a survey of underground walls (wall wash studies) to assess the potential release of contaminants to the water column when the mine floods at closure.

Closure Planning for the TCA

DIAND recommends that the Board require EBML to study the potential for interactions between covered cells and flooded areas of the TCA, and include thermal analyses and modeling of the interaction between the ponds, the frozen-core perimeter dykes, and frozen tailings within cells and address the thermal effects of proposed pond elevations. DIAND indicated at the public hearing that the methods (covered tailings and flooded tailings) may be incompatible particularly if flooded ponds are adjacent to covered frozen zones. Latent heat contained in the water has the potential to adversely affect the ability to maintain frozen tailings adjacent to the ponds.

DIAND acknowledges that EBML has begun progressive reclamation of the TCA. However DIAND recommends that EBML replace the two broken thermistors and add thermistors in at least three more areas: in the center of Cell 1, adjacent to Dam 3D which borders Pond 1, and at the point where tailings depth is estimated to be greatest. Monitoring should continue to examine the potential for ground warming trends and provide valuable data to assess depth of cover required for final closure. Monitoring of thermistor data should be undertaken monthly and reported to the Board annually.

For proper closure DIAND recommends that EBML conduct a long-term study on permafrost aggradation and pore water pressure in Cell 1. The study should include the following:

- Continued measurement of ground temperatures;
- General stratigraphy of Cell 1;
- Measurement of surface uplift of Cell 1;
- Measurement of pore water pressure in the tailings;
- Sampling and testing the solute concentration of unfrozen pore water; and
- Electromagnetic surveys to determine ground conductivity.

To ensure that the site is properly reclaimed, additional details in the form of a final reclamation plan is required. DIAND recommends that EBML submit a 'Final Phase' abandonment and restoration plan not less than three years prior to the end of mine life. The plan should incorporate suggestions contained in the report on "Closure Cost Estimate and Scoping of Mine Closure Issues, Lupin Mine NWT"¹ The plan should also include:

- An outline of methods to contain potential pore water expulsion from the TCA;
- Identification of sites of contaminated soils at the minesite;
- Identification of regions with appropriate esker material for TCA cover and the amount needed to cover cells
- A summary of existing data for background levels of metals in the area, and identification of needs for verification of data or reassessment with modern detection limits;

¹ Submitted with the application. (Golder Associates, 1997)

- Description of restoration activities outlined in the interim plan,
- An implementation schedule for the completion of restoration; and
- A detailed monitoring program.

DIAND further recommends that the final plan be subject to annual review to reflect changes in technology and operations.

Licence Term???