



December 8, 2006

## VIA E-MAIL AND OVERNIGHT DELIVERY

Mr. Dane L. Finerfrock  
Director  
Division of Radiation Control  
Department of Environmental Quality  
168 North 1950 West  
P.O. Box 144850  
Salt Lake City, UT 84114-4850

Dear Mr. Finerfrock:

### **Re: Cell 4A Lining System Design Report, Response to DRC Request for Additional Information – Round 5 Interrogatory, Cell 4A Design.**

We are responding to your October 5, 2006 letter, requesting additional information on the Cell 4A Lining System Design.

For ease of review, the Division of Radiation Control's ("DRC's") questions are repeated below in italics with Denison Mines (USA) Corp.'s ("DMC's") responses following each question.

1. *A Radiation Survey Report to demonstrate that the existing subgrade for Cell 4A has radiation and contamination levels that are acceptable. This is currently being addressed under a separate cover.*

IUSA has completed the confirmatory sampling of the cleanup efforts on Cell 4A and will submit these results and analysis to DRC under separate cover.

2. *An up to date seismic hazardous analysis that includes recent data and evaluation methods.*

Included as Attachment A is an analysis and review of the ground motion attenuation relationships, updated to reflect current evaluation methods, for the general area of the White Mesa Mill. The results of this analysis and review confirm that the 0.1g factor used in the original dike Cell 4A design is appropriate for the operational life of the Cell 4A dikes.

3. *An evaluation that demonstrates that the amount of area covered by the slimes drain is sufficient to remove the tailings solution in an efficient and timely manner. Also, that it is not beneficial to carry the*

*slime drainpipes and/or sand layer into the remaining portion of the cell bottom (as discussed in the August 2, 2006 conference call between DRC and IUC representatives).*

During the August 2, 2006 conference call between DRC and DMC representatives, DMC explain in detail the difficulties in accurately predicting the grain size analysis of the slurry tailings material, and thus the settling characteristics of the solids, because of the large number of mines providing ore to the White Mesa Mill and the diverse geology of the ore sources. To date the White Mesa Mill has processed conventional ore from over 130 different mines, located in four (4) different states. The milling procedures reduce all of the ore material to minus 28 mesh, with some ores having a large percentage of the solids in the larger size fraction (+60 mesh) after processing, but other ores breaking down into large portions less than 200 mesh, with significant portions less than 325 mesh.

Following discussions with DRC on August 12, 2006, DMC proposed to use a cyclone, or other similar methods, to make an initial sand-slime separation for placement of approximately 2 feet of sandy material over the portion of the slimes drain piping located in the southwest corner of Cell 4A. DRC acknowledged IUSA's concerns with the imperfect results of cyclone operation and the difficulty in placing the sands significant distances from the operations area on the dike crest, but agreed that the effort should add significantly to the performance of the slimes drain. Following the latest comments from DRC, DMC is proposing to extended the slimes drain piping to the north and east of the original design area to take more advantage of the sand layers overlapping the drain piping from slurry deposition along the north and east sides of the Cell (See attached Figure 1 for initial placement and Figure 2 for subsequent slurry discharge from the north, west and east sides of the Cell). This modification increases the area of the Cell bottom covered by the slimes drain piping from 12% to 25%. The area of the slimes drain piping close to the southwest corner of the Cell should be effectively covered by the sand fraction of the cycloned slurry, but the sand placement over the proposed extended area of the slimes drain network may be more uncertain due to difficulties in placing the sand fraction at great distances from the dike areas.

The result of this modification to the design should create areas along the north, west, east, and a portion of the south side, with higher concentrations of sand due to more rapid settling of the sand fraction in the slurries tailings. This portion of the tailings slurry will ultimately drain faster due to the layers containing higher sand fraction between thin layers of slimes. The slimes portion from the initial deposition of the slurry will settle later over the areas of previously deposited sand, or be pushed to the southwest corner where the slimes drain piping and the cycloned sand layer will increase the settling rate and drainage of the slimes fraction.

Additional splash guards have been added at points along the dike crest to protect the liner at the additional proposed discharge points.

4. *The CQA Plan needs to be clear that modifications or changes to the agency reviewed design and installation requirements reflected in the respective documents must be provided to the agency for review prior to implementation.*

The revised CQA Plan, Attachment B, has been modified to state that "Major modification to the Construction Drawings, Technical Specifications, or this CQA Plan must be provided to the regulatory agency for review prior to implementation."



5. *Include the 3000 psi requirement in item 2.01A.1 of Section 03400 of the technical specifications (for the 28-day compressive strength testing) in Section 13.2.4 of the CQA Plan (or at a minimum, a reference to this requirement in the technical specifications in 13.2.5 of the CQA Plan).*

To maintain consistency with the CQA Plan, reference to the Technical Specifications for conformance has been made to section 13.2.5. A revised version of the CQA Plan can be found in Attachment B.

6. *Item 2.04 of Section 02220 of the technical specifications addresses the compaction of the anchor trench. It states that backfill will be placed in lifts that result in a compacted thickness of no greater than 6-inches. Also include that the soil removed from the anchor trench will be placed back into the trench. This must be included in the specifications prepared for construction.*

Part 3.04.C of Section 02220 of the Technical Specifications states that "excavated anchor trench materials shall be returned as backfill for the anchor trench and compacted." A revised version of the Technical Specifications can be found in Attachment C.

7. *Backfill compaction requirements need to be included in either the CQAP, Technical Specifications, or on the Project Drawings regarding soil needed to make the proposed grade for the cell bottom (subgrade). This backfill shall be placed in 6-inch loose lifts and compacted to 95% of maximum dry density per ASTM 698 and within 0 to +3% of optimum moisture content.*

The existing sub-grade will be finish graded and used for the sub-grade for the new liner system installation. It is not anticipated that additional fill placement will be required along the base or side slopes of the existing Cell 4A subgrade. Therefore, compaction criteria is not included in the Technical Specifications, Construction Drawings, or CQA Plan.

8. *Included must be means and methods used (prior to operation of Cell 4A) that determine if the hydration of the GCL is adequate. The level of GCL hydration must be comparable to the level used in the reference acid resistance testing. Details of proposed GCL hydration procedure, field testing, and the respective level of hydration need to be provided to the DRC prior to the start of construction.*

GeoSyntec prepared a work plan, which was submitted to DRC on October 20, 2006, for demonstrating GCL hydration when exposed to the actual field conditions. DMC received comments on the work plan from DRC on November 9, 2006. The work plan will be modified and implemented in accordance with DRC comments.

The determination of adequate hydration will be based on the GCL manufacturer, CETCO, definition of GCL hydration as 100% moisture content.

9. *The requirement that construction loads on the completed liner shall be limited to foot traffic and low pressure ATV type vehicles that produce contact pressures at or lower than that exhibited by foot traffic need be added to the technical specifications.*

Part 3.02.C.5.a. of Section 02770 of the Technical Specifications limits the use of vehicular traffic on the geomembrane.



10. IUC proposes that a cyclone be used to process the tailings slurry. Please note that details of the tailings processing must be included in the cell operations procedures to be provided by IUC as part of Phase 2. These procedures need to include methods for placement of the tailing as part of the slimes drain layer so that the amount of the coarser sand is maximized, uniform, and the amount of fines minimized. In addition, it should be noted that if tailings are to be placed in the southeast corner, an HDPE splashguard is needed in that area.

Following discussions with DRC, DMC proposed to use a cyclone, or other similar methods, to make an initial sand-slime separation for placement of approximately 2 feet of sandy material over the portion of the slimes drain piping located in the southwest corner of Cell 4A. DRC acknowledged IUSA's concerns with the imperfect results of cyclone operation and the difficulty in placing the sands significant distances from the operations area on the dike crest, but agreed that the effort should add significantly to the performance of the slimes drain. The proposed extended length and area of the slimes drain network (see response to comment 3 above) may result in sand placement being less effective over these areas, but should be compensated for by deposition of slurry from other directions. Details on the procedures for sand-slime separation and sand placement will be included in the Cell 4A Operations Procedures.

Additional splashguards have been added in the southeast corner of Cell 4A, as detailed on the attached Figure 1.

11. There is a discrepancy in the gallon/day/acre ALR values obtained that needs to be clarified. One source (tables provided in 8/28/06 IUC response) has 604.01 gallons/acre/day at 37 feet of head, and another (calculations page 4 of 6) has 587 gallons/acre/day at 37 feet of head.

This discrepancy has been identified and found to be due to a rounding error in the calculation. The correct ALR value is 604 gallons/acre/day. The calculation has been updated and is included as Attachment D.

12. Please note that since the evaluation of the flow in the geonet assumes no adverse impact from uncertainties do to installation, quality control and assurance during installation must be thoroughly implemented and documented in the CQA Report for the liner system.

Section 12 of the CQA plan and Section 02773 of the Technical Specifications detail testing, handling, placement, repair, and seaming procedures for the geonet.

These responses hopefully answer all the outstanding questions concerning the Cell 4A design. If you have any additional questions please feel free to contact me at (303) 389-4160.

Yours very truly,

**DENISON MINES (USA) CORP.**



Harold R. Roberts  
Executive Vice President – US Operations



Letter to Dane L. Finerfrock  
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cc: Ron F. Hochstein, DMC  
David C. Frydenlund, DMC  
Steven D. Landau, DMC  
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