DENISON MINES

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August 7, 2009

VIA E-MAIL AND OVERNIGHT DELIVERY

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

Re: Cell 4B Lining System Design Report, Response to DRC Request for Additional Information – Round 2 Interrogatory, Cell 4B Design.

Dear Mr. Finerfrock:

We are responding to your July 31, 2009 letter requesting additional information regarding the Cell 4B Design Report.

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

1. *Dike Integrity – Please provide information concerning the location and magnitude of blasting expected to occur during construction of Cell 4B and an evaluation of potential impacts from such construction blasting in terms of supporting calculations, and/or supporting literature. The response should include information regarding potential impacts on slope stability for nearby features (e.g. berms and other features of Cell 4B and adjacent cells) and a definition of "damage(s)" that could be caused by blasting.*

   All previous cells at the White Mesa Mill site have been excavated using blasting techniques without damage to berms existing at the time of the blasting. Blasting is a common form of excavation and can be safely implemented in very close proximity to many constructed features with no impact to the feature.

   A plan view and cross sections indicating the location of the blasting relative to existing structures (the slopes of Cell 4A and Cell 3) are attached as Exhibit A. The blasting will be confined to the footprint of the proposed Cell 4B. The cross sections indicate the locations where the rock to be blasted is closest to the existing ground surface and therefore closest to the slopes of Cell 4A and Cell 3. The closest blast holes to the existing slopes within Cell 4A and Cell 3 will be approximately 40 feet from the crest of the slope.

   The DRC request for additional information referenced the "Blasting Guidance Manual, US Department of Interior, Office of Surface Mining and Reclamation and Enforcement (1987)" requirement that if measured ground vibration frequencies caused by blasting are greater than 30 Hz, a maximum peak particle velocity (PPV) of 2 inches per second (IPS) can be allowed or utilized without concern for damage to structures.

The frequency for the proposed excavation blasting is commonly in excess of 30 Hz. However, the 2 IPS PPV limit for damage to structures refers to building-type structures and not slopes. Our experience with construction blasting near existing slopes indicates that a PPV of 5 IPS will not cause damage to the existing slopes. From "The Influence and Evaluation of Basting on Stability," by Alan Bauer and Peter N. Calder presented in Stability in Open Pit Mining, 1971, a PPV between 2 and 4 IPS is conservatively safe for rock and soil slopes.

In order to be more conservative, DMC has revised the technical specifications to require that within 100 feet from the top of the existing berms, blasting peak particle velocities (PPV) shall be kept to a maximum of 2 inches per second. The revised specifications are attached as Exhibit B.

The effective permeability of the underlying material beneath the areas to be blasted should not be affected. Fractures or jointing in rock may increase or could become discontinuous as a result of blasting in the area of rock deformation. However, the rock to be blasted within this area of rock deformation is within the zone of excavation at the site and as such will be removed. Therefore, the potential for blasting to affect the permeability of the underlying material is negligible.

"Damage" caused by blasting may be the result of ground vibrations or fly rock. Damage from ground deformation or displacement is confined to a relatively small area within the designed blasting area. Deformation or displacement of rock generally occurs within about 20 feet of the blast location. As the closest blasting to a structure or an existing slope will be greater than 40 feet, damage from deformation or displacement is not considered an issue. Damage from ground vibration may result in cracking of drywall or separations in jointing of building structures. Damage from fly rock may result in rock striking existing improvements. Observations made before and after blasting of the slopes and nearby structures will provide potential evidence of damage. Any changes will be evaluated and the damage immediately repaired.

2. *Spillway Capacity Design/Calculations and Surface Water Runoff – Provide additional information to demonstrate the capacity of the entire facility tailings cell system to handle the Probable Maximum Precipitation (PMP) under current site conditions and under planned future build-out scenarios. Please provide an estimation of the PMP-related flow rate and volume. Include information to justify that a zero discharge would occur from the furthest downstream cell (Cell 4B) considering all sources of flow or liquids at the facility. Consider the geometry and elevation of the proposed spillway into Cell 4B in the evaluation. In the event that Cell 4A is not self-containing under some future PMP condition, and / or does not comply with the 3-foot freeboard requirement mandated in Part I.D.6(d) of the Ground Water Permit, please demonstrate how Cell 4B will contain and control all tailings solids and liquids without causing any discharge to nearby soil or surface water.*

   DUSA proposes to maintain a 5.77 foot freeboard to accommodate the estimated stormwater volume generated by the PMP condition. The Cell 4B Capacity Calculation package is provided as Exhibit C.

3. *GCL, Primary Liner, Secondary Liner, and Leak Detection System – Please provide a revised Cushion Protection Calculation and revisions to the Design Report and Technical Specifications, if needed, to reflect the results of considering/incorporating recently-issued (2008) revised cushion protection criteria in the revised calculation.*

   Geosyntec has revised the calculation to include the recently-issued, revised cushion protection criteria. The revised calculation is attached to this letter as Exhibit D.

4. GCL, Primary Liner, Secondary Liner, and Leak Detection System – *Provide additional information that discusses and compares laboratory test results conducted for the GCL, for use in Cells 4A and 4B, to pertinent published laboratory testing results involving permeability testing of GCLs exposed to acidic permeants. Include an explanation of differences and any inconsistencies between these test results. Include information demonstrating that test termination criteria specified in ASTM D 6766 were achieved during the GCL permeability testing that was reported in the October 28, 2008 test report.*

   The GCL will be pre-hydrated per the previously-approved hydration procedure for Cell 4A to achieve a moisture content of 50%. The Technical Specifications and Construction Quality Assurance plan have been revised to reflect the hydration of the GCL and are provided as Exhibits B and E, respectively.

5. GCL, Primary Liner, Secondary Liner, and Leak Detection System – *Provide information that adequately supports the proposed approach of not pre-hydrating the GCL in Cell 4B prior to installing an HDPE geomembrane over it. Address in detail each of the issues described in the Round 2 Interrogatory below as they relate to the Cell 4B GCL pre-hydration design (or, alternatively, provide information indicating that the previously-approved procedure used for installing the GCL in Cell 4A which included pre-hydration of the GCL to achieve a minimum moisture content of 50% in the GCL and maintain that level until completion of geomembrane placement, will be used when constructing Cell 4B).*

   The GCL will be pre-hydrated per the previously-approved hydration procedure for Cell 4A to achieve a moisture content of 50%. The Technical Specifications and Construction Quality Assurance plan have been revised to reflect the hydration of the GCL and are provided as Exhibits B and E, respectively.

   DUSA recognizes the importance of maintaining the hydration of the GCL prior to covering with geomembrane and this issue is addressed in Section 02772, Part 3.03D of the Technical Specifications (Exhibit B). The moisture content of the GCL is verified during destructive sampling of the geomembrane, which occurs after the geomembrane is deployed and seamed over the GCL. Table 5 in the CQA Plan (Exhibit E) has been revised to reflect the frequency of the moisture content testing required for the pre-hydrated GCL.

6. GCL, Primary Liner, Secondary Liner, and Leak Detection System – *Provide a revised GCL permeant travel time calculation that uses GCL hydraulic conductivity values that conservatively bound the range of hydraulic conductivity values that could reasonably be expected to occur in the GCL, in Cell 4B, during the cell's design life. Include information demonstrating that the hydraulic conductivity values, used in the calculation, bound the range of uncertainty associated with predictions of the effects of acidic permeant exposure on the GCL (e.g., that adequately bound the range of published laboratory GCL permeability testing results using acidic permeants).*

   See DUSA's response to Interrogatory Statement 5 above.

If you have any additional questions please feel free to contact me at (303) 389-4160.

Very truly yours,

Harold R. Roberts
Executive Vice President – U.S. Operations

DENISON MINES

cc: Ron F. Hochstein, DUSA
Gregory T. Corcoran, Geosyntec

Attached:
- Exhibit A – Blasting Locations and Profiles
- Exhibit B – Revised Technical Specifications
- Exhibit C – Cell 4B Capacity Calculation Package
- Exhibit D – Revised Cushion Protection Calculation Package
- Exhibit E – Revised Construction Quality Assurance Plan

References:

White Mesa Mill – Standard Operating Procedures, Book II: Environmental Protection Manual, Section 3.1, 5/09 Revision: Denison 8, pp. 15-19.

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