



State of Utah

Department of
Environmental Quality

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DIVISION OF RADIATION
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September 28, 2007

Mr. Harold R. Roberts
Executive Vice President – U.S. Operations
Denison Mines (USA) Corporation (DUSA)
1050 Seventeenth Street
Denver, CO 80265

Dear Mr. Roberts:

Subject: June 25, 2007 Division of Radiation Control, DUSA Cell 4A Relining Project Design Approval; August 31, 2007 Geosyntec Consultants, *GCL Liner Hydration Demonstration Letter Report* with proposed GCL Hydration Plan Modifications; September 18, 2007 DRC Request for Additional Information; September 20, 2007 Geosyntec Consultants, GCL Hydration Demonstration, Response to DRC Request for Information; September 26, 2007 DRC Email Requesting Revised Specifications; September 27, 2007 Geosyntec Consultants, Revised Technical Specifications and CQA Plan for GCL Hydration.
Revised GCL Hydration Plan Approval

We received a letter report from Geosyntec Consultants dated August 31, 2007. The original goal of the hydration project was to determine the duration needed by a flexible membrane liner (FML) covered geosynthetic clay liner (GCL) in contact with the subgrade on-site, to attain a fresh water pre-hydrated moisture content (MC) of 140%. Original estimates were that this MC would be reached between 2 and 6-weeks. This hydration did not occur during 4-week demonstration project. DUSA recognized the test pad study did not yield their desired results, and initiated a laboratory study. This study tested the specific GCL product (Cetco) to be installed, to determine the product's permeability to acid at the various MCs. The Division of Radiation Control (DRC) responded to the letter report above by letter dated September 18, 2007 requesting additional information.

On September 20, 2007 we received a response letter from Geosyntec Consultants (GSC) to this request. Via this response letter, GSC transmitted a letter dated September 19, 2007 from John M. Allen of TRI Environmental, and responded to other concerns raised by DRC. The TRI letter conveyed data from acid permeability test results. DRC's concerns over GCL hydration losses through evaporation and subgrade soil suction were also addressed.

In a telephone conversation on September 21, 2007 between Mr. Greg Corcoran of GSC and David Rupp of this office, the matter was further discussed. It was noted that 75% MC for the GCL yields the lowest acid permeability for the greatest number of pore volumes tested, i.e. 2.3×10^{-8} cm/sec., and that all the

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pre-hydrated MCs for 50, 75, 100 and 140% MC yielded acid permeability results that were fairly close in magnitude for each pore discharge volume studied.

Subsequently several email exchanges occurred, analyzing and agreeing to frequency of adding water to the subgrade, the rate of adding water to the GCL, and how to test for final GCL hydration results. DRC requested by email of September 26, 2007 that the specifications be formally revised to reflect the final criteria.

On September 27, 2007 GSC electronically transmitted revised *Technical Specifications* and *Revised Construction Quality Assurance Plan for the Construction of the Cell 4A Lining System* both covers dated September 2007 respectively. Individual pages of the specification are now labeled as 27 September 2007, and individual pages of the quality assurance plan as 07 09 27/09:56.

These documents revise the required frequency of moistening the subgrade to be the day before GCL placement (to preclude soil suction and mud generation). Fresh water is to be added to the GCL at a rate of 1/8-inch prior to being covered by flexible membrane liner (FML) within two hours (to make allowance for evaporation). The target GCL MC is 75%. However, test results showing the GCL is hydrated above 50% MC are acceptable. Samples of the GCL will be taken at a rate of one sample for every previously specified four destructive secondary FML liner seam samples. This corresponds to about 1 GCL MC being tested per acre. GCL MC will be determined by a certified laboratory. GCL samples will be taken from the opening through the secondary FML created by the seam sampling cuts.

This alternative GCL hydration plan is hereby approved. This alternative method of GCL hydration satisfies the condition four of DRC's Design Approval letter dated June 25, 2007. The remaining conditions remain in force. If you have any questions on the above, please contact Dave Rupp of this office.

Sincerely,

Dane Finerfrock
Director

DAR: dr

Cc: Greg Cocoran, P.E., Geosyntec Consulting Engineers
Britt Quinby, P.E., URS Corp.

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File: IUC 05.01.d3 Cell 4A Construction