

**From:** Dave Rupp  
**To:** Greg Corcoran  
**Date:** 9/26/2007 10:49 AM  
**Subject:** RE: DMC Cell 4A - GCL Hydration

**CC:** hroberts@denisonmines.com

Greg,

Thanks for the email. There are yet two main items to define. Will the subgrade normally be moistened one-day ahead, unless the surface is wet already from precipitation, or do you envision scratching the surface down 1-inch, and if it is "moist" there not applying any water to the subgrade?

The GCL water application rate submitted looks fine. We are no longer pursuing the water truck correlation. However, in order to verify by measurement the MC of the GCL to be  $\geq 75\%$ , samples of GCL will need to be taken from the FML covered GCL at an interval of 1 GCL sample per 2,000-feet. Removal of GCL coupons will be from the FML destructive seam samples which are specified to be taken at 500-foot intervals (Tech Specifications 2770, Section 3.03-J). Replacement of the GCL coupons will need to be by an acceptable bentonite paste or other approved method. Please review the above, and call to discuss, if necessary. The specifications will need to be formally revised and approved. Thanks. - -

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>>> Greg Corcoran <[GCorcoran@Geosyntec.com](mailto:GCorcoran@Geosyntec.com)> 9/25/2007 5:43 PM >>>

Dave,

I will be traveling tomorrow to Blanding, UT. You can reach me on my mobile phone at 619.279.6333. My flight leaves at 6:35 am.

In regards to the water truck measurement, although it would be a good check on the amount of water applied, I don't believe that this is accurate enough. Water trucks typically do not have a means to measure the water quantity in the tank, nor is it feasible to estimate the quantity in the truck based on a site gage (1/3 full vertically will not equal 1/3 of the volume based on the tank shape). Remember that with a 2 hour window, the contractor will likely be hydrating smaller areas of GCL to make sure they get covered expeditiously, which will require smaller amounts of water. This will be very difficult to track with any level of accuracy.

I think that this will just cloud the data with respect to the amount of water applied and would not advise using this method.

Regards,  
Greg

**From:** Dave Rupp [<mailto:drupp@utah.gov>]  
**Sent:** Tuesday, September 25, 2007 3:51 PM  
**To:** Greg Corcoran  
**Cc:** [hroberts@denisonmines.com](mailto:hroberts@denisonmines.com)  
**Subject:** Re: DMC Cell 4A - GCL Hydration

Greg,

Thanks. I will contact you on your figures tomorrow. I am here at 6:45 a.m. if you wish to contact me early. After internal meetings, an additional field control measure we need is for the volume of water applied from the water truck to the GCL area be averaged, as an additional check to the can depth. This volume over the area applied can then be compared to the required application rate, to verify it meets that minimum rate, and then if deficient, necessary additional water can be added. Please include this task to be documented by the field qa/qc manager. - -

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>>> Greg Corcoran <[GCorcoran@Geosyntec.com](mailto:GCorcoran@Geosyntec.com)> 9/25/2007 4:19 PM >>>

Dave,

As we discussed in our phone conversation this afternoon, Geosyntec will require the contractor to moisture condition the subgrade in an area to be covered with GCL the following day. Soil conditions will be moist to no less than 1 inch from the surface (i.e. the top one inch of subgrade soil can be dry).

During GCL hydration, Geosyntec will deploy a small can on the surface of the GCL to measure the quantity of water applied to the surface. This testing will be performed at a minimum of once per acre of GCL deployed.

Subsequent to spraying the GCL surface with water, the contractor will be required to cover the GCL with geomembrane within 2 hours. Based on pan evaporation rates for Mexican Hat, Utah (closest weather station to the site that reports pan evaporation rates), a monthly average of 9.37 inches of pan evaporation occurs in September and a monthly average of 5.52 inches of pan evaporation occurs in October. Using the September pan evaporation value and assuming that evaporation occurs during the approximately 12 hours of daylight and half as much evaporation occurs in the 12 night hours (18 hours of equal evaporation during a single day) and a total of 30 days in July, the estimated pan evaporation rate is approximately 0.017 inches per hour. Over a time period of 2 hours, a conservative estimate of water volume that could evaporate from free standing water is approximately 0.034 inches.

Calculating the amount of water necessary for the hydration of 14% moisture content GCL, with a mass per unit area of bentonite of 0.75 lbs/SF (specification requirement), to a moisture content of 75% can be performed as follows:

$(75\% - 14\%) \times 0.75 \text{ lbs/SF} / 62.4 \text{ lbs/CF water} = 0.0073 \text{ ft water} = 0.088 \text{ inches of water}$

Adding the potential evaporation of 0.034 inches in 2 hours, results in a water application rate of 0.122 inches or 1/8 inch.

The target value will be no less than 1/8 inches, or approximately 3,400 gallons per acre.

Please let us know if you need additional information.

Regards,

Greg

**Gregory T Corcoran, P.E.**  
**Principal Engineer**

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