



Department of Energy  
Office of Legacy Management

OCT 14 2009

Richard Chang  
U.S. Nuclear Regulatory Commission  
Mail Stop T8 F5  
Washington, DC 20555-0001

Subject: Rifle Disposal Cell Moisture Monitoring

Dear Mr. Chang:

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Enclosed is a work plan to place a number of neutron hydroprobes into the Rifle, Colorado, disposal cell. As we have previously discussed, we wish to determine where there may be saturated tailings in the cell and to then determine if there is any cause for concern about slope stability. This is the first step in the process of making those determinations.

Please contact me at 970-248-6073 or Tom Pauling at 970-248-6048 to let us know if you have any concerns over the work plan.

Sincerely,

Richard P. Bush  
Site Manager

Enclosure

cc w/enclosure:  
T. Pauling, DOE-LM  
File: RFL 410.10 (Roberts)

Bush\Rifle\9-8-09 Rifle Disposal Cell Moisture Monitoring.doc

2597 B 3/4 Road, Grand Junction, CO 81503	<input type="checkbox"/>	3600 Collins Ferry Road, Morgantown, WV 26505
1000 Independence Ave., S.W., Washington, DC 20585	<input type="checkbox"/>	11025 Dover St., Suite 1000, Westminster, CO 80021
10995 Hamilton-Cleves Highway, Harrison, OH 45030	<input type="checkbox"/>	955 Mound Road, Miamisburg, OH 45342
232 Energy Way, N. Las Vegas, NV 89030	<input type="checkbox"/>	

REPLY TO: Grand Junction Office

The DOE Office of Legacy Management (LM) is evaluating the water balance of the Rifle, Colorado disposal cell. The disposal cell is an engineered landfill containing 3.5 million cubic yards of tailings and other contaminated materials from two former uranium and vanadium processing sites near the city of Rifle. The cell is roughly triangular, measures approximately 3,000 feet on each side, and encompasses an area of 71 acres. The disposal cell cover consists of (1) an 18-inch thick low-permeability compacted soil layer overlying the tailings, (2) a 6-inch thick sand filter/drainage layer, (3) a 7.5 to 18-foot thick frost protection layer, (4) a second 6-inch thick filter layer, and (5) a 12-inch thick layer of rock riprap on the top and side slopes to protect against wind and water erosion.

Tailings were hauled wet to the disposal cell from the processing site and placed behind a geomembrane-lined earthen embankment at the downslope end of the cell. Tailings water continuously seeps from the mass of tailings upslope causing the water level behind the embankment to rise. LM pumps water from standpipes placed behind the embankment into an evaporation pond to prevent tailings water from topping the geomembrane and seeping from the downslope face of the embankment.

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LM is evaluating the water balance of the disposal cell in part to determine how long the standpipes will need to be pumped to prevent overtopping of the geomembrane. The water balance evaluation requires information on initial tailings moisture content, current tailings moisture content, percolation flux at the base of the disposal cell, and volume of water pumped from the standpipes. Initial tailings moisture content can be estimated from as-built construction reports, percolation flux can be calculated from saturated hydraulic conductivity values measured at the base of the cell before it was filled, and water volume pumped from the standpipes has been monitored since pumping began.

LM proposes installing neutron hydroprobe ports through the cover and into the tailings at 5-10 locations to monitor cover and tailings moisture content. Monitoring the cover will detect seasonal changes in the moisture profile as an indication of whether water is passing through the cover. Measurement of the tailings water profile will be used to refine water balance calculations. LM proposes installing hydroprobe ports by auguring through the cover and into the tailings with a geoprobe and placing an aluminum or PVC pipe in the auger hole. LM will first review as-built reports for information on the rock content of the cover protection layer; high rock content or large gravel and cobble in the protection layer would preclude use of a geoprobe auger. Locations for hydroprobe ports will be selected based on as-built information on the distribution of sands and "slimes" in the disposal cell and the geometry of the cell. Slimes are fine-grained (clay size) tailings that can hold and seep water for many years after construction.