

April 20, 2011

Mr. Thomas E. Gieck
Remediation Leader
The Dow Chemical Company
2754 Compass Drive, Suite 280
Grand Junction, CO 81506-8728

SUBJECT: U. S. NUCLEAR REGULATORY COMMISSION STAFF REVIEW OF
UMETCO MINERALS CORPORATION'S GAS HILLS RECLAMATION
PROJECT - ABOVE GRADE TAILINGS IMPOUNDMENT AND A-9
REPOSITORY EROSION PROTECTION ENHANCEMENT DESIGN
REPORT (LICENSE SUA-648, DOCKET 040-0299)

Dear Mr. Gieck:

On December 21, 2010, Umetco Minerals Corporation (Umetco) submitted the Erosion Protection Enhancement Design Report (Report) for Umetco's Gas Hills reclamation project to the U.S. Nuclear Regulatory Commission (NRC) for review and approval (Agencywide Documents Access and Management System (ADAMS) Accession number ML103640265). The NRC staff has completed our review of the Report and has identified several issues that require clarification or additional information. These issues were discussed with you on March 30, 2011 (ML110950420). A summary of that discussion and the staff's comments are enclosed.

Please review the issues in the enclosed summary and provide your responses within 30 days of the date of this letter. As some of the responses may require revisions to the Report, you may require more than 30 days to provide your responses to our comments. If you require additional time to develop the revisions, please inform the NRC staff as soon as you are aware that you will require the additional time.

In accordance with 10 CFR 2.390 of the NRC "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of ADAMS. ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html>.

T. E. Gieck

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If you have any questions concerning the NRC staff comments, please contact me at 301-415-6749 or by email at Dominick.orlando@nrc.gov

Sincerely,

/RA/

Dominick A. Orlando, Senior Project Manager
Special Projects Branch
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 040-0299

License No.: SUA-648

Enclosures: Request for Additional Information
Meeting Summary

T.E. Gieck

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DATE	4/ 19/11	4/ 20 /11	4/19 /11	4/20/11

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Rill Formation & Proposed Enhancements

1. Staff review of the proposed erosion protection enhancement indicates that Umetco intends to provide additional filter material under the 6-inch (Type C) rock layers to reduce interstitial flow velocities to acceptable levels. The staff concludes that this design is acceptable for the Type C rock layers, but may not be adequate to prevent future gully formation in the steeper portions of the riprap layers that have a D_{50} of 3 inches (Type B), where no additional filter material is proposed to be added. Based on review of information provided by Umetco and independent staff evaluations, the staff considers that the gullying observed in the Type C rock layers could occur in some steeper areas of the Type B rock layers. Although no gullying has yet been observed in the Type B riprap layers, the staff believes that additional measures need to be taken to assure stability of the layers. The staff's rationale for this conclusion is summarized below.

a. The gullies observed in the Type C rock layers may have been produced by freezing of the rock layers above the soil layer, causing a "bridging" effect where "tunnels" occurred under the rock - and above the soil layer - providing a low-resistance pathway for snowmelt runoff to produce sufficiently high velocities to erode the soil cover. After the snow had melted and the rock bridges had thawed, the rock collapsed into its current configuration.

b. The staff believes that interstitial velocities alone (in the Type C, 6-inch riprap) are not great enough to cause the significant erosion that occurred at the Umetco site. The interstitial flow velocities estimated by Umetco using NUREG-4620, of 0.5 to 1.0 ft/sec, are usually not great enough to cause such erosion. The staff also examined methods other than those found in NUREG-4620 for computing interstitial flow velocities, including "Estimation of Flow Through and Over Armored Slopes," (R. Codell, S. Abt, T. Johnson and J. Ruff, American Society of Civil Engineers, Journal of the Hydraulics Division, Volume 116, October, 1990). Using information in this article, the computed interstitial velocities for 6-inch rock on a 10 percent slope were about 0.5 ft/sec, less than normally required for significant erosion.

c. If a larger flow area than the area of the rock voids is assumed to occur, caused by freezing and "bridging" of the rock layers, a gully on a 5-10 percent slope could cause extensive erosion of the underlying soil. As shown on photos provided by Umetco, the gullies appear to be about 1-2 feet wide and 1-2 feet deep, indicating that freezing and bridging of the Type C rock layers may have produced openings with an area of at least one square foot. Concentrated flows in large openings on such steep slopes could produce flow velocities in excess of 2-3 feet per second, which would be sufficient to cause the observed significant erosion.

d. The staff considers that some soils that become saturated, freeze, and then thaw may have a significantly reduced resistance to erosion and movement in the recently-thawed condition. The staff examined information provided in references such as "Effects of Freeze-Thaw Cycling on Soil Erosion," (L. W. Gatto, et al), indicating that recently-thawed soils may have significantly reduced resistance to erosion.

Enclosure

e. Particularly large shear stresses can be produced in those areas where the Type B layer ends and the Type C layer begins. These excessive shear stresses can be produced where there is a slope change and the flow passes through critical depth.

f. Based on the 2/22/11 aerial photographs of the snow cover that were provided by Umetco, and Umetco's interpretation of the snow cover, it appears that snow drifts tend to concentrate in certain areas where the slope changes or in areas where the rock size transitions from one size to the other. Such concentrations of snow could result in concentrations of runoff due to rapid melting. Coupled with decrease in shear strength discussed in (d) above and the increase in shear stresses discussed in (e) above, this could lead to erosion problems.

Please provide additional information to resolve the concerns discussed above and provide further justification that the Type B rock layers would not be subject to the gullyng that occurred in the Type C rock layers.

Alternately, Umetco could provide an alternate bedding/filter design for the Type B rock layers. Such designs could include:

- a. Placement of additional material under the Type B rock layers
- b. Partial placement of filter material under the Type B rock layers, such as x-wide strips of filter material spaced at specific intervals.
- c. Placement of filter layers in those areas where flows transition from the Type B layers to the Type C layers.

Geotechnical Issues

Umetco discusses two proposed repair methods for the Type C erosion protection. However, it is not clear how material will be managed and staged on a daily basis (i.e., will the bedding material be stockpiled at the site or will it be transported from the quarry on an as needed basis). It is also not clear where the rock from the upstream side of the launch rock structure would be placed during repair.

Please provide a description of the manner in which rock and bedding material will be managed at the site

Financial Assurance

1. Source Materials License SUA-648, License Condition (LC) 55, in part, states the financial surety arrangement must be adequate to cover the costs, based on a third party contractor, associated with site closure activities. LC 55 also states that each revision to the surety amount must contain a basis for the cost estimates. In this regard, it is unclear whether the cost estimates are based on the costs of a third party, and the basis for the "Reclamation Construction Task[s]" is unclear. Specifically, the scope of activities associated with each task is unclear.

It appears that Umetco might be relying on first party costs. It is also unclear whether all pertinent costs related to the cover improvement are included. For example, it appears that the costs of Type-A and 30/70 bedding material and Type-C riprap are not included in the estimate:

- Section 3.1.2.1 states “an adequate quantity of Type A bedding material is stockpiled at the Rattlesnake Quarry to complete the repairs on the AGTI.”
- Section 4.4.1 states “[r]andom fill and the frost protection later of the cover shall be constructed with soils obtained from local mine spoil borrow sources, required excavations or the Rattlesnake Quarry.”
- Section 4.5 states “Type C riprap stockpiled in the [Rattlesnake] quarry, to be used in the construction of the apron channel and launch rock filters....”

While this material may already be available to Umetco at no cost, the license and 10 C.F.R. Part 40, Appendix A, Criterion 9, requires that cost estimates be based on the costs of a third party. Therefore, the third party costs of such material, as well as all other aspects of the cost estimates, should be based on third party costs.

Additionally, a description of the activities and costs associated with each “Reclamation Construction Task” should be provided. Such a description may clarify the scope of activities associated with the cover design improvements, and may clarify whether third party costs are included. For example, it is unclear whether the following activities/costs are included: (1) the costs of type-A rock, 30/70 material, and type-C riprap; (2) the costs of soil for the repair rills/gullies; (3) the costs of equipment and machinery rental/purchase; (4) labor and equipment costs for surveying, grading, tracking, rolling, compacting, etc., of the Type-A rock bedding layer and/or Type-C riprap; (5) supervision, oversight, and project management; (6) costs of materials, equipment, and labor for the construction of access bands.

Please provide additional clarification regarding the scope of activities and costs associated with each “Reclamation Construction Task,” and clarify whether all costs are based on the costs of a third party. If needed, please provide a revision to the cost estimates such that all third party costs are included.

2. Source Materials License SUA-648, License Condition 55, in part, states that “[a]long with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates....” In this regard, both the AGTI and A-9 Repository tables provide various unit costs, however, a clear basis is not provided (e.g., the source of the costs, such as a quote/contract).

With respect to units, additional clarification is requested. For example, for the task titled R&R Existing Type C Riprap” in the A-9 Repository table, units are listed as “cubic yards.” However, the table lists the unit cost at “\$10.” This suggests that “\$10” refers to

“\$10 per cubic yard,” however, the cost estimate should clearly state the units (e.g. U.S. Dollars per hour, U.S. Dollars per cubic yard, etc.).

For all tasks listed in both the AGTI and A-9 Repository tables please clarify the units (i.e. \$/cubic yard) and provide a basis for all unit costs relied on for the purposes of calculating the construction cost estimates.

3. 10 C.F.R. Part 40, Appendix A, Criterion 9, in part, states that “[i]n establishing specific surety arrangements, the licensee's cost estimates must take into account total costs that would be incurred if an independent contractor were hired to perform the decommissioning and reclamation work.” The Branch Technical Position (BTP) titled “Technical Position on Financial Assurances for Reclamation, Decommissioning and Long-Term Surveillance and Control of Uranium Recovery Facilities (October 1988)” (ML020300533) states that “[a]ll costs (unit and total) are to be estimated on the basis of independent contractor costs (include overhead and profit in unit costs or as a percentage of total).”

The cost estimates do not appear to include a sufficient basis or justification with respect to the overhead and contractor profit rates. It is also unclear which costs the overhead rate is intended to cover (i.e., vacation, sick leave, taxes).

Please provide a basis for the overhead and profit rates of 10%. If needed, please provide a revision to the cost estimates to include the full cost of overhead and profit.

4. Source Materials License SUA-648, License Condition 55, in part, states that “[a]long with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates....”

Relying upon Umetco’s submittal and the submitted site maps, the staff is unable to verify all of the quantities listed in the “Quantity” columns of the cost estimates. Specifically, it is unclear how these figures were calculated and whether a void space factor is included.

For all the figures listed in the “Quantity” column whose value is different from 1, please describe how each is calculated.

Miscellaneous Issues

1. The Report states that activities done outside the site boundary will only be done with the property owner’s permission. It is unclear what activities are contemplated outside of the Umetco property boundary.

Please clarify what activities Umetco contemplates occurring outside of the site boundary.

2. The Report states that fill and the frost protection layer will be constructed with soils from mine spoils. As mine spoils may contain residual radioactive material, it is not clear why Umetco does not contemplate re-use of the frost protection cover material for the test excavations.

Please provide the rationale for using mine spoils for the frost protection layer.

3. The staff raised several issues concerning the management and monitoring of equipment at the site, specifically:

- it is not clear why Umetco would wash a vehicle before doing a survey for residual radioactive material;
- the basis for the statement that only 10 percent of the heavy equipment leaving the site will be surveyed; and,
- the procedure whereby equipment delivered to the site in a contaminated condition is reported to the equipment owner and not the NRC.

Please provide a justification for these procedures or clarify how they will ensure that equipment entering and leaving the site will be managed appropriately.