



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION IV  
URANIUM RECOVERY FIELD OFFICE  
BOX 25325  
DENVER, COLORADO 80225

FEB 16 1990

URFO:GRK  
Docket No. WM-006  
040WM006010E

Robert M. Quillin, Director  
Colorado Department of Health  
4210 East 11th Avenue  
Denver, Colorado 80220-3716

Dear Mr. Quillin:

Our office is in receipt of the draft Preliminary Licensing Statement for Umetco's heap leach site at Maybell, Colorado. Mr. Weaver of your staff delivered it to our office, and requested that our reclamation and ground-water specialists review it for parallelisms with regulatory requirements. Accordingly, I have referred the review to members of my staff, and asked that they concentrate on ground-water compliance, erosion protection of the reclaimed tailings, and geotechnical considerations. The February 23, 1990, review period limited the depth of our comments; however, we feel that the major issues have been highlighted.

GROUND WATER

As you are aware, ground-water compliance requires a before, during, and after demonstration that the appropriate standards have been achieved. This necessitates that a valid comparison be made between background water quality, and that at the point of compliance and more distant locations. Pending the outcome of these comparisons, regulatory actions to assure compliance and adequate site closure may be necessary.

Page 3 - Liquid management is discussed concerning collection of drainage until flow from the heap leach stops. It may be helpful to determine a rate at which contributions from the heap leach will be considered insignificant.

Page 14 - The sprinkler system that is being utilized is a proven and efficient method of evaporating large amounts of water to the atmosphere. Figure 4-1 indicates that roughly 200,000 gallons/year is lost to the underlying strata from precipitation events. The sprinkler system could be designed, and perhaps enlarged, to minimize to the extent practical, any increases to this recharge rate.

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Page 26 - Considering the hazardous constituents that are commonly found in mill tailings solutions, it appears that a more complete analysis of the heap leach liquor would be in order. It is likely that nickel is present and mobile as well as radium-228. Copies of hazardous constituents commonly found in uranium recovery solutions have been supplied to your staff.

Page 73 - It appears that uranium milling and mining in locations upgradient from the heap leach site may have influenced background. It is therefore recommended that Umetco supply the State with sufficient data for the State to determine background concentrations for all hazardous constituents. The TDS readings downgradient of the heap leach confirm that loss to the underlying strata has taken place; therefore, compliance monitoring should be required.

Page 112 - Statements made in this text section indicate that leakage has taken place. Due to this, a statistical comparison is not necessary. The regulatory framework allows moving directly into a compliance monitoring program.

Page 142 Upon completion of the establishment of background concentrations (as noted above) all potential affected areas should be monitored by Umetco to determine the concentrations and extent of hazardous constituents in the uppermost aquifer.

Page 150 - Infiltration through the reclaimed cap, represents an unknown that will persist throughout the post closure period. A defensible argument should be made to determine a reasonable rate and what affect, if any, it will have on the aquifer.

#### EROSION PROTECTION

Umetco proposes to vegetate the top surfaces of the reclaimed heap. However, on page 58 the statement is made that, "Vegetation in the area is fairly sparse consisting primarily of sagebrush and other similar native shrubs." On the basis of this statement, it does not appear that assurance can be provided that vegetation will be self sustaining for a 1000 year period. Without an adequate vegetative cover, the integrity of the pile top cannot be assured.

Testing Frequency and Inspection procedures should be provided for the rock to be used as erosion protection. This will assure that the actual rock used as erosion protection is of the same high quality as the rock that was tested.

Limestone is particularly susceptible to weathering by acids. Weathering occurs from the dissolution of calcium carbonate and the formation of hard surface skins which exfoliate. Since the Maybell facility used an acid leach process, the limestone riprap may not be suitable for use in the acid environment.



We do not know the exact dimensions of the central collection ditch (Channel No. 4), but the bottom width appears to be about 15 feet (this dimension was scaled off of Figure 5-20). It is doubtful that a 15-foot ditch will have sufficient capacity to convey the PMF off of the pile top.

#### GEOTECHNICAL

There is some confusion as to the configuration of the cover on the pile top. It appears that the clay layer has been placed lower in the system even though the project description and the cover detail indicate that it is 1.5 feet below the surface. Also, the revised design depths given on page 47 do not contain enough material to total to 9.84 feet.

The design calculations for the radon attenuation appear to consider the entire cover depth of 3 meters. All material that will be considered as erosion protection should not be considered in the attenuation design. Also, the long term moisture contents that were used in models are not reasonable. In fact, they are almost out of specification. The optimum moisture of the clay material is reported to be 14.1 percent and placement specifications require that fill be within 2 percent of optimum. The long term moisture content modeled was 16 percent. It is suggested that the long term moisture content be re-evaluated and a more reasonable value be selected, remembering to apply the characteristics of the material as specified in the specifications rather than the results of testing in the proposed borrow (i.e. 30 percent passing the Number 200 sieve rather than 67 percent passing the Number 200 sieve). Without the supporting data, it was not possible to evaluate the other parameters modeled in the analysis.

A cursory review of the geology and seismology section indicates that the area is structurally complex and perhaps seismically active. However, it does not appear that there has been sufficient analysis of the maximum credible earthquake or the floating earthquake nor the resulting peak horizontal ground accelerations necessary to accurately determine the dynamic stability of the facility. The liquefaction potential of the site is questionable as it was indicated that the pile and its foundation are sandy and are at least partially saturated.

The document indicates that procedures will be required to assure that settlement of the gap area occurs prior to placement of the cover. Differential settlement of this area could significantly affect the cover's performance. Therefore, it is absolutely necessary that the procedures reflect prudent engineering judgement for this critical area.

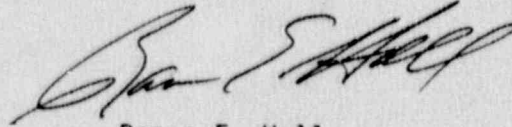
In summary, we wish to commend you and your staff on the high quality and thoroughness of the Preliminary Licensing Statement. We hope that this review

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will be helpful in your licensing efforts. If any further assistance is needed, we will be pleased to provide it, considering our time and resources limitations.

Sincerely,

A handwritten signature in dark ink, appearing to read "Ramon E. Hall". The signature is fluid and cursive, with the first name "Ramon" being more prominent than the last name "Hall".

Ramon E. Hall  
Director

cc:  
E. Kray, CO

Case Closed: 040WM006010E

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