MAY 13 1994

MEMORANDUM FOR: Joseph J. Holonich, Branch Chief
High-Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management/NMSS

FROM: Michael J. Bell, Branch Chief
Enginering and Geosciences Branch
Division of Waste Management/NMSS

SUBJECT: REVIEW OF ARCO RIPRAP CHANGES

We have completed a review of riprap changes proposed by ARCO in their letter of April 21, 1994. Based on this review, we conclude that the changes are acceptable. A technical evaluation of the proposal is enclosed.

This review was performed by Ted Johnson. If you have any questions, he may be reached at 415-6658.

/S/

Michael J. Bell, Branch Chief
Enginering and Geosciences Branch
Division of Waste Management/NMSS

Enclosure: As stated

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Riprap Size and Thickness for Top Slope

In determining riprap requirements for the top slopes, ARCO utilized the Corps of Engineers Method. This method may be used for relatively flat slopes of less than 10 percent; the Stephenson Method is used for slopes greater than 10 percent. The validity of this design approach has been verified by the NRC staff through the use of flume tests at Colorado State University. It was determined that the selection of an appropriate design procedure depends on the magnitude of the slope. The staff therefore concludes that the procedures and design approaches used by ARCO are acceptable and reflect state-of-the-art methods for designing riprap erosion protection.

The riprap on the top slope has been sized to withstand the erosive velocities resulting from an on-cell Probable Maximum Precipitaton event (PMP), as discussed above. ARCO proposes to use a 4.5-inch-thick layer of rock with a minimum D50 of 1.5 inches. No bedding layer will be provided under the rock layer. This practice will necessitate the use of extremely careful placement practices to assure that the minimum thickness of rock is provided in all areas and segreagation of rock into the finer soil particles does not occur. See below for discussion of acceptability of ARCO's proposed testing practice.

Based on staff review of the ARCO analyses and the acceptability of using design methods recommended by the NRC staff, the staff concludes that the proposed rock sizes are adequate.

Inspection of Erosion Protection

The staff has reviewed and evaluated the inspection quality control requirements proposed by ARCO for the placement of the erosion protection. ARCO has proposed a detailed program for assuring that proper placement will occur. ARCO proposes: to construct a test area for testing of in-place gradations; to provide a zero tolerance for minimum thickness; to visually inspect the placement for mounds, ridges and depressions; to conduct depth checks and surveys of the finished surface; and to monitor the volume of rock placed in a given area. Based on a review of the information provided by ARCO, the staff concludes that the proposed testing program is acceptable.