

January 12, 2000

Dr. English Pearcy, Manager  
Geohydrology and Geochemistry Element  
Center for Nuclear Waste Regulatory Analyses  
6220 Culebra Road, Bldg. 189  
San Antonio, Texas 78238-5166

SUBJECT: COMPLETION OF INTERMEDIATE MILESTONE - IM 1402.861.060 - LETTER REPORT "THE EFFECT OF CAVITY WALL IRREGULARITIES ON SEEPAGE EXCLUSION FROM HORIZONTAL CYLINDRICAL UNDERGROUND OPENINGS"

Dear Dr. Pearcy:

The U.S. Nuclear Regulatory Commission staff has completed its review of the subject report. It was sent on December 10th, 1999, well in advance of the January 7th due date. This product is programmatically and technically acceptable for publication and will be placed in our public document room. The report provides an excellent review of factors that affect seepage of groundwater into underground drifts. The authors develop a quasi-linear analytical approach to analyze the effects of tunnel wall irregularity on seepage. They conclude that irregularities near the top of a tunnel can strongly affect the magnitude of unsaturated flux that is needed to cause dripping. Dripping can occur at much lower fluxes than previously estimated.

The amount of seepage that contacts waste packages is among the most important factors that influence waste package lifetime and long-term isolation of high-level waste in a repository. The Center report directly supports resolution of the subissue on deep percolation under the key technical issue "Unsaturated and Saturated Flow Under Isothermal Conditions." The analytical approach that is described can help us independently interpret seepage data being collected in the Exploratory Studies Facility and East-West Drift. The report relates to the following sections of the Yucca Mountain Review Plan: 3.2.1.3.3 (Quantity and Chemistry of Water Contacting the Waste Packages and Waste Forms); 3.2.1.3.5 (Spatial and Temporal Distribution of Flow); and 3.2.1.3.6 (Flow Paths in the Unsaturated Zone).

If you have any questions, please contact me at (301) 415-6615.

Sincerely,  
[Original signed by:]  
Neil Coleman, Program Element Manager  
Division of Waste Management  
Office of Nuclear Material Safety and Safeguards

cc: J. Linehan  
B. Meehan  
B. Sagar, CNWRA

Ticket: C-99-166

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