

January 3, 2002

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

SUBJECT: COMPLETION OF INTERMEDIATE MILESTONE - IM 1402.861.230 - JOURNAL PAPER TITLED "IN SITU PERMEABILITY MEASUREMENT"

Dear Dr. Percy:

The U.S. Nuclear Regulatory Commission staff has completed its review of the subject paper, which was sent to us on December 7, 2001, more than two months early. I find the product to be technically and programmatically acceptable. This paper describes a new mini-permeameter probe that is used to measure permeability within small diameter boreholes. Mini-permeameters have been used for years to measure permeability on rock outcrops, but the field application had numerous problems. It was hard to obtain a proper seal between the instrument and the rough rock surface, and the permeability measured at the surface is often influenced by weathering processes that have altered the rock properties. This new instrument solves these problems by taking measurements in small high-quality holes drilled into outcrops with a masonry drill. The Center report provides a substantial scientific advance in the theory and application of mini-permeameter measurements.

I believe it would be very useful to obtain some measurements of matrix permeability at Yucca Mountain, particularly in units like the Paintbrush tuff nonwelded and in the Calico Hills tuff. Also, the probe could be used to show the extent of construction disturbance in tunnel walls, by collecting data in boreholes that are progressively deepened. Results could be compared to the unsaturated zone permeability data sets provided to us by the Department of Energy.

The Center paper report relates to three of our integrated subissues, which also constitute sections of the draft Yucca Mountain Review Plan. These are: 4.2.1.3.3 (Quantity and Chemistry of Water Contacting Waste Packages and Waste Forms); 4.2.1.3.5 (Climate and Infiltration); and 4.2.1.3.6 (Flow Paths in the Unsaturated Zone). If you have any questions, please call me at (301) 415-6615.

Sincerely,

/RA/
Neil Coleman, Program Element Manager
Division of Waste Management
Office of Nuclear Material Safety and Safeguards

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

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