

February 23, 1999

Dr. English Percy, Element 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 1402-861-990 - LETTER
REPORT: "TIME SCALES FOR DISSOLUTION OF CALCITE FRACTURE
FILLINGS AND IMPLICATIONS FOR SATURATED ZONE RADIONUCLIDE
TRANSPORT AT YUCCA MOUNTAIN, NEVADA"

Dear Dr. Percy:

The U.S. Nuclear Regulatory Commission staff has completed its review of the subject document. The letter report/journal paper was sent by cover letter dated February 3, 1999. This product is programmatically and technically acceptable. The report investigates a phenomenon related to matrix diffusion in tuffs at Yucca Mountain, Nevada. Calcite minerals tend to persist in the saturated zone despite the fact that groundwaters tend to be undersaturated with respect to calcite. The results of this excellent work will aid our continuing review of U.S. Department of Energy work related to groundwater chemistry and matrix diffusion. The paper will be an excellent addition to the publications of the Materials Research Society, to which it is being sent.

The report's abstract notes that the effective spacing between flowing fractures "may be large enough to diminish the overall benefit of matrix diffusion to proposed high-level waste repository performance." But as noted later in the paper, "For sorbing solutes....even a limited amount of matrix diffusion can provide a vast increase in the mineral surface area available for radionuclide sorption." Although the paper focuses solely on fractured tuff aquifers, there is also great potential for matrix diffusion to occur in tuff clasts contained within the extensive alluvial deposits south of Yucca Mountain.

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

Sincerely,
Original Signed By
Neil Coleman, Program Element Manager
Engineering and Geosciences Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

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

Ticket: C-99-014

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