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A Division of Southwest Research Institute
6220 Culebra Road • San Antonio, Texas, U.S.A. 78228-5166
(210) 522-5160 • Fax (210) 522-5155

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U.S. Nuclear Regulatory Commission
ATTN: Mrs. Deborah A. DeMarco
Two White Flint North
11545 Rockville Pike
Mail Stop T8A23
Washington, DC 20555

Subject: Programmatic Review of Abstract

Dear Mrs. DeMarco:

The enclosed abstract is being submitted for programmatic review. This abstract will be submitted for presentation at the Geological Society of America, to be held in November 4–7, 2000, in Reno, Nevada. The title of this abstract is:

> "Calibrating a 2-D Reactive Transport Model of Yucca Mountain, NV, to Ambient Conditions: Implications for Uncertainty in Thermally Perturbed Model Simulations" by Lauren Browning, Debra Hughson, and William Murphy

This abstract is a product of the CNWRA and does not necessarily reflect the view(s) or regulatory position of the NRC.

Please advise me of the results of your programmatic review. Your cooperation in this matter is appreciated.

Sincerely,

Budhi Sagar
Technical Director

BS: ar
Enclosure

cc:				
	B. Meehan	D. Brooks	N. Coleman	T. Nagy (SwRI Contracts)
	E. Whitt	S. Wastler	K. Stablein	
	J. Linehan	T. Essig	W. Patrick	
	J. Greeves	J. Bradbury	CNWRA Directors	
	W. Reamer	B. Leslie	CNWRA Element Mgrs	

Washington Office • Twinbrook Metro Plaza #210
12300 Twinbrook Parkway • Rockville, Maryland 20852-1606

Calibrating a 2-D Reactive Transport Model of Yucca Mountain, NV, to Ambient Conditions: Implications for Uncertainty in Thermally Perturbed Model Simulations. Lauren Browning, Debra Hughson, and William M. Murphy
Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, 6220 Culebra Rd., San Antonio, TX 78238-5166

Modeling a wide range of subsurface problems, such as evolution of sedimentary basins and disposal of nuclear waste, necessitates full coupling of hydrological, thermal, and geochemical processes. However, the multitude of additional parameters such models require exacerbates the familiar difficulty of estimating spatially heterogeneous properties inherent in groundwater flow and transport models. Direct application of laboratory determined parameters to complex thermal-hydrological-geochemical flow and reactive transport models often produces implausible results, such as excessive rates of mineral dissolution. Model results and physical observations can be reconciled via an inverse approach to estimate effective parameters that may bear scant resemblance to laboratory scale counterparts. We attempted, with limited success, to calibrate a 2-D flow and reactive transport model of Yucca Mountain, NV, with geochemical data for ambient conditions. The calibrated model results were then used to simulate the unsaturated water, gas, and mineral chemistry during a thermal event caused by the potential emplacement of high-level radioactive waste. Sensitivity analyses and geochemical constraints were used to identify and evaluate key parameter uncertainties in the coupled hydrological-chemical models. Model calibration approaches for resolving parameter and model uncertainties are proposed as alternatives to collecting additional data.

This work is funded by the the Nuclear Regulatory Commission (NRC) , but is an independent product of the CNWRA and does not necessarily reflect the views or regulatory position of the NRC.