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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

September 29, 1999
Contract No. NRC-02-97-009
Account No. 20-1402-661

U.S. Nuclear Regulatory Commission
ATTN: Mr. Jeffrey Pohle
Division of Waste Management
TWFN, Mail Stop 7-D13
11545 Rockville Pike
Washington, DC 20555

Subject: Thermal Effects on Flow (TEF) KTI Intermediate Milestone No. 1402-661-940: Thermal-Hydrologic Laboratory Testing—Journal Paper or Presentation

Dear Mr. Pohle:

Enclosed please find the paper titled "Thermally Driven Reflux in Fractured Porous Media." This paper is an Intermediate Milestone and describes results of an investigation of water refluxing into a heated emplacement drift. The paper includes results from two laboratory-scale experiments conducted at the Center for Nuclear Waste Regulatory Analyses (CNWRA) and analyses performed with the MULTIFLO code. The investigation concludes that water can reflux into a heated cavity even when the rock surrounding the cavity is above boiling temperature. The study also found that the refluxing mechanism can be represented using analytical and numerical models. Results from this study will provide Nuclear Regulatory Commission/CNWRA quantitative tools to assess the U.S. Department of Energy models of water flow near heated emplacement drifts. Mechanisms associated with episodic dripping into underground cavities were not investigated. These mechanisms will need to be understood to adequately describe the flux and timing of waste package exposure to groundwater and water vapor. This technical document, which will be submitted as a journal article to Water Resources Research, fulfills the requirements for the subject milestone, which is due September 30, 1999.

If you have any questions on this report, please contact me at (210) 522-5151 or Ronald T. Green at (210) 522-5305.

Sincerely yours,



Asadul H. Chowdhury, Manager
Mining, Geotechnical, and
Facility Engineering

AHC/jw
Enclosure

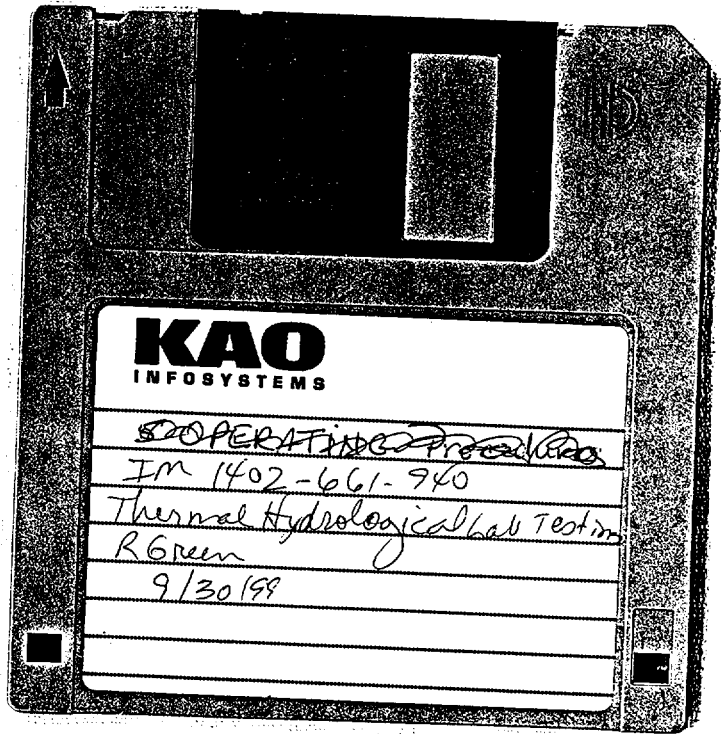
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cc: J. Greeves P. Justus N. Stablein B. Stiltenpole (2) R. Green
J. Holonich K. McConnell D. Brooks W. Patrick D. Hughson
D. DeMarco T. McCartin B. Leslie CNWRA Directors J. Prikryl
W. Reamer M. Nataraja B. Meehan CNWRA Element Managers T. Nagy (SwRI Contracts)
I. Linehan (w/o enclosure)



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

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IM 1402-661-940

Thermal Hydrological Lab Testing

R Green

9/30/99