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March 8, 1988

009/1.5/WWL.007
RS-NMS-85-009
Communication No. 245

U.S. Nuclear Regulatory Commission
Division of High-Level Waste Management
Technical Review Branch
MS 623-SS
Washington, DC 20555

Attention: Mr. Jeff Pohle, Project Officer
Technical Assistance in Hydrogeology - Project B (RS-NMS-85-009)

Re: Subtask 1.5 Final Technical Report #8 - The Use of Environmental Tracers for the Estimation of Recharge at Yucca Mountain: A Summary

Dear Mr. Pohle:

Attached please find the final report for Subtask 1.5 Technical Report #8, entitled "The Use of Environmental Tracers for the Estimationof Recharge at Yucca Mountain: a Summary." The final report addresses all of the NRC Staff's comments on the draft version of this document, which was submitted as NWC Communication No. 217.

The document provides a critical literature review of the potential to use environmental isotopes to address questions of net infiltration and, ultimately, the flux of water passing through the unsaturated, low permeability, dual porosity rocks of the repository horizon at Yucca Mountain. The report addresses the uses of radioactive (primarily tritium, chlorine-36, and carbon-14) and stable (primarily carbon, hydrogen and oxygen) isotopes. Among the radioactive isotopes, tritium and chlorine-36 studies are considered to offer the best opportunities opportunities for assessing the dual-porosity flow system, and the deuterium/oxygen-18 systematics may provide substantial insight, particularly into issues associated with two-phase flow. Taken together, it is considered that the use of environmental isotopes may provide very useful methods for evaluating conceptual models of fluid flow in the unsaturated fractured rocks of Yucca Mountain.

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The WWL report has received a managerial and technical review by M. Logsdon (NWC), and the report was prepared under WWL's QA procedures, consistent with the NWC QA manual. If you have any questions about this document, please contact me immediately.

Respectfully submitted,
NUCLEAR WASTE CONSULTANTS, INC.

Mark J. Logsdon

Mark J. Logsdon, Project Manager

Att: Subtask 1.6 Technical Report #8 - The Use of EnvironmentalTracers for the Estimation of Recharge at Yucca Mountain: A Summary

cc: US NRC - Director, NMSS (ATTN PSB)
HLWM(ATTN Division Director)
Edna Knox, Contract Administrator
HLTR (ATTN Branch Chief)
D. Chery, HLTR
W. Ford, HLTR

Water, Waste & Land, Inc.
CONSULTING ENGINEERS & SCIENTISTS

Mail dtd 2/18/88

February 22, 1988 WWL #4001

Mr. Mark Logsdon
Nuclear Waste Consultants, Inc.
155 South Madison Street, Suite 302
Denver, Colorado 80209

Dear Mark:

Enclosed is the final report for "Technical Report #8, The Use of Environmental Tracers for the Estimation of Recharge at Yucca Mountain: A Summary." If you have any questions or comments, please do not hesitate to call.

Sincerely,

WATER, WASTE & LAND, INC.

Tom L. Sniff
Project Engineer

TLS:dml
Enclosure