

WILLIAMS & ASSOCIATES, INC.

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Hydrogeology • ~~WATER~~ CENTER Resources Waste Management • Geological Engineering • Mine Hydrology

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D1020 PDR-1

LPDR WM-10 (2)
WM-11 (2)
WM-16 (2)

May 20, 1987
Contract No. NRC-02-85-008
Fin No. D-1020
Communication No. 128

Mr. Jeff Pohle
Division of Waste Management
Mail Stop 623-SS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: NTS

Dear Jeff:

Bill Ford requested that I provide him with full citations of the references cited in Communication No. 114. A copy of Communication No. 114 with references cited attached is enclosed. If you need additional information, please call.

Sincerely,

James Osiensky
James Osiensky

JO:s1

enclosure

WM-RES
WM Record File
D1020
W+A

WM Project 10, 11, 16
Docket No. _____
PDR
x LPDR (B, N, S)

Distribution:
Pohle _____ Ford _____

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WM Project: WM-10, 11, 16
PDR w/encl
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WM Record File: D1020
LPDR w/encl

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WILLIAMS & ASSOCIATES, INC.

P.O. Box 48, Viola, Idaho 83872

(208) 883-0153 (208) 875-0147

Hydrogeology • Mineral Resources Waste Management • Geological Engineering • Mine Hydrology

February 26, 1987

Contract No. NRC-02-85-008

Fin No. D-1020

Communication No. 114

Mr. Jeff Pohle
Division of Waste Management
Mail Stop 623-SS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: NTS

Dear Jeff:

This letter constitutes the semiannual update of our conceptual model for NNWSI by Williams and Associates as required by the SOW, Subtask 1.3, for Contract No. NRC-02-85-008. Some of the reports we have reviewed during the past six months tend to substantiate or at least agree with our conceptual model of August 28. To refresh your memory, our conceptual model of that date suggested that heterogeneity of the matrix hydrogeologic properties may control the apparent flux and the distribution of moisture content measured in the field. The paper by Wang and Narasimhan (1984) concerning the use of the TRUST model to describe flow in the fractures under unsaturated conditions shows that flow may occur from one block to another across the fractures under unsaturated conditions. If the blocks separated by fractures had varying hydraulic conductivity then flow could occur laterally from blocks of smaller hydraulic conductivity to blocks of larger hydraulic conductivity. Such a conceptual model does not require the lateral deflection (capillary barriers) of flow over large distances to fault zones. Use of the average hydraulic conductivity for the entire formation and assuming uniform downward flux could result in errors.

The Topics of Investigation by Williams and Associates, Inc. (dated 1/19/87) would investigate the effect of heterogeneity on the lateral uniformity of flow. The paper by Klavetter and Peters (1986) assumes that pressure is constant at a constant elevation. If our conceptual model is correct this assumption would not be completely valid, because our conceptual model would allow horizontal pressure gradients over relatively short distances between materials of varying conductivity. The report by Sinnock, Lin, Tierney and others (1986) assumes that the flow is uniformly distributed but they use varying values of hydraulic

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conductivity in various realizations. In summary, we feel that nothing appears in the reports that we have reviewed to date which would contradict our conceptual model of August 28, although there are some assumptions in these reports which may not be valid according to our conceptual model. No new conceptual models of the saturated zone have been developed since our last conceptual model update (August, 1986).

Sincerely,

Roy E. Williams, et

Roy E. Williams

REW:sl

REFERENCES CITED

- Klavetter, E.A., and Peters, R.R., July 1986, Estimation of Hydrologic Properties of An Unsaturated, Fractured Rock Mass. Sandia National Laboratories, Albuquerque, NM, SAND84-2642, 55 p.
- Sinnock, Scott, Lin, Y.T., Tierney, M.S., and others, 1986, Preliminary Estimates of Groundwater Travel Time and Radionuclide Transport at the Yucca Mountain Repository Site. Sandia National Laboratories, Albuquerque, NM, SAND85-2701.
- Wang, J.S.Y., and Narasimhan, T.N., 1984, Hydrologic Mechanisms Governing Fluid Flow in Partially Saturated, Fractured, Porous Tuff at Yucca Mountain: Lawrence Berkeley Laboratory, Berkeley, California, SAND84-7202, 47 p.

FROM Williams & Associates		DATE OF DOCUMENT 5/7/87	DATE RECEIVED 5/18/87	NO WM-87251
		LTR XX	MEMO	LETTER OTHER
TO JPohle		ORIG.	CC XX	OTHER
		ACTION NECESSARY <input checked="" type="checkbox"/>	CONCURRENCE <input type="checkbox"/>	DATE ANSWERED BY 6/1
		NO ACTION NECESSARY <input type="checkbox"/>	COMMENT <input type="checkbox"/>	
CLASSIF	POST OFFICE	REG. NO.	FILE CODE: 426.1	
DESCRIPTION (Must Be Unclassified) Apr 87 Report for FIN D1020		REFERRED TO	DATE	RECEIVED BY
		RBallard HLTR	5/18	<i>RB</i>
		JPohle		5/19
ENCLOSURES				
Ticket closed out by letter to Dr. Roy E. Williams on 87/06/01. from Jeff Pohle.				
REMARKS JW <i>action logged in by eg 5/18</i>				