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

WM-RES

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Pohle

(Return to WM, 623-SS)

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 SDW, 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, Jr.

Roy E. Williams

REW:s1