UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 07, 1998

Dr. Stephan Brocoum
Assistant Manager for Licensing
U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
P. O. Box 30307
North Las Vegas, Nevada 89036-0307

SUBJECT: ISSUE RESOLUTION STATUS REPORT (KEY TECHNICAL ISSUE: UNSATURATED AND SATURATED FLOW UNDER ISOTHERMAL CONDITIONS; REVISION 1)

Dear Dr. Brocoum:

As you know, the staff of the U.S. Nuclear Regulatory Commission (NRC) has developed a program for early resolution of technical issues at the staff level. The previous version (November 7, 1997) of this Issue Resolution Status Report (IRSR) on this Key Technical Issue (KTI) addressed present-day shallow infiltration. You'll also recall that our pilot IRSR (June 30, 1997) covered the subissues of climate change and hydrologic effects of such change. This revision covers the remaining subissues for Unsaturated and Saturated Flow Under Isothermal Conditions (USFIC). These are deep groundwater percolation; ambient flow in the saturated zone, including dilution; and matrix diffusion. The IRSR update is provided in two volumes, with attachments comprising the second volume.

Consistent with NRC regulations on prelicensing consultations and a 1992 agreement with the U.S. Department of Energy (DOE), staff-level issue resolution can be achieved during the prelicensing consultation period; however, such resolution at the staff level would not preclude the issue being raised and considered during the licensing proceedings. Issue resolution at the staff level during prelicensing is achieved when the staff has no further questions or comments (i.e., open items) at a point in time, regarding how DOE's program is addressing an issue. There may be some cases where resolution at the staff level is limited to documenting a common understanding about differences in NRC and DOE points of view. Further, pertinent additional information could raise new questions about a previously resolved issue.

Sections 4 and 5 of the enclosed IRSR summarize an independent, pre-licensing review and analysis of deep percolation, saturated zone issues, and matrix diffusion. Subissues 1, 2, and 3 remain resolved per Rev. 0 of this IRSR. Some aspects of Subissues 4 and 5 can now be resolved (see Section 5 of enclosed IRSR). Subissue 4 addresses the deep percolation of groundwater. The staff have no questions at this time about DOE's expert elicitation for the unsaturated zone. Subissue 5 deals with ambient flow conditions and dilution mechanisms in the saturated zone. The staff have no questions at this time about DOE's expert elicitation for the saturated zone or about DOE's treatment of wellbore dilution (no credit is currently being taken). Subissue 6 (matrix diffusion) and other aspects of subissues 4 and 5 remain to be resolved. Acceptance criteria have now been developed for all of the USFIC subissues, and these criteria will be used to evaluate DOE's Viability Assessment.

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As discussed in Section 5, to facilitate the resolution of subissues 4, 5, and 6 the staff have identified several data needs and have made appropriate recommendations for DOE's consideration. For example, the characterization of flow paths in saturated alluvium will be needed if a 20-km receptor distance will be required by the U.S. Environmental Protection Agency in a high-level waste environmental standard. The staff is aware that DOE plans to fund a Nye County drilling and testing program to collect hydrologic data for alluvium and the deeper Paleozoic carbonate aquifer. A receptor distance of less than 20 km would enhance the need for a clearer demonstration of matrix diffusion in tuffs because little or no saturated alluvium may exist along flowpaths. For this IRSR update the staff have presumed a 20-km receptor distance.

As discussed in Section 5 of the IRSR, all of the former USFIC open items under this KTI have been resolved at the staff level. In some cases, technical concerns remain, but these are now encompassed by the acceptance criteria for the various subissues. These acceptance criteria will be used to evaluate future DOE submittals (e.g., Viability Assessment). It should be noted that all of the information and analyses needed to demonstrate the methodology have not been qualified under DOE's Quality Assurance Program. It is necessary that appropriate data and analyses will be qualified before NRC's receipt of a DOE license application.

Finally, the enclosure should be viewed as a status report that provides the staff's most current views on the various subissues under this KTI. The staff intends to further update this report in FY99 to reflect progress on all of the subissues. We welcome a dialogue on this subject with DOE, the U.S. Nuclear Waste Technical Review Board, State of Nevada, and other interested parties. If you have any questions about this letter, please contact Neil Coleman of my staff at (301) 415-6615, or via internet mail service (nmc@nrc.gov).

Sincerely,

Original Signed By
Michael J. Bell, Chief
Engineering and Geosciences Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated
cc: See attached list

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and Safeguards

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cc: See attached list

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