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U.S. Nuclear Regulatory Commission
ATTN: Mr. James Andersen
Division of Waste Management
TWFN, Mail Stop 7-D11
Washington, DC 20555

SUBJECT: Review of DOE Response to Key Technical Issue Technical Exchange Agreement USFIC.6.01

REFERENCE: Summary Highlights of NRC and DOE Technical Exchange and Management Meeting on Unsaturated and Saturated Flow Under Isothermal Conditions, October 31–November 2, 2000, in Albuquerque, New Mexico

Dear Mr. Andersen:

This letter is to inform you that we have reviewed information provided by the DOE in response to agreement USFIC.6.01, which was documented at the NRC and DOE Technical Exchange and Management Meeting on Unsaturated and Saturated Flow Under Isothermal Conditions, October 31–November 2, 2000, in Albuquerque, New Mexico. Specifically, DOE agreed to provide the sensitivity analysis on matrix diffusion in the unsaturated zone in the Total System Performance Assessment–Site Recommendation, Revision 0, and to provide sensitivity analysis on matrix diffusion in the saturated zone in Total System Performance Assessment–Site Recommendation, Revision1.

The matrix diffusion sensitivity analyses were requested as a means to develop risk insight regarding the importance of matrix diffusion in total system performance assessment analyses. As agreed, DOE provided the requested sensitivity analysis for matrix diffusion in the unsaturated zone in the Total System Performance Assessment–Site Recommendation document, Revision 0. Sensitivity analyses for matrix diffusion in the saturated zone were documented by DOE in the Supplemental Science and Performance Assessment, Volume 2, rather than in a revised Total System Performance Assessment–Site Recommendation as originally agreed. Results of the sensitivity analyses for the saturated zone show nearly negligible differences in total system performance assessment dose calculations between simulations with no matrix diffusion and simulations with enhanced matrix diffusion (e.g., in Supplemental Science and Performance Assessment, Volume 2, compare Figures 3.2.10-2a-b to Figure 3.2.10-3a-b). The low risk-significance of matrix diffusion in the saturated zone is a result of reasonably modest assumptions regarding diffusion rates and flowing interval spacing. Results of the sensitivity analyses for matrix diffusion in the unsaturated zone show that a significant reduction in the simulated dose rate history occurs when credit is taken for matrix diffusion (e.g., see Total System Performance Assessment–Site Recommendation, Figure 5.2-14). It is not entirely clear

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why the risk significance of matrix diffusion in the unsaturated zone is moderate to high compared to the relatively low risk significance of matrix diffusion in the saturated zone. This ambiguity should be clarified, however, when DOE provides the additional information requested in key technical issue technical agreement TSPAI.3.29. Additionally, as indicated in key technical issue technical agreement USFIC.6.03, DOE has agreed to obtain further validation of the conceptual model for matrix diffusion in the unsaturated zone through completion of tracer transport testing in the Alcove 8-Niche 3 test.

We conclude that information provided by DOE per agreement USFIC 6.01 provides adequate risk insight regarding the importance of matrix diffusion in the unsaturated zone and saturated zone. We were recently informed by NRC staff, however, that in a letter dated July 11, 2001, DOE stated that the saturated zone portion of this agreement will be formally documented in a revision to the Input and Results of the Base Case SZ Flow and Transport Model Analysis and Model Report, which has not yet been received. It is not clear whether the DOE approach to including matrix diffusion in the saturated zone will differ in that document. NRC staff may therefore wish to continue to list this agreement as partly received.

If you have any questions, please contact me at (210) 522-5249 or English Pearcy at (210) 522-5540.

Sincerely yours,

James Winterle

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