

May 17, 2002

Joseph D. Ziegler, Acting Assistant Manager
Office of Licensing and Regulatory Compliance
U.S. Department of Energy
Yucca Mountain Site Characterization Office
P.O. Box 364629
North Las Vegas, NV 89036-8629

SUBJECT: EVOLUTION OF THE NEAR-FIELD ENVIRONMENT KEY TECHNICAL ISSUE
AGREEMENTS

Dear Mr. Ziegler:

During a Technical Exchange and Management Meeting held on January 9-12, 2001, the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Department of Energy (DOE) reached agreement on a number of issues within the Evolution of the Near-Field Environment (ENFE) Key Technical Issue (KTI). By letters dated March 2, 2001, and January 31, 2002, DOE provided information pertaining to ENFE Agreements 2.12 and 3.02. The NRC staff has reviewed this information as it relates to the agreements and the results of the staff's review are enclosed.

In summary, the staff believes that the data files and the documentation and analysis of the column crush tuff experiments meet the intent of the agreements and therefore consider ENFE Agreements 2.12 and 3.02 "complete." If you have any questions regarding this letter, please contact Mr. James Andersen of my staff. He can be reached at (301) 415-5717.

Sincerely,
/RA/

Janet Schlueter, Chief
High-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated
cc: See attached distribution list

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DOCUMENT NAME: S\DWMLHLWB\JWA\ENFE Agreement Letter-2.WPD

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Letter to J. Ziegler from J. Schlueter dated: May 17, 2002

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V. Miller, Fort Independence Indian Tribe

A. Bacock, Big Pine Paiute Tribe of
the Owens Valley

R. Quintero, Inter-Tribal Council of Nevada
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M. Bengochia, Bishop Paiute Indian Tribe

J. Egan, Egan & Associates, PLLC

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D. Crawford, Inter-Tribal Council of Nevada

H. Blackeye, Jr., Duckwater Shoshone Tribe

D. Eddy, Jr. Colorado River Indian Tribes

J. Leeds, Las Vegas Indian Center

G. Runkle, DOE, Washington, DC

NRC Review of DOE Documents Pertaining to Key Technical Issue Agreements

The U.S. Nuclear Regulatory Commission (NRC) goal of issue resolution during this interim pre-licensing period is to assure that the U.S. Department of Energy (DOE) has assembled enough information on a given issue for NRC to accept a license application for review. Resolution by the NRC staff during pre-licensing does not prevent anyone from raising any issue for NRC consideration during the licensing proceedings. Also, and just as importantly, resolution by the NRC staff during pre-licensing does not prejudge what the NRC staff evaluation of that issue will be after it's licensing review. Issues are resolved by the NRC staff during pre-licensing when the staff has no further questions or comments about how DOE is addressing an issue. Pertinent new information could raise new questions or comments on a previously resolved issue.

This enclosure addresses two NRC/DOE agreements made during the Evolution of the Near-Field Environment (ENFE) (see NRC letter dated January 26, 2001, which summarized the meeting) Technical Exchange and Management Meeting. By letters dated March 2, 2001, and January 31, 2002, DOE provided information pertaining to ENFE Agreements 2.12 and 3.02. The information submitted and associated Key Technical Issue (KTI) agreements are discussed below:

1) Evolution of the Near-Field Environment Agreement 2.12

Wording of the Agreement: Provide the documentation and analysis of the column crush tuff experiments. The DOE will provide documentation of the results obtained from the crushed tuff hydrothermal column experiment, and of post-test analysis, in new reports specific to the column test, expected to be available by September 2001.

NRC Review: By letter dated January 31, 2002, DOE provided the "Engineered Barrier Systems Thermal-Hydraulic-Chemical Column Test Report." The NRC has reviewed the report and believes it satisfies the intent of the agreement.

The NRC staff has the following general comments regarding the report. One stated objective of the report is to "generate data for validating THC [thermal-hydrological-chemical] predictive models that will support the EBS [Engineered Barrier System] Degradation, Flow, and Transport PMR [Process Model Report], Rev. 01." The column test experiment appears to be a satisfactory analog for evaluating the general effects of THC processes in the reflux zone above a heated repository. However, the experiment was not designed to evaluate changes in flow pathways or ground water composition beyond the reflux zone. Consequently, water composition and permeability and measurements generated by these experiments are not directly applicable to waste package/drip shield surface conditions or seepage flux. Direct comparison between the column test experimental results and THC model predictions of repository performance would require additional evaluation of time/distance scaling issues and consideration of reactive transport processes along more realistic flow pathways. To address these concerns, the NRC staff will review how DOE has used the data to calibrate or validate models. The expectation of the NRC staff for DOE calibration, validation, and assessment of uncertainty from experiments, such as these column tests, is documented in ENFE Agreement 2.17 (and ENFE Agreements 2.05, 2.09, and 2.15, which are closely related to ENFE Agreement 2.17). Results of the column test experiments reveal general trends in water composition, permeability, and mineral behavior around the reflux zone environment that should be useful for DOE model validation purposes.

Enclosure

Finally, Total System Performance Assessment (TSPA) Agreement 2.02, Comment 55, was to be addressed by ENFE Agreement 2.12, as well as ENFE Agreements 2.05, 2.08, and 2.11. Comment 55 pertained to the issue of reaction kinetics in the engineered barrier system (DOE Feature, Event, and Process # 2.1.09.07.00). As discussed with DOE on May 15, 2002, it is the NRC staff's understanding that DOE will address Concern 55 in either its response to ENFE Agreements 2.05, 2.08, or 2.11. The NRC staff finds this approach acceptable.

Additional Information Needed: None

Status of Agreement: ENFE Agreement 2.12 is "Complete."

2) Evolution of the Near-Field Environment Agreement 3.02

Wording of the Agreement: Provide the thermodynamic database and the report associated with the database. The DOE will provide the thermodynamic data base [Input Transmittal for Thermodynamic Data Input Files for Geochemical Calculations (MO0009THERMODYN.001)] and Data Qualification Report for the Thermodynamic Data File, DATA0.ympR0 for Geochemical Code EQ 3/6 (TDR-EBS-MD-000012) to the NRC in February 2001.

NRC Review: By letters dated March 2, 2001, and January 31, 2002, DOE provided the thermodynamic database [Thermodynamic Data Input Files for Geochemical Calculations (DTN MO0009THERMODYN.001)] and the Data Qualification Report for the Thermodynamic Data File, Data0.ymp.R0 for Geochemical Code EQ3/6 (TDR-EBS-MD-000012 REV 00). The NRC has reviewed the information, including supporting material (Appendix J) provided on January 31, 2002, and it satisfies the intent of the agreement.

Additional Information Needed: None

Status of Agreement: ENFE Agreement 3.02 is "Complete."