

October 29, 2003

Mr. Joseph Ziegler, Director
Office of License Application and Strategy
U.S. Department of Energy
Office of Repository Development
PO Box 364629 MS 523
North Las Vegas, NV 89036-8629

SUBJECT: PRE-LICENSING EVALUATION OF CONTAINER LIFE AND SOURCE TERM (CLST) 5.04, EVOLUTION OF THE NEAR-FIELD ENVIRONMENT (ENFE) 5.03, AND RADIONUCLIDE TRANSPORT (RT) 4.03 KEY TECHNICAL ISSUE AGREEMENTS

Dear Mr. Ziegler:

The U.S. Nuclear Regulatory Commission (NRC) has completed its evaluation of the U.S. Department Of Energy's (DOE's) July 14, 2003, submittal on Key Technical Issue (KTI) Agreements, Container Life and Source Term (CLST) 5.04, Evolution of the Near-Field Environment (ENFE) 5.03, and Radionuclide Transport (RT) 4.03. NRC found that the information provided in support of the above agreements did not satisfy the intent of the original agreements. As a result, NRC considers the status of the agreements as remaining "Partly Received". NRC also identified the need for additional information as discussed within the enclosed NRC evaluation of the agreement submittal.

In the enclosure to the DOE letter, DOE provided a list and schedule of Model (Validation) Reports supporting the Disposal Criticality Analysis Methodology Topical Report (Topical Report). NRC found that the information provided by DOE does not satisfy the agreements for the following reasons:

- The validation reports are identified as providing the details of the criticality analysis methodology and supporting the Topical Report (expected Oct. 2003); however, only 5 of the 17 validation reports have been provided;
- It is unclear to the NRC if DOE will or will not develop external criticality model reports as a result of external events being screened out of the total system performance assessment. If risk information will be provided in lieu of the information identified by the agreement it should be provided prior to the license application (LA) submittal in order to address these agreements; and
- The list and schedule does not necessarily indicate that the validation reports will be provided prior to LA as stated in the agreement.

If DOE intends to provide risk information in lieu of information identified in an agreement, DOE should: (i) address the combined effects of uncertainties; (ii) provide transparent and traceable

J. Ziegler

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documentation that allows the results to be independently verified; and (iii) provide information pertaining to the variability in the results.

Consistent with the agreements covered by this letter, such risk information should be provided prior to the license application. If you have any questions regarding this matter, please contact Mr. Gregory Hatchett at 301-415-3315 or by email to GXH@nrc.gov.

Sincerely,

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

Enclosure: NRC evaluation

cc: See attached distribution list

documentation that allows the results to be independently verified; and (iii) provide information pertaining to the variability in the results.

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/RA/

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Letter or Memorandum to J. Ziegler from J. Schlueter dated: October 29, 2003

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REVIEW BY THE OFFICE OF NUCLEAR MATERIAL SAFETY
AND SAFEGUARDS OF THE DEPARTMENT OF ENERGY'S
KEY TECHNICAL ISSUE AGREEMENT RESPONSE TO CONTAINER LIFE AND SOURCE
TERM (CLST) 5.04, EVOLUTION OF THE NEAR FIELD ENVIRONMENT (ENFE) 5.03,
and RADIONUCLIDE TRANSPORT (RT) 4.03
FOR A PROPOSED GEOLOGIC REPOSITORY AT YUCCA MOUNTAIN, NEVADA
PROJECT NO. WM-00011

1.0 INTRODUCTION

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 NRC during pre-licensing does not prevent anyone from raising any issue for NRC consideration during the licensing proceedings. Also, and just as important, resolution by NRC during pre-licensing does not prejudge what NRC evaluation of that issue will be after its licensing review. Issues are resolved by NRC during pre-licensing when NRC 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.

By letter dated July 14, 2003 (ADAMS Accession No. ML031970388), DOE submitted a report titled "List and Schedule of Model Reports Supporting the Disposal Criticality Analysis Methodology Topical Report," to satisfy the informational needs of Key Technical Issue (KTI) Agreements CLST 5.04, ENFE 5.03, and RT 4.03. DOE's agreement response indicates that the list and schedule for the validation reports satisfies NRC's information needs regarding the agreements and that the agreements status should be considered closed. NRC notes that the validation reports are variously referred to as 'validation reports', 'model validation reports', and 'model reports', in the DOE transmittal letter and enclosure. This letter will continue to use the term "validation reports" to be consistent with the agreements while understanding that the scope of the reports may extend beyond merely validation.

2.0 WORDING OF THE AGREEMENT

NRC found that DOE, in the transmittal letter of July 14, 2003, identified KTI Agreements CLST 5.04, ENFE 5.03, and CLST 4.03 as being satisfied by the information provided within the enclosed list and schedule. The staff review of DOE's response to the agreements within the report is based upon DOE providing the requested information identified in an NRC letter dated October 27, 2000 (ADAMS Accession No. ML003763270). The wording of the agreements states the following:

CLST 5.04: " Provide the list of validation reports and their schedules. DOE stated that the geochemical model validation reports for "Geochemistry Model Validation Report: Degradation and Release" and "Geochemistry Model Validation Report: Material Accumulation" are expected to be available during 2001. The remainder of the reports are expected to be available during FY2002 subject to the results of detailed planning and scheduling. DOE understands that these reports are required to be provided prior to LA. A list of model validation reports was provided during the technical exchange and is included as an attachment to the meeting summary.

ENCLOSURE

ENFE 5.03 and RT 4.03: “Provide the applicable list of validation reports and their schedules for external criticality. DOE stated that the geochemical model validation reports for “Geochemistry Model Validation Report: Degradation and Release” and “Geochemistry Model Validation Report: Material Accumulation” are expected to be available during 2001. The remainder of the reports are expected to be available during FY2002 subject to the results of detailed planning and scheduling. DOE understands that these reports are required to be provided prior to LA. A list of model validation reports was provided during the technical exchange and is included as an attachment to the meeting summary.”

3.0 TECHNICAL INFORMATION PROVIDED IN THE AGREEMENT RESPONSE

The enclosure to the DOE letter provided a list and schedule of Model Reports supporting the Disposal Criticality Analysis Methodology Topical Report (Topical Report). Four of the reports are scheduled to be provided after the projected License Application (LA) submittal date. A footnote indicates that although scheduled, the external criticality model reports may not be developed due to external events being screened out from TSPA evaluations based on low total event probability (i.e., below the regulatory threshold).

4.0 NRC EVALUATION AND COMMENT

In the license application, DOE will have to provide a technical basis for screening nuclear criticality events from the performance assessment (if applicable) and identify any design features or processes relied on to do so. Depending on the complexity of DOE’s screening argument, DOE will likely need to implement the methodology identified in the Topical Report and some if not all of the validation reports. While design changes to the waste packages or repository or different analytical approaches may eliminate the need for various validation reports, it does not seem feasible to eliminate all criticality models due to the significant quantities of fissile material that will be available in the repository. Therefore, it is anticipated that DOE will provide the related validation reports to facilitate NRC’s understanding of the technical basis for screening criticality.

In the submittal, DOE stated that the validation reports provide the details of the criticality analysis methodology and that the validation reports support the Topical Report. However, DOE has indicated that it intends to submit the revised Topical Report in October 2003 (ADAMS Accession No. ML032040200) prior to completing all of the supporting validation reports. DOE has also indicated that completion of the validation reports will be required to address shortcomings identified by NRC in revision zero to the Topical Report. Since it appears that the validation reports are needed to perform a review of the Topical Report, DOE needs to provide the validation reports or provide adequate justification for why the Topical Report can be reviewed separate from the validation reports.

In footnote “c” to the list and schedule of validation reports, DOE stated that five external criticality validation reports may not be developed due to external events being screened out from TSPA evaluations based on low total event probability. In the transmittal letter, DOE further indicates that these external criticality validation reports are not expected to be required on a risk-informed performance based basis. NRC identified the elements that should be addressed when providing risk information in lieu of information identified in an agreement in the January 27, 2003 letter from J. Schlueter to J. Ziegler (ADAMS Accession No. ML030150051).

These elements are:

- Enhanced consideration of the combined effect of uncertainties;
- Provide transparent and traceable documentation that allows the results to be verified independently; and
- Include information pertaining to the variability in the results.

For those validation reports not developed, the above information should be provided prior to the LA, consistent with the agreement.

While the agreements do state, "Provide the [applicable] list of validation reports and their schedules," the agreements also state that, "DOE understands that these reports are required to be provided prior to LA." Contrary to the agreements, DOE has indicated that four reports will not be provided until after the currently scheduled LA submittal date. Further, DOE indicates that schedule dates beyond September 2003 are subject to change and that some reports may not be provided at all. NRC found that the information provided by DOE does not satisfy the agreements for the following reasons:

- The list and schedule does not necessarily indicate that the validation reports will be provided prior to LA as stated in the agreement;
- The validation reports are identified as providing the details of the criticality analysis methodology and supporting the Topical Report (expected Oct. 2003); however, only 5 of the 17 validation reports have been provided; and
- It is unclear to the NRC if DOE will or will not develop external criticality model reports as a result of external events being screened out of the total system performance assessment. If risk information will be provided in lieu of the information identified by the agreement it should be provided prior to the license application (LA) submittal in order to address these agreements.

4.1 Need For Additional Information

DOE should provide the risk information in lieu of the information identified by the agreements as previously discussed.

5.0 SUMMARY

NRC staff reviewed the DOE KTI Agreement response within the report to determine whether the agreements were fully addressed. The information provided by DOE does not satisfy the intent of the agreement. Based upon statements made by DOE in its KTI Agreement response, DOE should provide the risk information in lieu of the information identified by the agreements prior to LA.

6.0 STATUS OF THE AGREEMENTS

Based upon the above review, NRC staff concluded that the information provided by DOE does not satisfy the intent of the agreement. Therefore, NRC staff considers the agreements remain partly received.