Department of Energy
Office of Civilian Radioactive Waste Management
Office of Repository Development
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QA: N/A
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OVERNIGHT MAIL

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TRANSMITTAL OF KEY TECHNICAL ISSUE (KTI) AGREEMENTS THERMAL EFFECTS ON FLOW (TEF) 2.07 AND REPOSITORY DESIGN AND THERMAL-MECHANICAL EFFECTS (RDTME) 3.14

References: (1) Ltr, Schlueter to Ziegler, dtd 7/3/02
(2) Ltr, Ziegler to Chief, High-Level Waste Branch (NRC), dtd 4/26/02

This letter, the enclosed report (enclosure 1) and a CD copy of the report (enclosure 2) provide information to satisfy KTI agreements TEF 2.07 and RDTME 3.14. These agreements address modeling of the effects on the ability of preclosure forced ventilation to remove heat from the emplacement drifts. These agreements are as follows:

TEF 2.07 – "Provide the Ventilation Model AMR, Rev. 01 and the Pre-Test Predictions for Ventilation Test Calculation, Rev. 00.

The DOE will provide the Ventilation Model AMR (ANL-EBS-MD-000030) Rev. 01 to the NRC in March 2001. Note that ventilation test data will not be incorporated in the AMR until FY02. Test results will be provided in an update to the Ventilation Model AMR (ANL-EBS-MD-000030) in FY02. The DOE will provide the Pre-Test Predictions for Ventilation Tests (CAL-EBS-MD-000013) Rev. 00 to the NRC in February 2001."

RDTME 3.14 – "Provide the results of the ventilation modeling being conducted at the University of Nevada-Reno (Multi-Flux code) and validation testing at the Atlas Facility (validation of the ventilation model based on the ANSYS code), including: 1) the technical bases for the adequacy of discretization used in these models and 2) the technical bases for the applicability of the modeling results to prediction of heat removal from the repository.

The DOE will provide the results of the ventilation tests in a update to the Ventilation Model, ANS-EBS-MD-000030, analysis and model report including: 1) the technical bases for the adequacy of discretization used in these models and

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2) the technical bases for the applicability of the modeling results to prediction of heat removal from the repository. This is expected to be available to NRC in FY 2002."

The U.S. Department of Energy (DOE) provided information addressing these agreements in a letter dated April 26, 2002 (Reference 2). The U.S. Nuclear Regulatory Commission (NRC) provided the results of its review of this information in a letter dated July 3, 2002 (Reference 1). The NRC letter identified that the first two of three components of the TEF 2.07 agreement were complete and that the third component (to update the Ventilation Model report using ventilation test data to validate the model) remained open. Validation to Ventilation Test Phase I was performed and is included in the *Ventilation Model and Analysis Report* (ANL-EBS-MD-000030, Revision 03, ICN 03). Ventilation Test Phase II was not used as part of the validation process. The rationale and justification for not incorporating this test data in the report is provided in section 7.1.2 of the report. Part of the third component of TEF 2.07 was to use the results of the Ventilation Test Phase III (VT3) to validate the moisture transport aspect of the Ventilation Model. Subsequent re-evaluation of the VT3 test plan indicated that the test would not provide a satisfactory degree of validation for the ventilation model. The VT3 test was determined not to be necessary. This determination was conveyed to the NRC and acknowledged in the NRC letter dated July 3, 2002 (Reference 1). Analytical calculations, existing literature and test data were used for the validation of the modeling approach for moisture transport.

RDTME 3.14 addresses issues related to preclosure ventilation modeling. The *Ventilation Model and Analysis Report* (ANL-EBS-MD-000030, Revision 03, ICN 03) provides the validation approach for the model. The validation process includes corroboration of model results to known analytical solutions; to published data; to an alternate mathematical model; and to project acquired testing data from the Phase I Ventilation Test. The *Ventilation Model and Analysis Report* also includes an alternative conceptual model that describes the processes associated with moisture and their effects on ventilation efficiency. The implementation of the alternative conceptual model in Revision 1 used the MULTIFLUX software. Revision 03, ICN 03 (enclosure 1), supersedes the unqualified MULTIFLUX software code approach with analytical approaches based on first principles, literature data and existing field data. The results show that water and water vapor mass transport is limited by the properties of the rock, and has little effect on the ability of ventilation to remove heat generated by the waste packages. Revision 03, ICN 03, of the report discusses the applicability of the ventilation model results (i.e., efficiency) to initialize postclosure thermal and thermal-hydrologic models in response to RDTME 3.14.

Open issues related to TEF 2.07 and RDTME 3.14 have been addressed in this transmittal. Pending NRC review and acceptance, the DOE recommends that the KTI Agreements TEF 2.07 and RDTME 3.14 be closed.

There are no new regulatory commitments in the body or the enclosures to this letter.

Please direct any questions concerning this letter and its enclosures to Carol L. Hanlon at (702) 794-1324, Deborah L. Barr at (702) 794-1479, or Kirk D. Lachman at (702) 794-5096.

Joseph D. Ziegler, Director
Office of License Application and Strategy

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Enclosures:
1. *Ventilation Model and Analysis Report,*
   with ERRATA 1 and 2
   ANL-EBS-MD-000030, Revision 03,
   ICN 03
2. CD of Enclosure 1

cc w/encl 2:
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