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QA: N/A
Project No. WM-00011

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OVERNIGHT MAIL

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TRANSMITTAL OF REPORT *TECHNICAL BASIS DOCUMENT NO. 11: SATURATED ZONE FLOW AND TRANSPORT* ADDRESSING KEY TECHNICAL ISSUE (KTI) AGREEMENTS RELATED TO SATURATED ZONE FLOW AND TRANSPORT

This letter transmits *Technical Basis Document No. 11: Saturated Zone Flow And Transport,* Revision 2 (enclosure 1), and a CD format of this report (enclosure 2). This technical basis document contains a summary of the current conceptual understanding of flow and transport in the saturated zone and provides the context within which individual KTI agreements related to flow and transport in the saturated zone are addressed. Appendices A through M provide direct responses to the following Unsaturated and Saturated Zone Flow Under Isothermal Conditions (USFIC), Radionuclide Transport (RT), Total System Performance Assessment and Integration (TSPAI) Key Technical Issue (KTI), and related General (GEN) 1.01 agreements:

Appendix A – The Hydrogeologic Framework Model/Geologic Framework Model Interface (Response to USFIC 5.10)
Appendix B – Hydrostratigraphic Cross Sections (Response to RT 2.09 AIN-1 and USFIC 5.05 AIN-1)
Appendix C – Potentiometric Surface and Vertical Gradients (Response to USFIC 5.08 AIN-1)
Appendix D – Regional Model and Confidence Building (Response to USFIC 5.02, USFIC 5.12, and USFIC 5.11 AIN -1)
Appendix E – Horizontal Anisotropy (Response to USFIC 5.01)
Appendix F – $^{14}C$ Residence Time (Response to USFIC 5.06)
Appendix G – Uncertainty in Flow Path Lengths in Tuff and Alluvium (Response to RT 2.08, RT 3.08, and USFIC 5.04)
Appendix H - Transport Properties (Response to RT 1.05, RT 2.01, RT 2.10, GEN 1.01 (#28 and #34), and RT 2.03 AIN-1)

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Appendix I – Transport-Spatial Variability of Parameters (Response to RT 2.02, TSPAI 3.32, and TSPAI 4.02)
Appendix J – Determination of Whether Kinetic Effects Should Be Included in the Transport Model (Response to RT 1.04)
Appendix K – Transport-$K_d$s in Alluvium (Response to RT 2.06, RT 2.07, and GEN 1.01 (#41 and #102))
Appendix L – Transport-Temporal Changes in Hydrochemistry (Response to TSPAI 3.31)
Appendix M – Microspheres as Analogs (Response to RT 3.08 AIN-1 and GEN 1.01 (#43 and 45))

The subject report is one in a series of technical basis documents that are being prepared to describe the Yucca Mountain repository system components and processes that are important for predicting the likely postclosure performance of the repository. The information presented in these documents, along with the associated references, responds to open KTI agreements made between the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Department of Energy (DOE). Placing the DOE responses to individual KTI agreements in the context of the applicable repository system components and processes allows for a more direct discussion of the relevance of the agreements to the postclosure safety analyses that will be presented in the License Application. The goal of this approach is to provide a more direct and transparent discussion of the relevant KTI agreements.

The enclosed technical basis document discusses the methods used to model the conceptual understanding of flow and transport in the saturated zone. It includes a description of processes and features that are important to understanding the regional groundwater flow system, the site-scale groundwater flow system, and the site-scale radionuclide transport model for the saturated zone. This document places the responses to individual KTI agreements related to saturated zone flow and transport within the context of the overall conceptual understanding of flow and transport in the saturated zone, explains their relationship to the postclosure safety analyses, and provides a discussion of the relevance of KTI agreements in the context of the saturated zone flow and transport models.

The DOE considers the KTI agreements covered in *Technical Basis Report 11: Saturated Zone Flow and Transport*, Revision 2, to be fully addressed, and pending review and acceptance by NRC, they should 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 or Drew H. Coleman at (702) 794-5537.

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

OLA&S:TCG-1883

Enclosures:
1. *Technical Basis Document No. 11: Saturated Zone Flow and Transport,* Revision 2
2. CD of Enclosure 1

cc w/encls 1 and 2:
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