



Department of Energy
Office of Civilian Radioactive Waste Management
Office of Repository Development
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QA: N/A
Project No. WM-00011

JUL 30 2004

OVERNIGHT MAIL

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Director, Division of High-Level Waste
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TRANSMITTAL OF REPORT *TECHNICAL BASIS DOCUMENT NO. 7: IN-PACKAGE ENVIRONMENT AND WASTE FORM DEGRADATION AND SOLUBILITY*, REVISION 1 ADDRESSING KEY TECHNICAL ISSUE (KTI) AGREEMENTS RELATED TO CONTAINER LIFE AND SOURCE TERM (CLST), EVOLUTION OF NEAR FIELD ENVIRONMENT (ENFE), TOTAL SYSTEM PERFORMANCE ASSESSMENT AND INTEGRATION (TSPAI), AND GENERAL AGREEMENT (GEN)

This letter transmits *Technical Basis Document No. 7: In-Package Environment and Waste Form Degradation and Solubility*, Revision 1 (enclosure 1) and a compact disk (CD) of the report (enclosure 2). The CD contains a pdf file, with 11,774 KB, dated July 28, 2004, and can be made publicly available. This technical basis document contains a summary of the current conceptual understanding of the evolution of the in-package chemistry and provides the context within which individual KTI agreements related to the effect of in-package chemistry on waste forms are addressed. Appendices A through E provide direct responses to the following CLST, ENFE, TSPAI, and GEN KTI agreements:

Appendix A – In-Package Chemistry Environment (Response to CLST 3.02 AIN-1, ENFE 3.03, TSPAI 3.14, and GEN 1.01 [Comments 116 and 126])

Appendix B – Effects on Radiolysis and Engineered Materials on In-Package Chemistry (Response to CLST 3.03 AIN-1, and CLST 3.04 AIN-1)

Appendix C – Demonstration of the Adequacy of the In-Package Chemistry Model Results (Response to ENFE 3.04 and CLST 3.05)

Appendix D – Localized Corrosion and Stress Corrosion Cracking in Cladding (Response to CLST 3.06 AIN-1, CLST 3.07, CLST 3.08 AIN-1, CLST 3.09 AIN-1, and GEN 1.01 [Comments 124])

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**Appendix E – Total System Performance Assessment Implementation of
In-Package Chemistry (Response to TSPAI 3.08)**

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, forms an outline of the postclosure safety analyses that are being developed for the License Application (LA). This information also 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 LA. 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 the in-package environment. It includes a description of processes and associated models that are important to understanding the evolution and effect of in-package environment within the waste package. As part of the model development, testing for validation purposes is discussed, uncertainties associated with data and models are also addressed. This document places the responses to individual KTI agreements related to in-package chemical environment within the context of the overall conceptual understanding of the evolution of chemical processes and solubility of radionuclides in the waste package, explains their relationship to the postclosure safety analyses, and provides a discussion of the relevance of the KTI agreements to repository performance.

The DOE considers the KTI agreements covered in *Technical Basis Document No. 7: In-Package Environment and Waste Form Degradation and Solubility*, Revision 1 to be fully addressed, and pending review and acceptance by the NRC, they should be closed.

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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 either David C. Haught at (702) 794-5474 or e-mail at david_haught@ymp.gov, or Paige R.Z. Russell at (702) 794-1315 or e-mail at paige_russell@ymp.gov.


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

OLA&S:DCH-1713

Enclosures:

1. *Technical Basis Document No. 7:
In-Package Environment and Waste
Form Degradation and Solubility,
Revision 1*
2. CD of Enclosure 1

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cc w/encl 2: (continued)

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