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

DEC 09 2003

OVERNIGHT MAIL

ATTN: Document Control Desk
Chief, High-Level Waste Branch, DWM/NMSS
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TRANSMITTAL OF REPORT *TECHNICAL BASIS DOCUMENT NO. 6: WASTE PACKAGE AND DRIP SHIELD CORROSION* ADDRESSING KEY TECHNICAL ISSUE (KTI) AGREEMENTS RELATED TO CONTAINER LIFE AND SOURCE TERM (CLST) AND REPOSITORY DESIGN AND THERMAL MECHANICAL EFFECTS (RDTME)

This letter transmits *Technical Basis Document No. 6: Waste Package And Drip Shield Corrosion,* Revision 1 (enclosure 1) and a CD format of the report (enclosure 2). This technical basis document contains a summary of the current conceptual understanding of the degradation modes of the waste package and drip shield materials and provides the context within which individual KTI agreements related to the long-term material behavior are addressed. Appendices A through H provide direct responses to the following CLST, RDTME, and related General (GEN) 1.01 agreements:

Appendix A – Measurement of Corrosion Rates of Waste Package Materials (Response to CLST 1.07 AIN-1)
Appendix B – Distribution of Stresses (Response to CLST 1.13 and GEN 1.01 (Comment 120))
Appendix C – Rockfall and Dead-Weight Effects (Response to CLST 1.14)
Appendix D – Effects of Fabrication on the Susceptibility of Alloy 22 and Titanium Grade 7 to Corrosion and Stress Corrosion Cracking (Response to CLST 1.15 and GEN 1.01 (Comment 119))
Appendix E – Thermal Profile of the Waste Package Material due to Induction Annealing (Response to CLST 1.16)
Appendix F – Stress Measure for Assessing the Susceptibility of Various Engineered Barrier System Materials to Stress Corrosion Cracking (Response to RDTME 3.18)
Appendix G – Quantification of the Resistance of Alloy 22 and Titanium Grade 7 to Environmentally Assisted Cracking Phenomena (Response to CLST 1.12 and GEN 1.01 (Comments 9, 10, 119 and 120))
Appendix H - Expected Behavior of Alpha Titanium Alloys (Response to CLST 6.02 AIN-1 and CLST 6.03 AIN-1)

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The subject report is one in a series of technical basis documents that are being prepared to describe the Yucca Mountain, Nevada, 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 analysis that is 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 testing and analysis of waste package and drip shield materials. It represents the current understanding of the long-term performance of the waste package and drip shield within the repository environment. It includes a description of processes and associated models that are important to understanding the various material degradation modes. As part of the model development, testing for validation purposes are discussed; uncertainties associated with test data are also addressed. This document places the responses to individual KTI agreements related to the waste package and drip shield within the context of the overall conceptual understanding of material degradation processes, explains their relationship to the postclosure safety analyses, and provides a discussion of the relevance of KTI agreements.

The DOE considers the KTI agreements covered in *Technical Basis Document No. 6: Waste Package and Drip Shield Corrosion*, Revision 1, 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 of this letter. Please direct any questions concerning this letter and its enclosures to David C. Haught at (702) 794-5474 or Paige R.Z. Russell at (702) 794-1315.

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

OLA&S:TCG-0039

Enclosures:
1. *Technical Basis Document No. 6: Waste Package and Drip Shield Corrosion,* Revision 1
2. CD of enclosure 1

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