



## Department of Energy

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

OCT 03 2003

OVERNIGHT MAIL

**ATTN: Document Control Desk**  
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**TRANSMITTAL OF REPORT *TECHNICAL BASIS DOCUMENT NO. 8: COLLOIDS*  
ADDRESSING KEY TECHNICAL ISSUE (KTI) AGREEMENTS RELATED TO COLLOIDS**

This letter transmits *Technical Basis Document No. 8: Colloids*, Revision 2 (enclosure 1), and a CD format of the report (enclosure 2). This technical basis document contains a summary of the current conceptual understanding of colloid-facilitated radionuclide transport and provides the context within which individual KTI agreements related to colloids are addressed. Appendices A through H provide direct responses to the following Evolution of the Near-Field Environment (ENFE), Radionuclide Transport (RT), Total System Performance Assessment and Integration (TSPAI) KTI agreements, and related General (GEN) 1.01 agreements:

- Appendix A – Exclusion of Entrained Colloids in Thermal-Chemical Alteration (Response to ENFE 1.06, ENFE 4.04, and GEN 1.01 (Comment 35))
- Appendix B – Sensitivity Analysis of Colloid Transport Parameters (Response to ENFE 4.06 AIN-1 and GEN 1.01 (Comments 35 and 37))
- Appendix C – Screening Out Coupled Thermal-Hydrologic-Chemical Effects (Response to ENFE 4.03 and GEN 1.01 (Comments 35 and 37))
- Appendix D – Contrasting Colloid Concentrations in the Engineered Barrier System and Saturated Zone (Response to TSPAI 3.30 and GEN 1.01 (Comments 43 and 46))
- Appendix E – Sensitivity Studies to Test Importance of Colloid Transport Parameters and Models (Response to RT 3.07 and GEN 1.01 (Comments 35, 43, and 46))
- Appendix F – Transport of Dissolved and Colloidal Radionuclides Through Invert (Response to TSPAI 3.17 and GEN 1.01 (Comments 36 and 38))
- Appendix G – Screening Criteria for Attachment of Radionuclides to Colloids (Response to RT 1.03 AIN-1, ENFE 3.05 AIN-1 and ENFE 4.05 AIN-1)
- Appendix H – Changes in Colloid Concentrations Due to Shifts in pH and Ionic Strength (Response to TSPAI 3.42)

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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 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 characterize the conceptual understanding of colloids, including physical characteristics, sorption characteristics and transport properties. It includes a description of processes and features that are important to understanding the role of colloids throughout the repository system, from the in-package environment to release to the aquifer. This document places the responses to individual KTI agreements related to colloids within the context of the overall conceptual understanding of the repository system; explains their relationship to the postclosure safety analyses; and provides a discussion of the relevance of KTI agreements in the context of the overall study of colloids.

The DOE considers the KTI agreements covered in *Technical Basis Report 8: Colloids*, 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 of this letter. Please direct any questions concerning this letter and its enclosures to Deborah L. Barr at (702) 794-1479 or David C. Haught at (702) 794-5474

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

OLA&amp;S:TCG-1861

## Enclosures:

1. *Technical Basis Document No. 8: Colloids*,  
Revision 2
2. CD of Enclosure 1

OCT 03 2003

cc w/encls 1 and 2:

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