

**COMPLIANCE DETERMINATION STRATEGY  
RRT 3.1.3 DESCRIPTION OF THE INDIVIDUAL SYSTEMS AND CHARACTERISTICS  
OF THE SITE: GEOCHEMICAL SYSTEM**

**APPLICABLE REGULATORY REQUIREMENTS:**

60.21(c)(1)(i)(A)  
60.21(c)(1)(i)(B)  
60.21(c)(1)(i)(E)  
60.21(c)(1)(i)(F)  
60.21(c)(1)(ii)(A)  
60.21(c)(1)(ii)(B)  
60.21(c)(1)(ii)(C)  
60.21(c)(1)(ii)(D)  
60.21(c)(1)(ii)(F)  
60.21(c)(2)  
60.21(c)(13)  
60.21(c)(14)  
60.31(a)(1)(i)

**TYPES OF REVIEW:**

Acceptance Review (Type 1)

**RATIONALE FOR TYPES OF REVIEW:**

**Acceptance Review (Type 1) Rationale:**

This regulatory requirement topic is license application-related because, as specified in 10 CFR 60.31(a)(1)(i), it is information that the Commission shall consider in determining if there is reasonable assurance that the types and amounts of radioactive materials described in the application can be received, possessed, and disposed of in a geologic repository operations area without unreasonable risk to the health and safety of the public. As presented in the license application content requirements of 10 CFR 60.21(c) referenced above and Section 3.1.3 of regulatory guide "Format and Content for the License Application for the High-Level Waste Repository (FCRG)," it must be addressed by the U.S. Department of Energy (DOE) in its license application. Therefore, the staff will conduct an Acceptance Review of the license application for this regulatory requirement topic.

Those sections of the license application that rely on descriptive information contained in this section are listed in Table 3.1.3-1. It is assumed that those sections listed in the table encompass all significant technical uncertainties that exist relative to the description of the geochemical system. Each section will receive the appropriate level of Safety Review (types 3, 4, or 5).

## **REVIEW STRATEGY:**

### **Acceptance Review:**

In conducting the Acceptance Review of the description of the geochemical system of the site, the reviewer should determine if the content of the license application is complete with respect to the information requested by Section 3.1.3 of regulatory guide "Format and Content of the License Application for the High-Level Waste Repository (FCRG)."

The descriptive material provided in Section 3.1.3 of the license application will support detailed Safety Reviews of information contained elsewhere in the license application. Thus, the information contained in Section 3.1.3 will be reviewed in parallel with the information contained in those sections of the license application concerning siting conditions, design, and performance. Therefore, during the acceptance review of Section 3.1.3, the reviewer should determine that the appropriate descriptive information needed to support the Safety Reviews has been provided in this section of the license application, and that the information is both internally consistent and consistent from section to section.

The reviewer should determine that the information in the license application is presented in such a way that the staff will not need to conduct extensive independent analyses or literature searches. The reviewer should also determine whether an appropriate range of alternative interpretations and models has been described.

Finally, the reviewer should determine if the U.S. Department of Energy (DOE) has either resolved all the NRC staff objections that apply to the applicable regulatory requirements or provided all the information requested in Section 1.6.2 of the FCRG, for unresolved objections. The reviewer should evaluate the effects of any unresolved objections, both individually and in combinations with others, on: (1) the reviewer's ability to conduct a meaningful and timely review; and (2) the Commission's ability to make a decision regarding construction authorization within the statutory three-year period.

If it is determined that the descriptive information in Section 3.1.3 of the license application is inadequate to support the Safety Reviews described above, then additional information will be requested from DOE before these Safety Reviews can begin.

## **RATIONALE FOR REVIEW STRATEGY:**

None.

### **Contributing Analysts:**

NRC: John Bradbury, Neil Coleman

CNWRA: William Murphy

Date of Analyses: February 25, 1993

## APPLICABLE REGULATORY REQUIREMENTS FOR EACH TYPE OF REVIEW:

### Type 1:

60.21(c)(1)(i)(A)  
60.21(c)(1)(i)(B)  
60.21(c)(1)(i)(E)  
60.21(c)(1)(i)(F)  
60.21(c)(1)(ii)(A)  
60.21(c)(1)(ii)(B)  
60.21(c)(1)(ii)(C)  
60.21(c)(1)(ii)(D)  
60.21(c)(1)(ii)(F)  
60.21(c)(2)  
60.21(c)(13)  
60.21(c)(14)  
60.31(a)(1)(i)

### REFERENCES:

Nuclear Regulatory Commission, "Format and Content for the License Application for the High-Level Waste Repository," Office of Nuclear Regulatory Research. [Refer to the "Products List" for the Division of High-Level Waste Management to identify the most current edition of the FCRG in effect.]

**TABLE 3.1.3-1: Section of the License Application Which Require Input from the "Description of the Individual Systems and Characteristics of the Site: Geochemical System" Section of the License Application**

#### *License Application Section*

#### *Section Title*

#### **Siting Criteria**

##### **(Favorable Conditions)**

3.2.3.1	Nature and Rates of Geochemical Processes
3.2.3.2	Geochemical Conditions
3.2.3.3	Mineral Assemblages

##### **(Potentially Adverse Conditions)**

3.2.1.4	Evidence of Dissolution
3.2.1.11	Presence of Naturally Occurring Materials
3.2.2.10	Complex Engineering Measures
3.2.3.4	Groundwater Conditions and the Engineered Barrier System
3.2.3.5	Geochemical Processes
3.2.3.6	Not Reducing Groundwater Conditions
3.2.3.7	Gaseous Radionuclide Movement

3.2.5	Assessment of Compliance with Criteria for Combination of Favorable Conditions and Potentially Adverse Conditions
3.4	Effectiveness of Natural Barriers against the Release of Radioactive Material to the Environment

## **Description of the GROA**

- 4.1.2 Description of Shafts and Ramps
- 4.1.3 Description of Underground Facility

## **Performance Objectives**

- 5.4 Assessment of Compliance with the Engineered Barrier System Performance Objectives
- 6.1 Assessment of Compliance with the Requirement for Cumulative Releases of Radioactive Materials
- 6.2 Assessment of Compliance with the Individual Protection Requirements
- 6.3 Assessment of Compliance with the Groundwater Protection Requirements
- 8.1.3 Performance Confirmation Program for the Natural Systems of the Geologic Setting: Geochemical System
- 8.2 Structure, Systems, and Components of the Geologic Repository Operations Area
- 8.3 Engineered Barrier System
- 8.4 Radiation Protection during Performance Confirmation
- 8.5 Analysis of Changes from Performance Confirmation Baseline
- 8.6 Unresolved Safety Questions

## **Design Criteria**

- 4.3 Assessment of Compliance with Design Criteria for Shafts and Ramps
- 4.4 Assessment of Compliance with Design Criteria for the Underground Facility
- 5.2 Assessment of Compliance with the Design Criteria for the Waste Package and its Components
- 5.3 Assessment of Compliance with the Design Criteria for the Engineered Barrier System
- 5.4 Assessment of Engineered Barrier System Compliance with the Performance Objectives

FEB 25 1993

RECEIVED  
CENTRAL ENVIRONMENTAL WASTE  
RECEIVED BY NRC STAFF

010924 MAR-23

NOTE TO: Larry McKague, Geologic Setting  
Program Element Manager  
Center for Nuclear Waste Regulatory Analyses

FROM: David Brooks, NRC-GS Program Element Manager  
Hydrology and Systems Performance Branch  
Division of High-Level Waste Management

SUBJECT CODE 703.6  
PROJECT NO. 20-5707-COS

SUBJECT: TRANSMITTAL OF PRELIMINARY NRC STAFF APPROVAL OF THE COMPLIANCE  
DETERMINATION STRATEGY FOR REVIEW PLAN 3.1.3: DESCRIPTION OF  
INDIVIDUAL SYSTEMS AND CHARACTERISTICS OF THE SITE -- GEOCHEMICAL  
SYSTEM

The purpose of this note is to transmit the subject compliance determination strategy (CDS) that has received preliminary approval by the NRC staff. Final approval of the CDS is subject to our review and resolution of any comments or changes made by the Center for Nuclear Waste Regulatory Analyses.

Enclosure: As stated

cc: BJYoungblood/HLWM  
JLinehan/HLWM  
DLoosley/PMDA  
MSilberberg/RES  
MLee/HLWM  
PMackin/CNWRA  
HLHP r/f

OFC	HLHP <i>ML</i>		HLHP <i>gmb</i>		HLHP		HLHP	
NAME	NColeman		JBradbury		DBrooks <i>DB</i>		MFederline <i>MF</i>	
DATE	2/12/93		2/19/93		2/17/93		2/25/93	
OFC	HLHP							
NAME	DBrooks <i>DB</i>							
DATE	2/2/93							

OFFICIAL RECORD COPY\*

\* Noted: MPLee 02/25/93

GEOKEMSD

February 25, 1993

## COMPLIANCE DETERMINATION STRATEGY

~~Review Plan No. 3.1.3~~

RRT 3.1.3 Description of the Individual Systems and Characteristics  
of the Site: Geochemical System

### APPLICABLE REGULATORY REQUIREMENTS:

60.21(c)(1)(i)(A) ——— 60.21(c)(1)(i)(B)  
60.21(c)(1)(i)(E)  
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60.21(c)(1)(ii)(D)  
60.21(c)(1)(ii)(F)  
60.21(c)(2) ——— 60.21(c)(13)  
60.31(a)(1)(i) ——— 60.21(c)(14)

### TYPES OF REVIEW:

Acceptance Review (Type 1)

### RATIONALE FOR TYPES OF REVIEW:

#### Acceptance Review (Type 1) Rationale:

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### REVIEW STRATEGY:

## **GEOKEMSD**

**February 25, 1993**

### **Acceptance Review (Type 1):**

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### **Contributing Analysts:**

**NRC:** John Bradbury, Neil Coleman

**CNWRA:** William Murphy

**Date of Analyses:** February 25, 1993

**GEOKEMSD**

February 25, 1993

**APPLICABLE REGULATORY REQUIREMENTS FOR EACH TYPE OF REVIEW:**

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60.21(c)(1)(ii)(C)  
60.21(c)(1)(ii)(D)  
60.21(c)(1)(ii)(F)  
60.21(c)(2) \_\_\_\_\_ 60.21(c)(13)  
60.31(a)(1)(i) 60.21(c)(14)

**REFERENCES:**

Nuclear Regulatory Commission, "Format and Content for the License Application for the High-Level Waste Repository," Office of Nuclear Regulatory Research. [Refer to the "Products List" for the Division of High-Level Waste Management to identify the most current edition of the FCRG in effect.]



TABLE 3.1.3-1: Section of the License Application Which Require Input from the "Description of the Individual Systems and Characteristics of the Site: Geochemical System" Section of the License Application

<u>License Application</u>	<u>Section Title</u>
<b>Siting Criteria</b>	
(Favorable Conditions)	
3.2.3.1	Nature and Rates of Geochemical Processes
3.2.3.2	Geochemical Conditions
3.2.3.3	Mineral Assemblages
(Potentially Adverse Conditions)	
3.2.1.4	Evidence of Dissolution
3.2.1.11	Presence of Naturally Occurring Materials
3.2.3.4	Groundwater Conditions and the Engineered Barrier System
3.2.3.5	Geochemical Processes
3.2.3.6	Not Reducing Groundwater Conditions
3.2.3.7	Gaseous Radionuclide Movement
3.2.5	Description of the GROA
3.4	4.1.3
	<b>Performance Objectives</b>
	5.4
	6.1
	6.2
	6.3
	8.1.3
8.2	8.4
8.3	8.5
	<b>Design Criteria</b>
4.3	5.2
4.4	5.3
	5.4

Section titles given on attached sheet.

## Additions to Table 3.1.3-1

### License Application Section

### Section Title

Siting Criteria  
(Potentially Adverse  
Conditions)

3.2.2.10

Complex Engineering Measures

Siting Criteria  
3.2.5

Assessment of Compliance with  
Criteria for Combination of Favorable  
Conditions and Potentially Adverse  
Conditions

3.4

Effectiveness of Natural Barriers  
against the Release of Radioactive  
Material to the Environment

Description of the GROA

4.1.2

Description of Shafts and Ramps

4.1.3

Description of Underground Facility

Design Criteria

4.3

Assessment of Compliance with Design  
Criteria For Shafts and Ramps

4.4

Assessment of Compliance with Design  
Criteria for the Underground Facility

5.4

Assessment of Engineered Barrier  
System Compliance with the  
Performance Objectives

Performance Objectives

8.2

Structure, Systems, and Components of  
the Geologic Repository Operations Area

8.3

Engineered Barrier System

8.6

Unresolved Safety Questions

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