

**COMPLIANCE DETERMINATION STRATEGY  
RRT 3.1.1 DESCRIPTION OF INDIVIDUAL SYSTEMS AND CHARACTERISTICS  
OF THE SITE: GEOLOGIC SYSTEM**

**APPLICABLE REGULATORY REQUIREMENTS:**

60.21(c)(1)(i)(A)  
60.21(c)(1)(i)(B)  
60.21(c)(1)(i)(C)  
60.21(c)(1)(i)(F)  
60.21(c)(1)(ii)(A)  
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 (RRT) is considered to be license application-related because, as specified in 10 CFR60.31(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 public health and safety. As presented in the license application content requirements of 10 CFR 60.21(c) and in the regulatory guide on format and content for the license application for the high-level waste (HLW) repository (i.e., the 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.

It is assumed that all significant technical uncertainties that could potentially exist relative to description of the geologic system are encompassed in the sections of the license application listed in Table 3.1.1-1 of this report. This table indicates sections of the license application which rely on information contained in Section 3.1.1 of the license application related to description of the geologic system and characteristics of the site.

**REVIEW STRATEGY:**

**Acceptance Review:**

In conducting the acceptance review of the geologic system site description, the reviewer should determine if the information presented in the license application for demonstrating compliance with the applicable regulatory requirements is complete in technical breadth and depth as specified in Section 3.1.1 of the FCRG. The descriptive material provided in Section 3.1.1 of the license application will form the basis for the detailed safety reviews of information contained elsewhere in the license application.

The information contained in Section 3.1.1 of the license application will be reviewed in parallel with the information contained in the sections concerning siting conditions, design, and performance. During the acceptance review of Section 3.1.1, the reviewer should determine that the appropriate descriptive

information, necessary for the staff to conduct the safety reviews, has been provided in the license application, and that the information is consistent both internally and from section to section.

The reviewer should determine whether the information in the license application is presented in such a manner that the assumptions, data and logic leading to a demonstration of compliance with the applicable regulatory requirements are clear and do not require the reviewer to conduct extensive independent analyses or literature searches. The reviewer should also determine whether controversial information and appropriate alternative interpretations and models have been adequately described and considered.

Finally, the reviewer should determine that the DOE has either resolved all the NRC staff objections which 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 the descriptive information in Section 3.1.1 of the license application is determined to be inadequate to support the safety reviews described above, then additional information will be requested from the DOE before these safety reviews can begin.

**Contributing Analysts:**

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**Date of Analysis:** February 4, 1993

**RATIONALE FOR REVIEW STRATEGY:**

Not applicable

**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)(C)

60.21(c)(1)(i)(F)

60.21(c)(1)(ii)(A)

60.31(a)(1)(i)

**REFERENCES:**

U.S. Nuclear Regulatory Commission, "Format and Content for the License Application for the High-Level Waste Repository (FCRG)", Office of Nuclear Regulatory Research.

**TABLE 3.1.1-1: Sections of the License Application Requiring Input from Section 3.1.1 of the License Application**

<i>License Application Section</i>	<i>Section Title</i>
<b>Siting Criteria</b>	
<b>(Favorable Conditions)</b>	
3.2.1.1	Nature and Rates of Physical Processes
3.2.1.2	Minimum Waste Emplacement Depth
3.2.2.1	Nature and Rate of Hydrogeologic Processes
3.2.3.1	Nature and Rates of Geochemical Processes
<b>(Potentially Adverse Conditions)</b>	
3.2.1.4	Evidence of Dissolution
3.2.1.5	Structural Deformation
3.2.1.6	Historic Earthquakes
3.2.1.7	Correlation of Earthquakes with Tectonic Processes
3.2.1.8	Increasing Earthquake Frequency/Magnitude
3.2.1.9	Evidence of Igneous Activity
3.2.1.10	Evidence of Extreme Erosion
3.2.1.11	Presence of Naturally Occurring Materials
3.2.1.12	Evidence of Subsurface Mining
3.2.1.13	Evidence of Drilling
3.2.1.14	Geomechanical Properties
3.2.2.6	Human Activity and Groundwater
3.2.2.7	Natural Phenomena and Groundwater
3.2.2.8	Structural Deformation and Groundwater
3.2.2.9	Changes to Hydrologic Conditions
3.2.2.10	Complex Engineering Measures
8.5	Analysis of Changes from Performance Confirmation Baseline
<b>Performance Objectives</b>	
3.3	Assessment of Compliance with the Groundwater Travel Time Performance Objective
4.5.1-4.5.2	Assessment of Integrated GROA Compliance with the Performance Objectives:
	4.5.1 Protection against Radiation Exposures and Releases of Radioactive Material to Unrestricted Areas
	4.5.2 Retrievability of Waste
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

TABLE 3.1.1-1:  
(Cont'd)

Sections of the License Application Requiring Input from Section 3.1.1 of the License Application.

<i>License Application Section</i>	<i>Section Title</i>
8.1.1	Performance Confirmation Program for the Natural Systems of the Geologic Setting: Geologic System
8.4	Radiation Protection during Performance Confirmation
Design Criteria	
4.1.1-4.1.4	Description of the GROA Structures, Systems, and Components:
	4.1.1 Surface Facilities
	4.1.2 Shafts and Ramps
	4.1.3 Underground Facility
	4.1.4 Radiation Protection Systems
4.2	Assessment of Compliance with Design Criteria for Surface Facilities
4.3	Assessment of Compliance with Design Criteria for Shafts
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
5.5	Radiation Protection