

**COMPLIANCE DETERMINATION STRATEGY  
RRT 4.1.4 DESCRIPTION OF THE GROA STRUCTURES, SYSTEMS, AND  
COMPONENTS: RADIATION PROTECTION SYSTEMS**

**APPLICABLE REGULATORY REQUIREMENTS:**

10 CFR 60.21(c)(1)(ii)(E)  
10 CFR 60.21(c)(2)  
10 CFR 60.21(c)(3)  
10 CFR 60.21(c)(6)  
10 CFR 60.21(c)(11)  
10 CFR 60.21(c)(14)

**TYPES OF REVIEW:**

Acceptance Review (Type 1)

**RATIONALE FOR TYPES OF REVIEW:**

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

This regulatory requirement topic is considered to be license application-related because, as specified in the license application content requirements of 10 CFR 60.21(c) and Section 4.1.4 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 in its license application. Therefore, the staff will conduct an Acceptance Review of the license application for this regulatory requirement topic.

**REVIEW STRATEGY:**

**Acceptance Review:**

This regulatory requirement topic is limited to the description of the U.S. Department of Energy's (DOE's) design and plans for geologic repository operations area (GROA) radiation protection systems. These systems are intended to control radiation exposures and radiation levels, and releases of radioactive material, in effluents, per 10 CFR 60.111(a), which includes maintaining exposures "as low as is reasonably achievable" (ALARA) as required by 10 CFR Part 20 (*Code of Federal Regulations*, Title 10, "Energy"). Accordingly, these designs and plans would apply to those conditions and events associated with normal repository operations and those events that can be reasonably expected to occur prior to permanent closure (such as those events referred to in American Nuclear Society Standard, ANSI/ANS-57.9-1984 (ANS, 1984) as Design Events "I," "II," and "III"). DOE's designs and plans for radiation protection are not concerned with those conditions and events which are beyond those events that can be reasonably expected to occur prior to permanent closure (Design Event "IV"); they will be addressed separately in Section 3.2.6 ("Assessment of Compliance with Design Criteria for the Controlled-use Area") of the license application and its attendant review plan.

In conducting the Acceptance Review of the description of structures, systems, and components of the GROA radiation protection systems, the reviewer should determine if the information present in the license application and its references for demonstrating compliance with the applicable regulatory

requirements is complete in technical breadth and depth as identified in regulatory guide "Format and Content for the License Application for the High-Level Waste Repository (FCRG)." The descriptions provided in Section 4.1.4 of the license application will form the basis for the Safety Review of information contained in other sections of the license application listed in Table 4.1.4-1. In regards to radiation protection, the Safety Review of those sections of the license application listed in Table 4.1.4-1 will assess the adequacy of the GROA design for the control of radiation exposures and radiation levels, and releases of radioactive material to workers and individual members of the public. Thus, the information contained in Section 4.1.4 will be reviewed in parallel with the information contained in those other license application sections. Therefore, the reviewer should determine that all appropriate information necessary for the staff to conduct a Safety Review of the GROA radiation protection systems is presented in this section of the license application.

The reviewer should determine that 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 that controversial information and appropriate alternative interpretations and models have been acceptably described and considered.

In conducting the Acceptance Review, the reviewer should, at a minimum, assess the adequacy of the descriptions presented in the license application to demonstrate DOE compliance with the applicable regulatory requirements. Specifically, for each element identified in Table 4.1.4-2, the reviewer should determine that DOE has submitted the following:

- (1) The identification of structures, systems, and components important to safety (SSCIS) including a general description and discussion, supported by analysis (as appropriate), indicating the rationale behind their selection.<sup>1</sup>
- (2) A general description and scaled drawings showing the location of GROA structures, systems, and components intended for radiation protection.
- (3) For each element identified in Item (2), above, layout drawings showing radiological design features. This would include, but not be limited to: shield wall thicknesses, controlled-access areas, controlled-use areas, personnel and equipment decontamination areas, contamination-control areas with type of control, and traffic patterns; and location of all related facilities, equipment, and components.
- (4) A general description, discussion, and scaled drawings showing the location of radiological monitoring instrumentation and systems in relation to the GROA.
- (5) A general description, discussion, and scaled drawings showing design features of the GROA intended for emergencies.
- (6) Any additional details specified in Sections 4.1.4.1 through 4.1.4.4 of the FCRG.

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<sup>1</sup> The identification of SSCIS should be internally consistent with information described in Section 2.5 ("Radioactive Material Description") of the license application on the physical inventory of the types, amounts, and specifications of those radioactive waste forms to be disposed of at the geologic repository.

In reviewing DOE's descriptions of GROA radiation protection systems, the reviewer should determine that these descriptions include any possible inter-relationship among such items, both individually and in combination with others, which would impact public health and safety. The reviewer should also assure that the proper design interfaces between GROA operations and the GROA physical facility itself are described.

Finally, the reviewer should determine if DOE has either resolved all the NRC staff objections related 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 related 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 three-year statutory period.

If it is determined that the descriptive information in Section 4.1.4 of the license application is inadequate to support the Safety Reviews of the information listed in Table 4.1.4-1, then additional information will be requested from DOE as part of that review.

**Contributing Analysts:**

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**Date of Analyses:** August 26, 1993

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

Type 1:

10 CFR 60.21(c)(1)(ii)(E)  
10 CFR 60.21(c)(2)  
10 CFR 60.21(c)(3)  
10 CFR 60.21(c)(6)  
10 CFR 60.21(c)(11)  
10 CFR 60.21(c)(14)

**REFERENCES:**

American Nuclear Society, "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Storage Type)," American National Standards Institute, La Grange Park, Illinois, ANSI/ANS-57.9-1984, 1984.

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 in effect.]

**TABLE 4.1.4-2.**

**A minimum set of structures, systems, and components (SSC) that might be used for radiation protection at the geologic repository operations area. These SSC are identified in Sections 4.1.1, 4.1.2, 4.1.3, and 4.5.2 of the license application.**

1. hot cells
2. on-site radioactive waste management systems
3. ventilation systems (intake and exhaust)
4. fire suppression and explosion protection systems
5. utility systems
6. emergency systems
7. communication systems
8. operational support systems
9. decommissioning and decontamination systems
10. instrumentation and control systems (including radiation)
11. on-site transportation systems (personnel and material)
12. waste handling systems (including shafts and ramps)
13. electrical support systems
14. excavation and ground support systems
15. waste emplacement systems
16. waste retrieval systems

TABLE 4.1.4-1.

Sections of the License Application that are Related to the Acceptance Review of the "Description of the GROA Structures, Systems, and Components: Radiation Protection Systems" Section of the License Application. (Sections 4.1.1, 4.1.2, 4.1.3, and 4.5.2 of the license application will contain some general information on GROA radiation protection systems. The general information contained in these other license application sections should be both internally consistent, and consistent from section-to-section.)

<i>License Application Section</i>	<i>Title</i>
4.1	Description of the GROA Structures, Systems, and Components
4.1.1	Surface Facilities
4.1.2	Shafts and Ramps
4.1.3	Underground Facility
4.2	Assessment of Compliance with Design Criteria For Surface Facility
4.3	Assessment of Compliance with Design Criteria For Shafts and Ramps
4.4	Assessment of Compliance with Design Criteria For Underground Facility
4.5	Assessment of Integrated GROA Compliance with the Performance Objectives:
4.5.1	Protection against Radiation Exposures and Releases of Radioactive Material to Individual Members of the Public
4.5.2	Retrievability of Waste
5.5	Radiation Protection for Engineered Barrier Systems
7.2	Description of Radiation Protection Program
8.4	Radiation Protection During Performance Confirmation