14 DECOMMISSIONING EVALUATION (SL)

14.1 Review Objective

The objective of the U.S. Nuclear Regulatory Commission's (NRC's) review with regard to decommissioning is to ensure that the applicant's provisions for eventual decontamination and decommissioning of the independent spent fuel storage installation (ISFSI) or monitored retrievable storage installation (MRS) provide reasonable assurance that (1) the proposed provisions for eventual decontamination and decommissioning of the ISFSI or MRS will provide adequate protection of public health and safety, (2) funds will be available to decommission the ISFSI or MRS, and (3) the design and operational features of the ISFSI or MRS facilitate eventual decontamination and decommissioning.

14.2 Applicability

This chapter applies to the review of applications for specific licenses **(SL)** for an ISFSI or an MRS facility, categorized as a dry storage facility (DSF). For sites with a general license in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 72.210, "General license issued," the decommissioning review is conducted as part of the licensing review under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

14.3 Areas of Review

This chapter addresses the following areas of review:

- proposed decommissioning plan
- decommissioning funding plan
- design features
- operational features

14.4 Regulatory Requirements and Acceptance Criteria

This section summarizes those parts of 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste," that are relevant to the review areas addressed by this chapter. The NRC staff reviewer should refer to the exact language in the regulations. Table 14-1 matches the relevant regulatory requirements to the areas of review covered in this chapter.

Table 14-1 Relationship of Regulations and Areas of Review

Areas of Review	10 CFR Part 72 Regulations			
	72.22(e)(3)	72.24	72.30	72.130
Proposed Decommissioning Plan		(q)●	●	
Decommissioning Funding Plan	●		●	
Design Features		(f)(g)●		●
Operational Features		(f)(g)●		

Decommissioning of a DSF must meet the requirements for license termination in Subpart E, "Radiological Criteria for License Termination," to 10 CFR Part 20, "Standards for Protection Against Radiation." The requirements related to eventual decommissioning of the DSF applicable at the time of initial licensing are satisfied if the applicant adequately addresses the following acceptance criteria for the proposed decommissioning plan (DP), decommissioning funding plan, design features, and operational features.

14.4.1 Proposed Decommissioning Plan

The NRC's regulations in 10 CFR 72.24(q) and 10 CFR 72.30, "Financial assurance and recordkeeping for decommissioning," require an applicant to submit a proposed DP with the license application. The proposed DP must include a decommissioning funding plan (10 CFR 72.30(b)) containing information on how reasonable assurance will be provided that funds will be available to decommission the DSF (see Section 14.4.2 below). As required in 10 CFR 72.30(a), the proposed DP must also discuss the design features of the DSF that will facilitate decontamination and decommissioning (see Section 14.4.3 below). DOE is exempt from financial assurance requirements per 10 CFR 72.22(e), 10 CFR 72.40(a)(6) and 10 CFR 72.40(a)(10).

The proposed DP must contain information on proposed practices and procedures for the decontamination of the site and facilities and for the disposal of residual radioactive materials after all spent nuclear fuel (SNF), high-level radioactive waste (HLW), and reactor-related greater-than-Class-C (GTCC) waste have been removed from the facility (10 CFR 72.30(a)). This information must be sufficient to provide reasonable assurance that the licensee can conduct eventual decontamination and decommissioning of the DSF in a manner that adequately protects the health and safety of workers and the public (10 CFR 72.30(a)).

In accordance with 10 CFR 72.54, "Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas," a licensee is not required to submit a "final" DP for NRC review and approval until one of the criteria in 10 CFR 72.54(d) is triggered. The proposed DP submitted at the time of license application is expected to be conceptual in nature. It should identify and discuss the anticipated types of contamination and waste generated and the anticipated practices and procedures for decontamination, decommissioning, and disposal of residual radioactive materials. It should be in sufficient detail to support the decommissioning cost estimate required by 10 CFR 72.30(b). The proposed DP should include a commitment to submit a timely final DP for NRC review and approval before initiating decommissioning activities, in accordance with 10 CFR 72.54. The proposed DP should include a commitment to

decommission the facility for unrestricted use in accordance with the radiological criteria for license termination in 10 CFR Part 20, Subpart E.

14.4.2 Decommissioning Funding Plan

The NRC's regulations in 10 CFR 72.22(e)(3) and 10 CFR 72.30 require that the application include a decommissioning funding plan. The decommissioning funding plan must demonstrate reasonable assurance that the applicant will have sufficient funds such that decommissioning will be completed after the removal of SNF, HLW, and reactor-related GTCC waste, as appropriate, from the site (10 CFR 72.30(b)(1)). The decommissioning funding plan must contain a detailed cost estimate for an independent contractor to remediate the site to unrestricted release criteria and an adequate contingency factor (10 CFR 72.30(b)(2)). It must also include means for adjusting cost estimates and associated funding levels periodically over the life of the facility (10 CFR 72.30(b)(4)).

Chapter 4, "Financial Assurance Overview," and Appendix A, "Standard Format and Content of Financial Assurance Mechanisms for Decommissioning," to NUREG-1757, Volume 3, "Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness," provide guidance on decommissioning financial assurance and submittal of the decommissioning funding plan. DOE is exempt from financial assurance requirements per 10 CFR 72.22(e), 10 CFR 72.40(a)(6) and 10 CFR 72.40(a)(10).

14.4.3 Design Features

The NRC's regulations in 10 CFR 72.24(f), 10 CFR 72.30, and 10 CFR 72.130, "Criteria for decommissioning," require that the application identify and discuss the features included in the design of the DSF that will facilitate decommissioning. This includes decontamination of structures and equipment, minimizing the quantity of radioactive wastes and contaminated equipment, and facilitating the removal of radioactive wastes and contaminated materials at the time the DSF is permanently decommissioned.

Design features include surfaces that are less susceptible to contamination (or activation) and are readily decontaminated, as well as shielding to minimize any occupational exposure associated with decontamination. Design features also include equipment to facilitate the decontamination and removal of air circulation and filtration systems, and components of waste treatment and packaging systems.

14.4.4 Operational Features

The NRC's regulations in 10 CFR 72.24(f) and 10 CFR 72.130 require that the application identify the operational features or provisions that will facilitate eventual decontamination and decommissioning of the DSF and reduce radioactive waste volumes generated at the facility. Such features include minimizing contamination buildup on components and maintaining records of information important to decommissioning, such as records of spills or other unusual occurrences involving the spread of contamination and accurate as-built drawings. This information may be in the safety analysis report (SAR) or the proposed DP.

14.5 Review Procedures

Figure 14-1 shows the interrelationship between the decommissioning evaluation and the other areas of review described in this standard review plan (SRP).

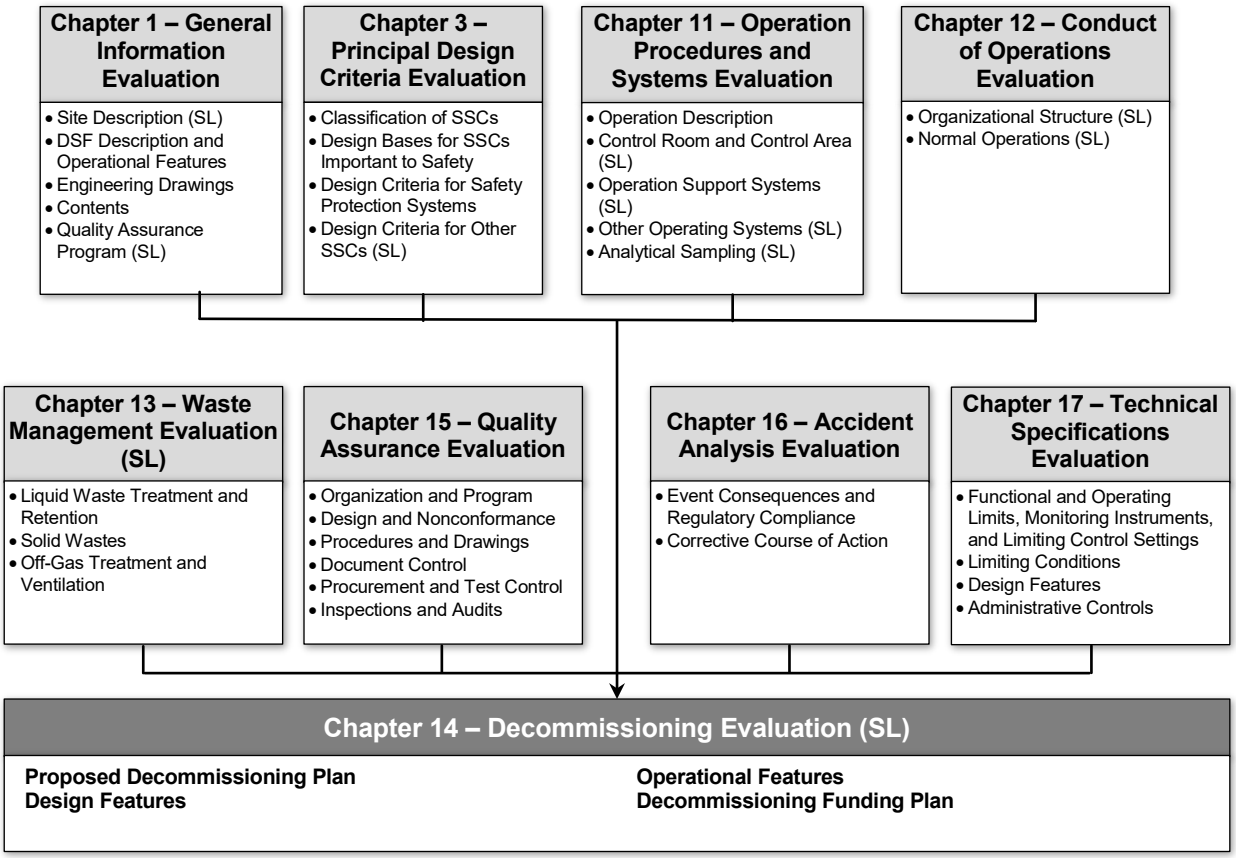

Figure 14-1 Overview of Decommissioning Evaluation

14.5.1 Proposed Decommissioning Plan

Evaluate the applicant's proposed DP and verify that it addresses the areas described below to ensure that it provides reasonable assurance that the licensee can conduct eventual decontamination and decommissioning in a manner that adequately protects the health and safety of workers and the public.

Verify that the applicant has identified the anticipated types of waste to be generated, the anticipated types of contamination, and the anticipated practices and procedures for decontamination, decommissioning, and disposal of residual radioactive materials after all SNF, HLW, and reactor-related GTCC waste have been removed from the site.

Verify that the applicant has committed to submit a timely final DP for NRC review and approval before initiating decommissioning activities, in accordance with 10 CFR 72.54. Verify that the applicant has committed to decommission the facility in accordance with the radiological criteria for unrestricted use for license termination in 10 CFR Part 20, Subpart E.

Although the proposed DP specifically applies to activities licensed under 10 CFR Part 72, there may be interrelationships with other licensed activities, including collocated 10 CFR Part 50 or 10 CFR Part 52 facilities. Evaluate any proposed provisions intended to accommodate conditions associated with the collocated facilities.

14.5.2 Decommissioning Funding Plan

Coordinate the review of the decommissioning funding plan with the NRC Office of Nuclear Reactor Regulation or the Office of Nuclear Material Safety and Safeguards, Division of Decommissioning, Uranium Recovery, and Waste Programs.

Specific guidance for reviewing decommissioning financial assurance appears in NUREG-1757, Volume 3 (Chapter 4 and Appendix A).

Ensure the application includes a decommissioning funding plan containing information on how the applicant provides reasonable assurance that funds will be available to decommission the ISFSI or MRS. Ensure that the decommissioning funding plan includes the following:

- a detailed cost estimate for decommissioning, in an amount that reflects the cost of an independent contractor to perform all decommissioning activities, the cost of meeting the unrestricted use criteria in 10 CFR 20.1402, "Radiological criteria for unrestricted use," and an adequate contingency factor

- identification of and justification for using the key assumptions contained in the decommissioning cost estimate

- a description of the method of assuring funds for decommissioning (using one of the permissible methods of assuring funds listed in 10 CFR 72.30(e)), including means for adjusting cost estimates and associated funding levels periodically over the life of the facility

- the potential volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination

- a certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning

Ensure that the applicant has a plan to update and resubmit the decommissioning funding plan, as specified in 10 CFR 72.30(c) and 10 CFR 72.30(d), and maintain records of the cost estimate performed for the decommissioning funding plan and records of the funding method used for assuring funds, as provided in 10 CFR 72.30(f)(4). The applicant should also ensure that the funds will only be used for decommissioning activities and to monitor and replenish decommissioning funds and report to the NRC, as provided in 10 CFR 72.30(g).

14.5.3 Design Features

Ensure that the SAR or DP identifies the design features of the ISFSI or MRS that will facilitate decontamination and decommissioning, as required in 10 CFR 72.24(f), 10 CFR 72.30, and 10 CFR 72.130. Examine the SAR and the proposed DP for this information. The design can be considered to meet these requirements if (1) the applicant incorporated provisions that are feasible and economic and (2) the applicant has selected design choices over competing alternatives that support decommissioning, or an acceptable rationale for not adopting the most favorable alternatives is provided. The NRC has accepted the priority of important to safety features and capabilities over decommissioning considerations when such tradeoffs arise.

In determining whether the design facilitates decommissioning, consider the extent to which the applicant has selected design features that have characteristics favorable to decommissioning, such as the following:

- Select materials and processes to minimize waste production.
- Minimize mass of shielding materials subject to activation.
- Facilitate future demolition and removal by use of modular design and inclusion of lifting points (with anticipation of the size of containers that may be used for transportation and permanent disposal).
- Select materials compatible with projected decommissioning and waste processing.
- Use finishes with minimum surface roughness on structures, systems, and components.
- Use selected coatings to preclude penetration of radioactive gas, condensate, or deposited aerosols (if present) into porous materials to permit future decontamination by surface treatment.
- Incorporate features to contain leaks and spills.
- Consider current industry technology for the minimization of waste production.
- Conduct a radiation survey of the proposed site of the ISFSI or MRS before construction to facilitate eventual demonstration of compliance with decommissioning criteria.

In performing these design reviews, ensure that the design features have adequately considered health and safety, including provisions to maintain occupational and public radiation exposures to as low as reasonably achievable during decommissioning.

Refer to Regulatory Guide (RG) 4.21, “Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning,” which provides guidance for the implementation of 10 CFR 20.1406, “Minimization on Contamination.”

14.5.4 Operational Features

Review the SAR and DP for operational features or provisions that facilitate eventual decommissioning and reduce radioactive waste volume. Verify with the reviewers of the conduct of operations (SRP Chapter 12, “Conduct of Operations Evaluation”) and waste management (SRP Chapter 13, “Waste Management Evaluation”) that the applicant has procedures, processes, or programs to identify and minimize the spread of contamination. Verify that the applicant has committed to a plan to keep records of information important to decommissioning as provided in 10 CFR 72.30(f), such as spills or other unusual occurrences, until the license is terminated. Records should include information on contamination that may have spread to inaccessible areas, as in the case of seepage into porous materials such as concrete. Records should include any known information on the identification of nuclides, quantities, forms, and concentrations. Verify that the applicant has a plan to maintain records of as-built drawings and modifications (or suitable substitute records if drawings are not available) of structures and equipment in areas where radioactive materials are used, handled, transferred, or stored and of locations of possible inaccessible contamination.

Consult with the reviewer for waste management to determine whether proposed operations of waste management systems have adequately addressed the facilitation of decommissioning. Consult with the radiation protection reviewer (SRP Chapter 10A) to determine whether the proposed health physics surveys and recordkeeping will facilitate decommissioning.

Refer to RG 4.22, "Decommissioning Planning During Operations," which provides guidance for the implementation of 10 CFR 20.1406 on the minimization of contamination.

14.6 Evaluation Findings

The NRC reviewer should prepare evaluation findings on satisfaction of the regulatory requirements in Section 14.4 of this SRP. If the documentation submitted with the application fully supports positive findings for each of the regulatory requirements, the statements of findings should be similar to the following:

F14.1 The staff has reviewed the proposed decommissioning plan the applicant submitted for the [DSF designation] and the description of the plan in the SAR. The staff has determined that the proposed decommissioning plan the applicant submitted contains sufficient information on the proposed practices and procedures for decontamination of the site and disposal of residual radioactive materials to provide reasonable assurance that the eventual decommissioning of the [DSF designation] at the end of its useful life will provide adequate protection of the health and safety of the public. The staff, therefore, concludes that the proposed decommissioning plan complies with 10 CFR 72.24(q) and 10 CFR 72.30(a).

F14.2 The staff has reviewed the decommissioning funding plan the applicant submitted for the [DSF designation]. The staff has determined that (a) the decommissioning funding plan the applicant submitted is sufficient to provide reasonable assurance that costs related to decommissioning as characterized by the proposed decommissioning plan have been adequately estimated, (b) the financial assurance method the applicant described is sufficient to provide reasonable assurance that adequate funds will be available to decommission the facility at the end of its useful life, and (c) the applicant has provisions for adjusting cost estimates and associated funding levels periodically over the life of the [DSF designation] and plans to maintain records of the cost estimate performed for the decommissioning funding plan and records of the funding method used for assuring funds. The staff, therefore, concludes that the decommissioning funding provisions comply with 10 CFR 72.22(e)(3), 10 CFR 72.30(b), 10 CFR 72.30(e), and 10 CFR 72.30(f)(4).

F14.3 The staff has reviewed the application for the [DSF designation]. The staff has determined that the applicant has identified and discussed those design features of the [DSF designation] that facilitate decontamination and decommissioning, minimize the quantity of radioactive wastes and contaminated equipment, and facilitate removal of radioactive wastes and contaminated materials at the time the [DSF designation] is permanently decommissioned. The staff, therefore, concludes that the application complies with 10 CFR 72.24(f), 10 CFR 72.30(a), and 10 CFR 72.130.

F14.4 The staff has reviewed the application for the [DSF designation]. The staff has determined that the applicant identifies and discusses those [DSF designation] operating modes that reduce radioactive waste volumes generated at the installation and facilitate decontamination and decommissioning, and includes plans to maintain records of information important to decommissioning. The staff, therefore, concludes that the application complies with 10 CFR 72.24(f) and 10 CFR 72.30(f).

The reviewer should provide a summary statement similar to the following:

> The staff concludes that the decommissioning plan and decommissioning funding plan of the [DSF designation] are in compliance with 10 CFR Part 72 and that the applicable acceptance criteria have been satisfied. The evaluation of the decommissioning plan provided in the SAR offers reasonable assurance that the [DSF designation] will, at the conclusion of the safe storage of SNF, HLW, and reactor-related GTCC waste (as applicable), enable remediation of the site and termination of the license in accordance with 10 CFR Part 20, Subpart E. This finding is based on a review that considered the regulations, appropriate regulatory guides, applicable codes and standards, and accepted practices.

14.7 References

10 CFR Part 20, “Standards for Protection against Radiation.”

10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities.”

10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”

10 CFR Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste.”

NUREG-1757, Volume 3, “Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness.”

Regulatory Guide 4.21, “Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning.”