14.0 DECOMMISSIONING

I. Review Objective

The decommissioning review ensures that the safety analysis report (SAR) demonstrates that the applicant has conceived adequate provisions to facilitate transfer of the spent fuel stored in the ISFSI to the DOE and provide for the future decontamination and disposal of the components that make up the dry cask storage system (DCSS).

The NRC recognizes that decommissioning will occur in the distant future (perhaps more than 20 years after the cask is first used) and will employ site-specific procedures available at that time. Consequently, 10 CFR Part 72[1] does not require licensees to develop detailed decommissioning plans until near the time of license termination.

By contrast, during the licensing of a proposed Dry Cask Storage System (DCSS), the applicant need only submit a *conceptual* decommissioning plan for NRC evaluation. Nonetheless, the applicant's conceptual plan must provide reasonable assurance that the owner of the DCSS can conduct decontamination and decommissioning in a manner that adequately protects the health and safety of the public.

Specifically, the conceptual decommissioning plan must identify the types of waste to be generated, the anticipated types of contamination, the proposed practices and procedures for decontaminating the cask and disposing of residual radioactive materials.

To augment the conceptual plan, the NRC requires a commitment that *general* licensees submit a detailed plan for ISFSI decommissioning along with their reactor decommissioning plan. Similarly, *site-specific* licensees will submit a detailed decommissioning plan for review and approval before initiating decommissioning activities at the facility.

II. Areas of Review

This portion of the DCSS review evaluates the applicant's conceptual decommissioning plan to ensure that it provides reasonable assurance that the licensee can conduct decontamination and decommissioning in a manner that adequately protects the health and safety of the public. Consequently, this chapter of the DCSS Standard Review Plan (SRP) provides guidance for use in conducting a comprehensive evaluation of the conceptual plan, which *may* encompass the following areas of review, as described in Section V, "Review Procedures":

1. identification and discussion of the anticipated decommissioning activities, types of waste to be generated, possible types of contamination, and planned waste disposal method(s)

2. commitment to decontaminate the facility to applicable NRC criteria

3. a financial plan, providing adequate financial assurance for the cost of decommissioning, submitted as a separate document, as required by Regulatory Guide (RG) 3.50[2]

4. commitment to submit a timely, detailed decommissioning plan for NRC review and approval before initiating decommissioning activities

III. Regulatory Requirements

The requirements applicable to this portion of the DCSS review represent the following four distinct areas:

1. The ISFSI or MRS must be designed for decommissioning. Provisions must be made to facilitate decontamination of structures and equipment, minimize the quantity of radioactive wastes and contaminated equipment, and facilitate the removal of radioactive wastes and contaminated materials at the time the ISFSI or MRS is permanently decommissioned. [10 CFR 72.130.]

2. The cask must be designed to facilitate decontamination to the extent practicable. [10 CFR 72.236(i).]

3. The requirements for financial assurance and record keeping associated with decommissioning are found in 10 CFR 72.30.

4. The requirements for terminating an ISFSI license and decommissioning ISFSI sites and buildings are found in including the requirements for submitting the final decommissioning plan are found in [10 CFR 72.54.]

IV. Acceptance Criteria

In general, the DCSS decommissioning evaluation seeks to ensure that the given design and conceptual decommissioning plan fulfill the following acceptance criteria:

1. decontamination of buildings and equipment, as specified in RG 1.86[3].

2. classification and disposal of wastes, as contained in 10 CFR 61.55[4].

V. Review Procedures

Review the general description and operating features of the cask system and its application to an ISFSI facility, as presented in SAR Section 1. Then, review the conceptual decommissioning plan in SAR Section 2. In particular, verify that the applicant has accurately and acceptably identified (1) the types of waste to be generated, (2) the anticipated types of contamination, (3) the proposed practices and procedures for decontaminating the cask and disposing of residual radioactive materials after all spent fuel and spent fuel casks have been removed from the site, and (4) the projected decommissioning activities. Note that the final acceptance criteria will be measured and evaluated at the time of decommissioning, and further guidance will be added to this SRP as it becomes available.

The NRC accepts that cask system features required to provide other capabilities may counter or interfere with features intended to facilitate decommissioning. For example, use of steel to provide strength may result in greater activation of materials; structural integrity designed to provide required safety in design-basis events increases the difficulty associated with demolition and size reduction, as does the increased material mass used for radiation and physical shielding. The NRC has accepted the priority of safety-related features and capabilities over decommissioning considerations when such trade-offs arise.

After the casks have been decontaminated, the major radiation sources may be those resulting from activation of the system components, such as the concrete shielding and reinforcing steel. Verify that the applicant has properly estimated the activities of these nuclides. Several activation products are short-lived, and the SAR may discuss their activity as a function of time after unloading. Although the specific activation products depend on the materials initially present in the cask components, the nuclides of interest are generally Cr-51, Mn-55, Fe-58, Co-58, Co-60, and Ni-63. A significant reduction in the total activation occurs in only 1 year after unloading.

Because of the low levels of spontaneous fission and subcritical multiplication in the spent fuel during the storage period, the activation of the cask components is generally very minor and can be approximated by simple, conservative methods. A typical approach is to use the same flux calculated from the deterministic shielding analysis (documented in SAR Section 5), along with appropriate cross-sections from the same calculation. For conservatism, activation of the cask body is determined from the flux at the inner surface. Equilibrium activities of the irradiated structures are generally calculated without considering the time dependence of the flux during the storage period.

Another common approach is to determine a conservative one-group flux, select a conservative cross-section library, and calculate the activities of the resulting radioactive nuclides using ORIGEN2[5]. This evaluation is intended to ensure that the activated cask components can be disposed of in a low-level waste disposal site. The acceptable criteria are specified in the tables contained in 10 CFR 61.55[2]. Radiological survey information in the applicant's final decommissioning plan should verify the preliminary waste classification and the acceptability of the proposed disposal methods. Other wastes generated from the applicant's decontamination activities should also be reviewed and evaluated to determine their quantity and acceptability for disposal under 10 CFR Part 61.

VI. Evaluation Findings

Review the 10 CFR Part 72 acceptance criteria and provide a summary statement for each. These statements should be similar to the following model:

The applicant's proposed cask design includes adequate provisions for decontamination and decommissioning. As discussed in Section ___ of the SAR, these provisions include facilitating decontamination of the DCSS, if needed; storing the remaining components, if no waste facility is expected to be available; and disposing of any remaining low-level radioactive waste.

Section _____ of the SAR presents information concerning the proposed practices and procedures for decontaminating the cask and disposing of residual radioactive materials after all spent fuel has been removed. This information provides reasonable assurance that the applicant will conduct decontamination and decommissioning in a manner that adequately protects the health and safety of the public.

The staff concludes that the decommissioning considerations for the [cask designation] are in compliance with 10 CFR Part 72. This evaluation provides reasonable assurance that the [cask designation] will allow safe storage of spent fuel.This finding is reached on the basis of a review that considered the regulation itself, appropriate regulatory guides, applicable codes and standards, and accepted engineering practices.

VII. References

1.*U.S. Code of Federal Regulations*, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-level Radioactive Waste," Part 72, Title 10, "Energy."

2.U.S. Nuclear Regulatory Commission, Standard Format and Content for a License Application to Store Spent Fuel and High-Level Radioactive Waste," Regulatory Guide 3.50, September 1989.

3. U.S. Nuclear Regulatory Commission,"Termination of Operating Licenses for Nuclear Reactors," Regulatory Guide 1.86, June 1974.

4. *U.S. Code of Federal Regulations*, Part 61, "Licensing Requirements for Land Disposal of Radioactive Wastes," Title 10, "Energy."

5. Oak Ridge National Laboratory, "ORIGEN2: Isotope Generation and Depletion Code-Matrix Exponential Method,"**,** 1991.