1.0 GENERAL DESCRIPTION

I. Review Objective

The purpose of reviewing the general description of the cask or dry cask storage system (DCSS) is to ensure that the applicant has provided a non-proprietary description that is adequate to familiarize reviewers and other interested parties with the pertinent features of the system.

II. Areas of Review

The general description should enable all reviewers, regardless of their specific review assignments, to obtain a basic understanding of the DCSS, its components, and the protections afforded for the health and safety of the public. Regulatory Guide (RG) 3.61[1] provides general guidance regarding information that should be included in the general description. Because much of the information relevant to this initial aspect of the DCSS review is presented in more detail in other chapters of this standard review plan (SRP), this chapter focuses on familiarization with the DCSS and should be consistent with the remaining sections of the safety analysis report (SAR). Specifically, this focus may encompass the following areas of review:

1. DCSS description and operational features
2. drawings
3. DCSS contents
4. qualifications of the applicant
5. quality assurance
6. consideration of 10 CFR Part 71[2] requirements regarding transportation

III. Regulatory Requirements

1. General Description and Operational Features

The application must present a general description and discussion of the DCSS, with special attention to design and operating characteristics, unusual or novel design features, and principal safety considerations. [10 CFR Part 72.24(b)][3]

2. Drawings

Structures, systems, and components (SSCs) important to safety must be described in sufficient detail to enable reviewers to evaluate their effectiveness. [10 CFR Part 72.24(c)(3)]

3. DCSS Contents

The applicant must provide specifications for the contents expected to be stored in the DCSS (normally spent fuel). These specifications may include, but not be limited to, type of spent fuel (i.e., boiling-water reactor (BWR), pressurized-water reactor (PWR), or both), maximum allowable enrichment of the fuel before any irradiation, burnup (i.e., megawatt-days/metric ton Uranium), minimum acceptable cooling time of the spent fuel before storage in the DCSS (aged at least 1 year), maximum heat designed to be dissipated, maximum spent fuel loading limit, condition of the spent fuel (i.e., intact assembly or

consolidated fuel rods), weight and nature of non-spent fuel contents, and inert atmosphere requirements. [10 CFR Part 72.2(a)(1) and 10 CFR Part 72.236(a)]

4. Qualifications of the Applicant

The application must include the technical qualifications of the applicant to engage in the proposed activities. Qualifications should include training and experience. [10 CFR Part 72.24(j), 10 CFR Part 72.28(a)]

5. Quality Assurance

The safety analysis report (SAR) must include a description of the applicant's quality assurance (QA) program, with reference to implementing procedures. This description must satisfy the requirements of 10 CFR Part 72, Subpart G, and must be applied to DCSS SSC that are important to safety throughout all design, fabrication, construction, testing, operations, modifications and decommissioning activities. These implementing procedures need not be explicitly included in the application. [10 CFR Part 72.24(n)]

6. Consideration of 10 CFR Part 71 Requirements Regarding Transportation

If the DCSS under consideration has previously been reviewed and certified for use as a transportation cask, the application must include a copy of the Certificate of Compliance issued for the DCSS under 10 CFR Part 71, including drawings and other documents referenced in the certificate. [10 CFR 72.230(b)]

IV. Acceptance Criteria

In general, this initial aspect of the DCSS review seeks to ensure that the applicant's general description of the DCSS fulfills the following acceptance criteria:

1. DCSS Description and Operational Features

The applicant should provide a broad overview and a general, non-proprietary description (including illustrations) of the DCSS, clearly identifying the functions of all components and providing a list of those components classified by the applicant as being "important to safety."

2. Drawings

The applicant should provide non-proprietary drawings of the storage system, of sufficient detail, that an interested party can ascertain its major design features and general operations.

3. DCSS Contents

The applicant should characterize the fuel and other radioactive wastes expected to be stored in the DCSS. If the potential exists that the DCSS will be used to store degraded fuel, the SAR should include a discussion of how the sub-criticality and retrievability requirements will be maintained.

4. Discussion of Organizational Roles

The reviewer should ensure that the applicant has clearly identified the roles and responsibilities that the DCSS designer, vendor, and other agents, such as potential licensees, fabricators, and contractors will have in the review process. Verify that the applicant has provided clear evidence demonstrating that they are qualified to engage in the proposed activities. In addition, verify that the applicant has delineated the responsibilities for all those who will be involved in the construction and operation of the DCSS if known. The reviewer should ensure that the applicant has specifically defined activities which they will not perform.

5. Quality Assurance

Verify that the applicant has described the proposed QA program, citing the applicable implementing procedures. This description should satisfy all requirements of 10 CFR Part 72, Subpart G, that apply to the design, fabrication, construction, testing, operation, modification, and decommissioning of the DCSS SSCs that are important to safety.

6. Consideration of 10 CFR Part 71 Requirements Regarding Transportation

If the DCSS under review has previously been evaluated for use as a transportation cask, the submittal should include the Part 71 Certificate of Compliance and associated documents.

V. Review Procedures

1. DCSS Description and Operational Features

Verify that the applicant has provided for this section of the application, a broad overview of the cask or DCSS design that is non-proprietary and may be used as a tool to familiarize interested parties with the features of the proposed DCSS. This description should present the principal characteristics of the DCSS, including its dimensions, weight, and construction materials. In addition, the description should clearly identify all components that the applicant considers important to safety. Features such as confinement, sampling ports, valves, lids, seals, closure mechanisms, shielding, and lifting devices should be identified and described. A clear definition of the primary confinement system is particularly important. Special design features of the DCSS such as non-passive heat removal system, neutron poisons or monitoring instrumentation should also be discussed.

Sketches and diagrams, if presented in this section, should be compared with the detailed drawings presented elsewhere in the SAR. If the application includes proprietary drawings and descriptions, that will remain proprietary upon approval of the license or certificate, the sketches, drawings and diagrams that provide the general description and operational features need not show the proprietary features. This may be achieved by depicting less detail or by illustrating generic components which fulfill the design function that differ from the actual design. However, these representations should show the operational concept and safety-related features in sufficient detail to form an acceptable basis for public review and comment, as necessary for public hearings.

In addition to information on a single DCSS, the application should describe any limitations on the arrangement of DCSS arrays. For some DCSS, this may be minimum spacing between DCSS, maximum density of DCSS in an array, and/or total number of DCSS or amount of spent fuel that may be stored at a single independent spent fuel storage installation (ISFSI). The acceptable limitations should be included among the conditions for use in the SER (see Chapter 12 of this SRP). However, for DCSS

systems such as those with metal confinement vessels stored in a concrete vault, information on the configuration of vault compartments and horizontal/vertical arrangement is necessary.

2. Drawings

Drawings are usually presented in Section 1 of the SAR. Although some applicants may submit drawings designated as "proprietary," reviewers should note that any drawings relied on as the technical basis for adding the DCSS design to the "list of approved spent fuel storage DCSS" contained in Subpart K of 10 CFR 72, become part of the public record. Such drawings will not be treated as proprietary and will be made available to the public (10 CFR 2.790(c)). Applicants may submit additional drawings showing greater detail to support their evaluations, and these may be exempted from the public record if they are not relied on by the staff as part of the technical basis for DCSS design approval. Verify that all SSC important to safety that are not detailed in latter sections of the SAR are sufficiently detailed to enable reviewers to evaluate their effectiveness. In addition, information on non-safety items may also be necessary to ensure that they do not impede the safety systems.

The level of detail needed in the drawings is generally assessed by each reviewer during the evaluation of specific sections of the SAR. Particular attention should be devoted to ensuring that dimensions, materials, and other details on the drawings are consistent with those described in both the text of the SAR and those used in supplementary analysis. If size reduction has rendered any information unclear or illegible, reviewers should request that the applicant provide larger or full-size drawings.

Drawings applicable to the SAR review should be identified by number and revision in Section 12 of the SER.

3. DCSS Contents

The application should present a general description of the fuel or other contents proposed for storage in the DCSS. Because a very detailed description of the proposed DCSS contents or spent fuel is typically provided in Section 2, "Principal Design Criteria," the information presented in Section 1, "General Description," is important only to the extent that it permits overall familiarization with the DCSS. Key parameters for spent fuel include the type of fuel (i.e., PWR, BWR, or both), number of fuel assemblies, and condition of the fuel assemblies (intact or consolidated). This section often includes additional characteristics, such as maximum burnup, initial enrichment, heat load, and cooling time, as well as the assembly vendor and configuration (e.g., Westinghouse 17x17), and these characteristics may also be repeated in the principal design criteria. In addition, the cover gas, if any, should be identified.

If the applicant proposes the storage of spent fuel with gross cladding defects or storage of non-fuel core components that do not have an integral confinement boundary, the range of permissible conditions for the stored material must be defined. If the DCSS system is intended to be used to store fuel with gross cladding defects or an integral confinement boundary when placed in the confinement DCSS, the possible range of conditions of the fuel or components should be stated. 10 CFR 72.122(h)(1) requires "canning" or use of other acceptable means for storing fuel with cladding that is not or may not remain intact and for unconsolidated assemblies (without intact cladding). The application, therefore, should address the following basic requirements:

- maintain subcriticality
- prevent unacceptable release of contained radioactive material
- avoid excessive radiation dose rates and doses

- maintain ready retrievability of the contents

If the requested approval is to address the possible use of the DCSS system for storing non-fuel core components, the application should present summary descriptions of those components. Also, if the components are degraded (e.g., the component does not provide adequate confinement under design basis conditions to contain radioactive gas or other dispersable radioactive materials), the application should describe the possible conditions and alternative confinement methods, if any.

4. Qualifications of the Applicant

The application should clearly designate the applicant and the prime agents, consultants, and contractors, if known, for design, fabrication, and testing of the proposed DCSS components. In addition, the application should clearly define the division and assignment of responsibilities among those parties. Although specific subcontractors may not be known at the time the SAR is submitted, the application should clearly identify any activities that the applicant will not perform. In addition, the application should describe the technical qualifications, previous experience and suitability of the all organizations participating in the proposed activities.

5. Quality Assurance

The applicant should describe the proposed QA program, citing all implementing procedures, in a manner that satisfies the 18 criteria defined in 10 CFR Part 72, Subpart G, "Quality Assurance." (The description need only refer to procedures that implement the QA program. These procedures need not be explicitly included in the application.) The QA program should address design, fabrication, construction, testing, operation, modification, and decommissioning activities regarding the DCSS SSCs that are important to safety. The applicant should also discuss the activities that will be performed under the QA program, and how the activities will be controlled to ensure compliance with all of the requirements of Subpart G. These controls should be applied to the various activities using a graded approach, i.e., QA efforts expended for a given activity should be consistent with that activite’s system classification and function.

6. Consideration of 10 CFR Part 71 Requirements Regarding Transportation

If the DCSS system under review for storage has previously been evaluated for use as a transportation DCSS, the submittal should include a copy of the Certificate of Compliance issued for the DCSS under 10 CFR Part 71, if applicable. Drawings or other documents referenced in the certificate, should be included with the application or incorporated by reference to the NRC Part 72 docket number. The applicant should include a discussion supporting the proposed use of the DCSS for spent fuel storage for a period of at least 20 years.

Because applications for certification under 10 CFR Parts 71 and 72 are sometimes submitted concurrently, the final (approved) version of such documents may not be available at the time of initial DCSS SAR submission. Nonetheless, applicable documentation of the Part 71 certification, including questions and responses from the related review, is generally provided to the Part 72 review team, as appropriate. Substantial coordination of the Part 71 and Part 72 reviews is necessary to ensure consistency and avoid duplication of effort. The applicant should have a process for promptly informing each of the review teams about DCSS system design changes precipitated by any concurrent safety reviews. Provisions for communicating these changes should be addressed by and discussed with the applicant.

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:

A general description and discussion of the DCSS is presented in Section(s) _____ of the SAR, with special attention to design and operating characteristics, unusual or novel design features, and principal safety considerations.

Drawings for structures, systems, and components (SSCs) important to safety are presented in Section _____ of the SAR. A listing of those drawings that were relied upon as a basis for approval appears in Section 12 of the Safety Evaluation Report (SER).

Specifications for the spent fuel to be stored in the DCSS are provided in SAR Section _____. Additional details concerning these specifications are presented in Chapter 2 of both the SAR and SER.

The technical qualifications of the applicant to engage in the proposed activities are identified in Section _____ of the SAR.

The quality assurance program, and implementing procedures, are described in Section 13 of the SAR.

The [DCSS system designation] [has been/is/is not being] certified under 10 CFR Part 71 for use in transportation. A copy of the SAR and Certificate of Compliance issued under 10 CFR Part 71 are on file with the NRC under Docket No. _____ [if applicable].

The staff concludes that the information presented in this section of the SAR satisfies the requirements for the general description under 10 CFR Part 72. This finding is reached on the basis of a review that considered the regulation itself, Regulatory Guide 3.61, and accepted practices.

VII. References

1. U.S. Nuclear Regulatory Commission, "Standard Format and Content for a Topical Safety Analysis Report for a Spent Fuel Dry Storage Cask," Regulatory Guide 3.61, February 1989.

2. *U.S. Code of Federal Regulations*, "Packaging and Transportation of Radioactive Material," Part 71, Title 10, "Energy."

3. *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."