

## **12.0 CONDITIONS FOR CASK USE — OPERATING CONTROLS AND LIMITS OR TECHNICAL SPECIFICATIONS**

### **I. Review Objective**

In this portion of the dry cask storage system (DCSS) review, the NRC evaluates the operating controls and limits or the technical specifications (including their bases and justification) that the applicant has established as license conditions (for site-specific applications) or conditions of use (for applications requesting DCSS system approval under 10 CFR Part 72<sup>1</sup>). The NRC also determines whether the applicant has fully evaluated the proposed operating controls and limits, or technical specifications, and whether the safety evaluation report (SER) prepared by the NRC staff incorporates any additional operating controls and limits that the staff deems necessary.

For simplicity in defining the acceptance criteria and review procedures, the term *technical specifications* may be considered synonymous with *operating controls and limits*. The technical specifications define the conditions that are deemed necessary for safe DCSS system use. Specifically, they define operating limits and controls, monitoring instruments and control settings, surveillance requirements, design features, and administrative controls that ensure safe operation of the DCSS. As such, these technical specifications are included in a DCSS certificate of compliance or site-specific license, as applicable. Each specification should be clearly documented and justified in the technical review sections of the safety analysis report (SAR) and the associated SER as necessary for safe DCSS operation.

### **II. Areas of Review**

This chapter of the DCSS Standard Review Plan (SRP) provides guidance for use in evaluating the technical specifications that the applicant deems necessary for safe use of the proposed DCSS system. As defined in Section V, “Review Procedures,” a comprehensive review of the proposed technical specifications would assess the applicant’s compliance with the regulatory requirements for technical specifications, as defined in 10 CFR Part 72.44(c). These requirements represent the following five areas of review:

1. functional/operating limits, monitoring instruments, and limiting control settings
2. limiting conditions
3. surveillance requirements
4. design features
5. administrative controls

### **III. Regulatory Requirements**

#### **1. General Requirement for Technical Specifications**

The applicant shall propose technical specifications (complete with acceptable bases and adequate justification). These specifications must include the following five areas [10 CFR 72.44(c), 10 CFR 72.24(g), and 10 CFR 72.26]:

- a. functional/operating limits, monitoring instruments, and limiting controls
- b. limiting conditions
- c. surveillance requirements
- d. design features
- e. administrative controls

Subpart E, “Siting Evaluation Factors,” and Subpart F, “General Design Criteria,” to 10 CFR Part 72, provide the bases for the cask system design and, hence, are applicable as bases for appropriate technical specifications.

#### **2. Specific Requirements for Technical Specifications — Storage Cask Approval**

As a condition of approval, the design, fabrication, testing, and maintenance of a spent fuel DCSS must comply with the requirements of 10 CFR 72.236. [10 CFR 72.234(a)]

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The applicant must provide specifications for the spent fuel to be stored in the DCSS. At a minimum, these specifications should include, but not be limited to the following details [10 CFR 72.236(a)]:

- a. type of spent fuel (i.e., BWR, PWR, or both)
- b. maximum allowable enrichment of the fuel prior to any irradiation
- c. burn-up (i.e., megawatt-days/MTU)
- d. minimum acceptable cooling time of the spent fuel prior to storage in the DCSS (minimum 1 year)
- e. maximum heat that the DCSS system is designed to dissipate
- f. maximum spent fuel loading limit
- g. weights and dimensions
- h. condition of the spent fuel (i.e., intact assembly or consolidated fuel rods)
- i. inerting atmosphere requirements

The applicant must provide design bases and design criteria for structures, systems, and components (SSCs) important to safety. [10 CFR 72.236(b)]

The applicant must design and fabricate the DCSS so that the spent fuel will be maintained in a subcritical condition under credible conditions. [10 CFR 72.236(c)]

The applicant must provide radiation shielding and confinement features that are sufficient to meet the requirements in 10 CFR 72.104 and 72.106 regarding radioactive material in effluents, direct radiation, and area control. [10 CFR 72.236(d) and 10 CFR Part 20<sup>2</sup>]

The applicant must design the DCSS to meet the following criteria:

- Provide redundant sealing of confinement systems. [10 CFR 72.236(e)]
- Provide adequate heat removal capacity without active cooling systems. [10 CFR 72.236(f)]
- Safely store the spent fuel for a minimum of 20 years and permit maintenance as required. [10 CFR 72.236(g)]
- Facilitate decontamination to the extent practicable. [10 CFR 72.236(i)]

The DCSS must be compatible with wet or dry spent fuel loading and unloading facilities. [10 CFR 72.236(h)]

The applicant must inspect the DCSS to ascertain that there are no cracks, pinholes, uncontrolled voids, or other defects that could significantly reduce its confinement effectiveness. [10 CFR 72.236(j)]

The applicant must evaluate the DCSS, and its systems important to safety, using appropriate tests or other means acceptable to the Commission, to demonstrate that they will reasonably maintain confinement of radioactive material under normal, off-normal, and credible accident conditions. [10 CFR 72.236(l)]

## IV. Acceptance Criteria

In this portion of the DCSS review, the NRC evaluates the technical specifications that the applicant deems necessary and sufficient for safe use of the proposed DCSS. This evaluation is based on information that the applicant presents in SAR Section 12<sup>\*</sup>, as well as accepted practices and applicant commitments discussed in other sections of the SAR or in correspondence subsequent to submission of the application.

The staff generally expects that appropriate section of the SAR will include commitments regarding DCSS design and use. Where this expectation is not met, the staff may request that the applicant revise the SAR to include certain commitments. Such commitments may also be documented in other pertinent

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\* An applicant may submit the proposed operating controls, limits and technical specifications as a separate document, provided that the document is submitted at the same time as the application.

applicant correspondence, or in site-specific license conditions as required by applicable regulations. Nonetheless, it is helpful to ensure that SAR Section 12 includes *all* commitments applicable to technical specifications (regardless of where else they may be addressed), and that the SER prepared by the NRC staff acknowledges each of these commitments. Moreover, it should be noted that the fact that SAR Section 12 does not explicitly address all commitments does not negate the requirement of the DCSS owner/operator to meet and comply with such commitments.

Because of the breadth and scope of the conditions for DCSS use, it is not possible to define each instance where a technical specification is necessary. The applicant is responsible for submitting a complete application that proposes all conditions that are deemed necessary for safe DCSS use. For these reasons, it is important that NRC staff reviewers conduct a detailed, thorough, and independent evaluation of each technical section and its associated technical specifications. In particular, the pertinent SAR sections must identify and support the technical specifications deemed necessary to maintain subcriticality, confinement barrier integrity, shielding and radiological protection, heat removal capability, and structural integrity under normal and accident operations.

## V. Review Procedures

Evaluate each section of the SAR with the goal of establishing the technical specifications. Each reviewer of the SAR should note all instances in which the SAR either makes an assumption or imposes a condition that should be identified as a technical specification. Reviewers should also note any instances in which the SAR requests exceptions or exemptions from regulatory requirements, or other conditions that the reviewer identifies as an operational limit or condition. Reviewers assigned to this portion of the review should also ensure that such limits and exemptions are clearly identified and documented in SAR Section 12, and acknowledged in SER Section 12.

Review or be familiar with the technical specifications of similar cask designs previously approved by the NRC staff. For example, the staff has previously approved cask designs and issued technical specifications regarding a variety of items including, but not limited to, the following examples:

- general requirements and conditions regarding site-specific parameters, operating procedures, quality assurance, heavy loads, training, etc.
- a preoperational training exercise and demonstration of most cask operations, including loading, sealing, and drying (using mockups as appropriate); placement in storage; and return of fuel to the spent fuel pool
- specifications for the spent fuel to be stored in the cask, including, but not limited to, the type of spent fuel (i.e., BWR, PWR, or both), the maximum allowable enrichment of the fuel before irradiation, burnup (i.e., megawatt-days/MTU), the minimum acceptable cooling time of the spent fuel before storage in the cask, the maximum heat designed to be dissipated, the maximum spent fuel loading limit, the maximum neutron and gamma source terms, condition of the spent fuel (i.e., intact assembly or consolidated fuel rods, allowable cladding condition), and physical parameters (e.g., length, width, depth, weight, etc.)
- criticality controls, such as cask water boron concentrations
- the inerting atmosphere requirements, such as vacuum drying and helium backfill parameters
- cask handling restrictions, such as lift height limits and ambient temperature (high/low) conditions
- confinement barrier requirements, such as leak rate limits
- thermal performance parameters, such as maximum temperatures or delta-temperatures
- radiological controls, such as radiation dose rates and contamination limits
- cask array and/or spacing limits for thermal performance and radiological considerations

Ensure that all necessary technical specifications are explicitly delineated in the SER and in the certificate of compliance or site-specific license, as applicable. These delineations typically restate the

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Technical specifications defined in the SAR, but may be modified or supplemented as the staff deems appropriate.

NRC technical reviewers assigned to each SAR section have the responsibility to review the applicant's technical specifications and to identify any additional conditions that are necessary for cask use. The staff should ensure that the conditions for use, as evaluated and approved by the technical reviewers, complement one another and are not contradictory. The staff will coordinate the resolution of any disputed condition, limit, or specification. The staff is also responsible for identifying any unique specifications (e.g., administrative) that may not be covered in the technical sections, although input may be solicited from the technical reviewers regarding any topic.

Regulatory Guide 3.61<sup>3</sup> provides a recommended format for use by applicants in presenting Technical specifications. However, this format may not be applicable to all controls. Since the basis for the control may be extensively discussed in earlier sections of the SAR, the applicant may use an abbreviated format in SAR Section 12.

Coordinate the review of the proposed technical specifications with appropriate NRC staff familiar with ISFSI inspections and operations to assure the operational limitations are measurable and inspectable.

Upon completion of the review, the staff may prepare a separate table or appendix for SER Section 12 to explicitly designate the technical specifications that are applicable to the cask.

## VI. Evaluation Findings

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

Table \_\_\_ of the safety evaluation report (SER) lists the technical specifications for the [cask designation]. These technical specifications are further discussed in Section 12 of the safety analysis report (SAR) [or other related document].

The staff concludes that the conditions for use of the [cask designation] identify necessary technical specifications to satisfy 10 CFR Part 72, and that the applicable acceptance criteria have been satisfied. The proposed technical specifications provide reasonable assurance that the cask 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 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. Code of Federal Regulations*, Part 20, "Standards for Protection Against Radiation," Title 10, "Energy."
3. U.S. Nuclear Regulatory Commission, "Standard Format and Content for a Topical Safety Analysis Report for a Spent Fuel Dry Storage Facility," Regulatory Guide 3.61, February 1989.