U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

9.1.2 SPENT FUEL STORAGE

REVIEW RESPONSIBILITIES

Primary - ~~Auxiliary~~Plant Systems Branch (~~ASB~~SPLB)[1]

Secondary - Civil Engineering and Geosciences Branch (ECGB)[2]
Materials and Chemical Engineering Branch (~~CMEB~~EMCB)[3]
Reactor Systems Branch (SRXB)[4]

I. AREAS OF REVIEW

Nuclear reactor plants include storage facilities for the wet storage of spent fuel assemblies. The safety function of the spent fuel pool and storage racks is to maintain the spent fuel assemblies in a safe and subcritical array during all credible storage conditions and to provide a safe means of loading the assemblies into shipping casks.

The ~~ASB~~SPLB[5] reviews the spent fuel storage facility design including the spent fuel storage racks, the spent fuel storage pool that contains the storage racks, the spent fuel pool liner plate, and the associated equipment storage pits to ~~assure~~ensure[6] conformance with the requirements of General Design Criteria 2, 4, 5, 61, 62, and 63.

1. The facility and components are reviewed with respect to the following:

   a. The quantity of fuel to be stored.

   b. The design and arrangement of the storage racks for maintaining a subcritical array during all conditions.

c. The degree of subcriticality provided along with the analysis and associated assumptions.

d. The effects of external loads and forces on the spent fuel storage racks, pool, and liner plate (e.g., safe shutdown earthquake, crane uplift forces, missiles, and dropped objects).

e. Design codes, materials compatibility, and shielding requirements.

f. The use of applicable codes and standards consistent with the assigned seismic classification.

~~2. The ASB review of the pool's water level control system, cleanup system and cooling system is performed with the spent fuel cooling system review in SRP Section 9.1.3.[7]~~

~~3. The ASB review of provisions to preclude dropping the spent fuel shipping cask into the pool are evaluated during the review of the cask loading pit area in SRP Section 9.1.5.[8]~~

Review Interfaces[9]

~~4~~1.[10] ~~ASB~~SPLB[11] also performs the following reviews under the Standard Review Plan (SRP),[12] sections indicated:

a. Review of flood protection is performed under SRP Section 3.4.1.

b. Review of the protection against internally generated missiles as well as missiles generated by natural phenomena is performed under SRP Sections 3.5.1.1, 3.5.1.2, 3.5.2, and 3.5.1.4.

c. Review of structures, systems, and components to be protected against externally generated missiles is performed under SRP Section 3.5.2.

d. Review of the pool's water level control system, cleanup system and cooling system is performed with the spent fuel cooling system review in SRP Section 9.1.3.[13]

e. Review of provisions to preclude dropping the spent fuel shipping cask into the pool are evaluated during the review of the cask loading pit area in SRP Section 9.1.5.[14]

f. Review of fire protection is performed under SRP Section 9.5.1.[15]

g. Review of equipment qualification is performed under SRP Section 3.11.[16]

~~A secondary review is performed by the Chemical Engineering Branch (CMEB) and the results of its evaluation are used by ASB to complete the overall evaluation of the system. The CMEB reviews the compatibility and chemical stability of the materials wetted by the pool water. In addition, CMEB will verify that there are no potential mechanisms that will: (1) alter the dispersion of the strong fixed neutron absorbers incorporated in the design of the storage racks,~~

~~and/or (2) cause physical distortion of the tubes retaining the stored fuel assemblies. The results of CMEB's evaluation are transmitted to ASB for inclusion in the spent fuel storage SER writeup.~~[17]

2.[18] In addition, ~~ASB~~SPLB[19] will coordinate reviews performed by other branches, and the results are used by ~~ASB~~SPLB[20] in the overall spent fuel storage evaluation. The coordinated reviews are as follows:

a.[21] The ~~Structural Engineering Branch (SEB)~~Civil Engineering and Geosciences Branch (ECGB)[22] determines the acceptability of the design analyses, procedures, and criteria used to established the ability of seismic Category I structures to withstand the effects of natural phenomena such as safe shutdown earthquakes (SSE), the probable maximum flood (PMF), and missiles as part of its primary review responsibility for SRP Sections 3.3.1, 3.3.2, 3.4.2, 3.5.3, 3.7.1 through 3.7.4, 3.8.4, and 3.8.5.

b.[23] The ~~Core Performance Branch (CPB)~~Reactor Systems Branch (SRXB)[24] determines that the criticality limits are acceptable and in accordance with ANS 57.2[25] paragraphs 5.1.1.2.1 and 5.1.l.2.2 as part of its primary responsibility for SRP Section 4.3.

c.[26] The Mechanical Engineering Branch (~~MEB~~EMEB)[27] determines that the components and structures are designed in accordance with applicable codes and standards as part of its primary review responsibility for SRP Sections 3.9.1 through 3.9.3.

d.[28] The ~~MEB~~EMEB[29] also determines the acceptability of the seismic and quality group classifications for system components as part of its primary review responsibility for SRP Sections 3.2.1 and 3.2.2.

e. The EMEB reviews the seismic qualification of Category I instrumentations as part of its primary review responsibility for SRP Section 3.10.[30]

f.[31] The ~~Materials Engineering Branch (MTEB)~~ ECGB[32] verifies that inservice inspection requirements are met for system components as part of its primary review responsibility for SRP Section 6.6.

~~The review for Fire Protection, Technical Specifications, and Quality Assurance is coordinated and performed by the Chemical Engineering Branch, Quality Assurance Branch, and Licensing Guidance Branch as part of their primary review responsibilities for SRP Sections 9.5.1, 16.0, and 17.0, respectively.~~[33]

g. The Technical Specifications Branch (TSB) coordinates and performs reviews of the proposed technical specifications as part of its primary review responsibility for SRP Section 16.0.[34]

h. The Quality Assurance and Maintenance Branch (HQMB) coordinates and performs reviews of quality assurance programs as part of its primary review responsibility for SRP Chapter 17.[35]

~~The Equipment Qualification Branch reviews the seismic qualification of Category I instrumentation and the environmental qualification of mechanical and electrical equipment as part of its primary review responsibility for SRP Sections 3.10 and 3.11, respectively.~~[36]

i. A secondary review is performed by the Materials and Chemical Engineering Branch (EMCB) and the results of its evaluation are used by SPLB to complete the overall evaluation of the system. The EMCB reviews the compatibility and chemical stability of the materials wetted by the pool water. In addition, EMCB will verify that there are no potential mechanisms that will: (1) alter the dispersion of the strong fixed neutron absorbers incorporated in the design of the storage racks, and/or (2) cause physical distortion of the tubes retaining the stored fuel assemblies. The results of EMCB's evaluation are transmitted to SPLB for inclusion in the spent fuel storage safety evaluation report (SER) writeup.[37]

For those areas of review identified above as ~~being reviewed as part of~~ the primary ~~review~~ responsibility of other branches, the acceptance criteria ~~necessary for the review~~ and ~~their~~ methods of application are contained in the referenced SRP section ~~of the corresponding primary branch~~.[38]

II. ACCEPTANCE CRITERIA

Acceptability of the spent fuel storage facility design as described in the applicant's safety analysis report (SAR) is based on certain General Design Criteria and Regulatory Guides, and on independent calculations and staff judgments with respect to system functions and component selection. The design of the spent fuel storage facility is acceptable if the integrated design is in accordance with the following criteria:

1. General Design Criterion 2 (GDC 2),[39] as it relates to structures housing the facility and the facility itself being capable of withstanding the effects of natural phenomena such as earthquakes, tornadoes, and hurricanes. Acceptance for meeting this criterion is based on conformance to position ~~C.3~~C.2[40] of Regulatory Guide 1.13, the applicable portions of Regulatory Guide 1.29, Regulatory Guide 1.117, and ANS 57.2 paragraphs 5.1.1, 5.1.3, 5.1.12, 5.3.2, and 5.3.4.

2. General Design Criterion 4 (GDC 4),[41] as it relates to structures housing the facility and the facility itself being capable of withstanding the effects of environmental conditions and external missiles, and internally generated missiles, pipe whip, and jet impingement forces associated with pipe breaks, such that safety functions will not be precluded. Acceptance for meeting this criterion is based on meeting position ~~C.3~~C.2[42] of Regulatory Guide 1.13, Regulatory Guides 1.115 and 1.117, as well as appropriate paragraphs of ANS 57.2.

3. General Design Criterion 5 (GDC 5),[43] as it relates to shared structures, systems, and components important to safety being capable of performing required safety functions.

4. General Design Criterion 61 (GDC 61),[44] as it relates to the facility design for fuel storage and handling of radioactive materials. Acceptance for meeting this criterion is based on conformance to positions C.1 and C.4 of Regulatory Guide 1.13 and the appropriate paragraphs of ANS 57.2. Acceptance is also based on meeting the fuel storage capacity requirements noted in subsection III.1 of this SRP section.

5. General Design Criterion 62 (GDC 62),[45] as it relates to the prevention of criticality by physical systems or processes utilizing geometrically safe configurations. Acceptance for meeting this criterion is based on conformance to positions C.1 and C.4 of Regulatory Guide 1.13 and the appropriate paragraphs of ANS 57.2.

6. General Design Criterion 63 (GDC 63),[46] as it relates to monitoring systems provided to detect conditions that could result in the loss of decay heat removal capabilities, to detect excessive radiation levels, and to initiate appropriate safety actions. Acceptance for meeting this criterion is based on conformance with paragraph 5.4 of ANS 57.2.

Technical Rationale[47]

The technical rationale for application of these acceptance criteria to reviewing spent fuel storage is discussed in the following paragraphs:[48]

1. Compliance with GDC 2 requires that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquake, tornado, hurricane, flood, tsunami and seiche without loss of capability to perform their safety functions.

   The function of the spent fuel storage facility is to maintain spent fuel in a subcritical array that can be adequately cooled during all credible storage conditions and to limit offsite exposures in the event of significant release of radioactive materials from the fuel. The requirements of GDC 2 are imposed to verify that the structures, systems, and components of the spent fuel storage facility are designed to withstand the effects of natural phenomena that might occur at the plant site, thereby ensuring that spent fuel will be maintained in a subcritical array. Position C.2 of Regulatory Guide 1.13; the applicable portions of Regulatory Guide 1.29; Regulatory Guide 1.117; and ANS 57.2 paragraphs 5.1.1, 5.1.3, 5.1.12, 5.3.2, and 5.3.4, provide guidance acceptable to the staff for meeting these requirements.

   Meeting the requirements of GDC 2 provides assurance that stored spent fuel will be maintained in a subcritical configuration that can be adequately cooled after a natural phenomena event.[49]

2. Compliance with GDC 4 requires that structures, systems, and components important to safety be designed to accommodate the effects of, and be compatible with, the environmental conditions associated with normal operations, maintenance, testing, and

postulated accidents, including loss of coolant. This requirement includes protection against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids resulting from equipment failures and from events and conditions outside the nuclear power unit.

GDC 4 requires that a spent fuel storage facility provide a controlled environment that will facilitate maintaining the fuel in a coolable and subcritical geometry. In addition, the facility is required to protect the fuel from the effects of missiles and jet impingement forces associated with turbine failure, natural phenomena (including tornadoes), and pipe breaks. Position C.2 of Regulatory Guide 1.13, Regulatory Guides 1.115 and 1.117, and appropriate paragraphs of ANS 57.2 provide guidance acceptable to the staff for meeting this requirement.

Meeting the requirements of GDC 4 provides assurance that the spent fuel storage facility will contain radioactive materials and maintain a subcritical configuration that can be adequately cooled after being exposed to the effects of missiles and natural phenomena.[50]

3. Compliance with GDC 5 requires that structures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units.

GDC 5 requires that the fuel storage facility at multiple-unit sites either not be shared among the units or that those systems, structures, or components that are shared will be designed in such a manner that an accident at one facility will not significantly impair the ability of the remaining facility to protect spent fuel. Should an accident that causes damage to the fuel storage facility occur, spent fuel will be a potential source of radioactive effluents. Therefore, spent fuel storage must be designed to minimize the likelihood of such an event.

Meeting the requirements of GDC 5 provides assurance that spent fuel will not become a source of radioactive effluents.[51]

4. Compliance with GDC 61 requires that fuel storage and handling, radioactive waste, and other systems that may contain radioactive materials be designed to ensure adequate safety under normal and postulated accident conditions.

GDC 61 applies to this SRP section because the reviewer evaluates inspection and testing of components, shielding for radiation protection, containment and filtering, testability of residual heat removal, and preventing the loss of fuel storage coolant inventory. Positions C.1 and C.4 of Regulatory Guide 1.13 and appropriate paragraphs of ANS 57.2 provide guidance acceptable to the staff for meeting the requirements of this criterion.

Meeting the requirements of GDC 61 provides assurance that criticality and releases of radioactive materials related to the storage and handling of spent fuel will be prevented.[52]

5. Compliance with GDC 62 requires that criticality in the fuel storage and handling system be prevented through the use of physical systems or processes, with preference given to the application of geometrically safe configurations.

The function of the spent fuel storage facility is to maintain spent fuel in a subcritical array that can be adequately cooled during all credible storage conditions and to limit offsite exposures in the event of significant release of radioactivity from the fuel. This role requires that the design of spent fuel storage use potential moderators to provide assurance that spacing be adequate to prevent criticality during earthquakes and flooding. The configuration of spent fuel storage must also prevent the insertion of a fuel assembly anywhere other than in a design location. Positions C.1 and C.4 of Regulatory Guide 1.13 and appropriate paragraphs of ANS 57.2 provide guidance acceptable to the staff for meeting the requirements of this criterion.

Meeting the requirements of GDC 62 provides assurance that criticality will be prevented in the spent fuel storage facility.[53]

6. Compliance with GDC 63 requires that appropriate systems be provided in fuel storage and radioactive waste systems, and associated handling areas, to detect conditions that may result in loss of residual heat removal capability and excessive radiation levels and to initiate appropriate safety actions.

GDC 63 requires that pool building radiation, pool level, and pool temperature monitoring be provided for the protection of personnel and to detect conditions that could result in the loss of decay heat removal capabilities. In addition, alarms and communications systems must be provided to alert personnel and provide for communications between fuel handling machines, refueling machines, and the control room. Paragraph 5.4 of ANS 57.2 provides guidance acceptable to the staff for meeting these requirements.

Meeting the requirements of GDC 63 provides assurance that residual heat removal will be adequately provided and that the release of radioactive materials will be prevented.[54]

III. REVIEW PROCEDURES

The procedures below are used during the construction permit (CP) application review to determine that the design criteria and bases and the preliminary design meet the acceptance criteria given in subsection II. For the review of the operating license (OL) application, the review procedures and acceptance criteria will be utilized to verify that the initial design criteria and bases have been appropriately implemented in the final design. The OL review includes verification that the content and intent of the technical specifications prepared by the applicant are in agreement with requirements for system testing, minimum performance, and surveillance developed as a result of the staff's review.

Upon request from the primary reviewer, the coordinating review branches will provide input for the areas of review stated in subsection I of this SRP section. The secondary review branch, ~~CMEB,~~EMCB,[55] will provide an input on a routine basis for those areas of review indicated in

this SRP section. The primary reviewer (~~ASB~~SPLB)[56] obtains and uses such input as required to ~~assure~~ensure[57] that this review procedure is complete.

The review procedures given below are for a typical storage system. Any variance of the review, to take account of a proposed unique design, will be such as to ~~assure~~ensure[58] that the facility design conforms to the criteria in subsection II of this SRP section. The reviewer selects and emphasizes material from this SRP section as may be appropriate for a particular case.

1. The SAR is reviewed to determine that the design bases and facility description section indicates the storage capacity provided in the design. The minimum storage capacity in the spent fuel storage pool shall be in accordance with ANS 57.2 paragraph 5.1.15, i.e., for a single unit facility the storage capacity shall equal or exceed one full core discharge plus the maximum normal fuel discharge cycle; for a dual shared storage pool facility the storage capacity shall equal or exceed one full core discharge plus two normal fuel discharge cycles. Due to a lack of sufficient away-from-reactor (AFR) storage capacity, the industry trend has been to use high density storage racks. ~~ASB~~ SPLB[59] reviews high density storage on a case-by-case basis. Low-density storage should be used, at a minimum, for the most recently discharged fuel to decrease the probability of igniting the zircaloy cladding in the event of draining the spent fuel pool.[60]

2. The information provided in the SAR relating to the facility design criteria, safety evaluation, system description, and the layout drawings for the spent fuel pool and storage racks is reviewed to verify that:

    a. Criticality information (including the associated assumptions and input parameters) in the SAR must show that the center-to-center spacing between fuel assemblies and any strong fixed neutron absorbers in the storage racks is sufficient to maintain the array, when fully loaded and flooded with nonborated water, in a subcritical condition. A K_{eff} not greater than 0.95 for this condition is acceptable.

    b. The design of the storage racks is such that a fuel assembly cannot be inserted anywhere other than in a design location.

    c. Failures of nonsafety-related systems or structures not designed to seismic Category I that are located in the vicinity of the spent fuel storage facility are reviewed to ~~assure~~ensure[61] that their failure will not cause an increase in K_{eff} to exceed the maximum allowable. The SAR description section, the general arrangement and layout drawings, and the tabulation of seismic design classifications for structures and systems are reviewed and evaluated to ~~assure~~ensure[62] that this condition is met. A statement in the SAR establishing the above condition as a design criterion is acceptable at the CP review stage.

    d. Design calculations should show that the storage racks and any anchorages can withstand the maximum fuel handling equipment uplift forces without an increase in K_{eff} or a decrease in pool water inventory. A statement in the SAR that excessive forces cannot be applied due to the design of the fuel handling equipment is

acceptable if justification is presented. The evaluation procedures identified in SRP Sections 9.1.4 and 9.1.5 are used to validate this statement.

e. Conventionally the plant's Technical Specification states that the weight of all loads being handled above stored spent fuel shall not exceed that of one fuel assembly and its associated handling tool. This weight and its normal carrying height above the storage racks establishes what was considered the upper bound on the potential energy available to damage the stored spent fuel if a load drop occurs. It has been subsequently noted that lighter loads handled at greater drop heights may have greater amounts of potential energy. Therefore, the following additional requirement is being made. The licensee is required to demonstrate and the reviewer to verify that the available potential energy of all lighter loads, being handled above stored spent fuel, shall not exceed that of one fuel assembly and its associated handling tool when dropped from its normal operating height above stored spent fuel.

f. Sharing of storage facilities in multi-unit plants will not increase the potential for the loss of pool water or decrease the degree of subcriticality provided.

3. The reviewer verifies that the safety function of the facility will be maintained, as required, if the facility is subjected to adverse natural phenomena such as earthquakes, tornadoes, hurricanes, and floods. In making this determination, the reviewer considers the following points:

a. The facility design basis and criteria and the component classification tables are reviewed to verify that the spent fuel storage facility including the storage pool, pool liner, and racks have been classified and designed to seismic Category I requirements. The ~~ASB~~ SPLB[63] will accept a statement that the facility will be designed and constructed as a seismic Category I system (CP).

b. If the spent fuel pool liner plate will not be designed and constructed to seismic Category I requirements, the spent fuel pool liner plate is reviewed to verify that a failure of the liner plate as a result of an SSE will not cause any of the following:~~:~~

1. Significant releases of radioactivity due to mechanical damage to the fuel;

2. Significant loss of water from the pool which could uncover the fuel and lead to release of radioactivity due to heatup;

3. Loss of ability to cool the fuel due to flow blockage caused by a portion or one complete section of the liner plate falling on top of the fuel racks;

4. Damage to safety-related equipment as a result of the pool leakage, and

5. Uncontrolled release of significant quantities or radioactive fluids to the environs.

c. The essential portions of the spent fuel storage system are reviewed to verify that protection from the effects of floods, hurricanes, tornadoes, and internally or externally generated missiles is provided. Flood protection and missile protection criteria are discussed in sections of the SRP contained in Chapter 3. The reviewer utilizes the information in those SRP sections, as appropriate, to ~~assure~~ensure[64] that the analyses presented are valid. ~~ASB~~SPLB[65] will accept a statement to the effect that the storage facility is located in a seismic Category I structure that is missile and flood protected.

4. The safe handling of spent fuel assemblies necessitates the underwater transfer of spent fuel between the respective areas of the plant including spent fuel cask loading area. The SAR is reviewed to verify that the design basis and facility description section has stated that a separate spent fuel shipping cask loading area (pit) has been provided adjacent to the spent fuel pool. The reviewer verifies that the loading pit has been designed so that the safety function of the integrated system will be maintained during adverse environmental conditions. In addition, the reviewer verifies that the following are included in the design:

   a. An interconnecting fuel transfer canal should be capable of being isolated from the fuel pool and cask loading area. A statement in the SAR that these features are included in the design is acceptable. The reviewer uses engineering judgment to ~~assure himself~~verify[67] that the means provided meet the stated intent.

   b. In regard to the handling of heavy loads, e.g., the spent fuel shipping cask in the vicinity of the spent fuel storage pool, the reviewer is required to establish and verify in SRP Section 9.1.5 that one of the alternative approaches described in Section 5 of NUREG-0612 has been satisfied. If Sections 5.1.1 and 5.1.6 of NUREG-0612 have not been met, the SAR safety evaluations, results of design calculations, and the general arrangement and layout drawings should show that the spent fuel loading ~~put~~pit[68] has been designed to withstand the loads from dropped heavy objects including the shipping cask, and that the loading area is not an integral part of the storage pool floor so that if a dropped object should breach the

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~~† The implementation of this item reflects current regulatory practice. The methods of review described herein will be used in the evaluation of submittals for operating license or construction permit applications docketed after November 17, 1977, which is based on the first application to which this method was specifically applied. Implementation for applications docketed prior to November 17, 1977 is not considered necessary since stresses induced in the fuel pool liner plate welds due to an SSE will usually be well below the maximum allowable stress levels and therefore liner failure is not considered a likely event. Even in the event that a liner plate failed, it would not likely block the coolant outlet of spent fuel assemblies completely and sufficient cooling of stored spent fuel would be maintained. Therefore, the spent fuel pool liner plate seismic design is not considered a significant safety issue and backfit is not required.~~[66]

pit area, loss of fuel pool water would not result in an unacceptable level.

For standard design certification reviews under 10 CFR Part 52, the procedures above should be followed, as modified by the procedures in SRP Section 14.3 (proposed), to verify that the design set forth in the standard safety analysis report, including inspections, tests, analysis, and acceptance criteria (ITAAC), site interface requirements and combined license action items, meet the acceptance criteria given in subsection II. SRP Section 14.3 (proposed) contains procedures for the review of certified design material (CDM) for the standard design, including the site parameters, interface criteria, and ITAAC.[69]

IV. EVALUATION FINDINGS

The reviewer verifies that the information provided and ~~his~~ that the[70] review support conclusions of the following type, to be included in the staff's ~~safety evaluation report~~SER:[71]

> The spent fuel storage facility includes the spent fuel storage racks, the spent fuel storage pool that contains the storage racks, and the associated equipment storage pits. Based on the review of the applicant's proposed design criteria, design bases, and safety classification for the spent fuel storage facility and the provisions necessary to maintain a subcritical array, the staff concludes that the design of the spent fuel storage facility and supporting systems is in conformance with the Commission's regulations as set forth in General Design Criteria 2, 4, 5, 61, 62, and 63.
>
> This conclusion is based on the following:
>
> 1. The applicant has met the requirements of General Design Criterion 2 by conforming with position ~~C.3~~C.2[72] of Regulatory Guide 1.13 and the applicable portions of Regulatory Guides 1.29 and 1.117, as well as paragraphs 5.1.1, 5.1.3, 5.1.12, 5.3.2, and 5.3.4 of ANS 57.2.
>
> 2. The applicant has met the requirements of General Design Criterion 4 pertaining to the environmental and missile protection design basis by conforming to position ~~C.3~~C.2[73] of Regulatory Guide 1.13 and the applicable portions of Regulatory Guides 1.115 and 1.117, as well as appropriate paragraphs of ANS 57.2.
>
> 3. The applicant has met the requirements of General Design Criterion 5 since the failure of any portion of the shared spent fuel storage facility will not impair the ability of plants systems to perform their safety function.
>
> 4. The applicant has met the requirements of General Design Criteria 61 and 62 pertaining to fuel storage, handling, criticality, and radioactivity control by conforming to positions C.1 and C.4 of Regulatory Guide 1.13 and the appropriate paragraphs of ANS 57.2.
>
> 5. The applicant has met the requirements of General Design Criterion 63 pertaining to monitoring the status of the stored spent fuel by conforming to paragraph 5.4 of ANS 57.2.

For design certification reviews, the findings will also summarize, to the extent that the review is not discussed in other safety evaluation report sections, the staff's evaluation of inspections, tests, analyses, and acceptance criteria (ITAAC), including design acceptance criteria (DAC), site interface requirements, and combined license action items that are relevant to this SRP section.[74]

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the staff's plans for using this SRP section.

This SRP section will be used by the staff when performing safety evaluations of license applications submitted by applicants pursuant to 10 CFR 50 or 10 CFR 52.[75] Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff on its evaluation of conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications docketed six months or more after the date of issuance of this SRP section.[76]

Implementation schedules for conformance to parts of the method discussed herein are contained in the referenced NUREG and Regulatory Guides.

VI. REFERENCES

1. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena."

2. 10 CFR Part 50, Appendix A, General Design Criterion 4, "~~Environmental and Missile Design Bases~~Environmental and Dynamic Effects Design Bases."[77]

3. 10 CFR Part 50, Appendix A, General Design Criterion 5, "Sharing of Structures, Systems, and Components."

4. 10 CFR Part 50, Appendix A, General Design Criterion 61, "Fuel Storage and Handling and Radioactivity Control."

5. 10 CFR Part 50, Appendix A, General Design Criterion 62, "Prevention of Criticality in Fuel Storage and Handling."

6. 10 CFR Part 50, Appendix A, General Design Criterion 63, "Monitoring Fuel and Waste Storage."

7. Regulatory Guide 1.13, ~~"Design Objectives for Light-Water Reactor Spent Fuel Storage Facilities at Nuclear Power Stations."~~"Spent Fuel Storage Facility Design Basis."[78]

8. Regulatory Guide 1.29, "Seismic Design Classification."

9. Regulatory Guide 1.115, "Protection Against Low-Trajectory Turbine Missiles."

10. Regulatory Guide 1.117, "Tornado Design Classification."

11. ANS 57.2/ANSI N210-1976, "Design Objectives for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Stations."

12. NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants."

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SRP Draft Section 9.1.2
Attachment A - Proposed Changes in Order of Occurrence

Item numbers in the following table correspond to superscript numbers in the redline/strikeout copy of the draft SRP section.

Item	Source	Description
1.	Current PRB name and abbreviation	Changed PRB to Plant Systems Branch (SPLB).
2.	SRP-UDP format item	Added ECGB as an SRB per NRC guidance.
3.	Current SRP name and abbreviation	Updated SRB to Materials and Chemical Engineering Branch (EMCB).
4.	SRP-UDP format item	Added SRXB as an SRB per NRC guidance.
5.	Current PRB abbreviation	Changed PRB to SPLB.
6.	Editorial revision	Changed "assure" to "ensure."
7.	SRP-UDP format item	Removed section to reflect current SRP format.
8.	SRP-UDP format item	Removed section to reflect current SRP format.
9.	SRP-UDP format item	Added "Review Interfaces" to AREAS OF REVIEW and organized in numbered paragraph form to describe how SPLB reviews aspects of the new fuel storage facility design under other SRP sections and how branches support the review.
10.	SRP-UDP format item	Changed item number to reflect current SRP format.
11.	Current PRB abbreviation	Change PRB to SPLB.
12.	Editorial	Defined "SRP" as "Standard Review Plan."
13.	Current SPLB review responsibility	Changed the responsibility for this review from ASB to SPLB. Relocated the paragraph from Areas of Review in the current SRP section.
14.	Current SPLB review responsibility	Changed the responsibility for this review from ASB to SPLB. Relocated the paragraph from Areas of Review in the current SRP section.
15.	Current SPLB review responsibility	Modified to reflect review responsibility for SRP Section 9.5.1.
16.	Current SPLB review responsibility	Modified to reflect review responsibility for SRP Section 3.11.
17.	SRP-UDP format item	Removed section to reflect current SRP format.
18.	SRP-UDP format item	Added item number to reflect current SRP format.
19.	Current PRB abbreviation	Changed PRB to SPLB.
20.	Current PRB abbreviation	Changed PRB to SPLB.
21.	SRP-UDP format item	Added item number to reflect current SRP format.

Item	Source	Description
22.	Current ECGB review responsibility	Changed to reflect primary review responsibility for SRP Sections 3.3.1, 3.3.2, 3.4.2, 3.5.3, 3.7.1 through 3.7.4, 3.8.4, and 3.8.5.
23.	SRP-UDP format item	Added item number to reflect current SRP format.
24.	Current SRXB review responsibility	Changed to reflect primary review responsibility for SRP Section 4.3.
25.	Integrated Impact No. 398	This standard is outdated. ANS 57.2/ANSI N210-1976 was revised in 1983 to ANSI/ANS-57.2-1983.
26.	SRP-UDP format item	Added item number to reflect current SRP format.
27.	Current PRB abbreviation	Changed PRB to EMEB.
28.	SRP-UDP format item	Added item number to reflect current SRP format.
29.	Current PRB abbreviation	Changed PRB to EMEB.
30.	Current EMEB review responsibility	Reflect review responsibility for SRP Section 3.10.
31.	SRP-UDP format item	Added item number to reflect current SRP format.
32.	Current SRP name and abbreviation	Modified to reflect the ECGB's primary review responsibility for SRP Section 6.6.
33.	SRP-UDP format item	Removed section to reflect current SRP format.
34.	SRP-UDP format item	Rewrote section to reflect current SRP format.
35.	SRP-UDP format item	Rewrote section to reflect current SRP format.
36.	SRP-UDP format item	Removed section to reflect current SRP format.
37.	SRP-UDP format item	Moved section to this location and revised to reflect current SRP format and review responsibilities.
38.	Editorial	Simplified for clarity and readability.
39.	Editorial	Introduced "GDC 2" as initialism for "General Design Criterion 2."
40.	Current Revision of RG 1.13	Changed to reflect paragraph number in current revision (Rev. 1) of RG 1.13.
41.	Editorial	Introduced "GDC 4" as initialism for "General Design Criterion 4."
42.	Current Revision of RG 1.13	Changed to reflect paragraph number in current revision (Rev. 1) of RG 1.13.
43.	Editorial	Introduced "GDC 5" as initialism for "General Design Criterion 5."
44.	Editorial	Introduced "GDC 61" as initialism for "General Design Criterion 61."

Item	Source	Description
45.	Editorial	Introduced "GDC 62" as initialism for "General Design Criterion 62."
46.	Editorial	Introduced "GDC 63" as initialism for "General Design Criterion 63."
47.	SRP-UDP format item, develop technical rationale	Added "Technical Rationale" to ACCEPTANCE CRITERIA and organized in numbered paragraph form to describe the basis for referencing the General Design Criteria.
48.	SRP-UDP format item, develop technical rationale	Added lead-in sentence for "Technical Rationale."
49.	SRP-UDP format item, develop technical rationale	Added technical rationale for GDC 2.
50.	SRP-UDP format item, develop technical rationale	Added technical rationale for GDC 4.
51.	SRP-UDP format item, develop technical rationale	Added technical rationale for GDC 5.
52.	SRP-UDP format item, develop technical rationale	Added technical rationale for GDC 61.
53.	SRP-UDP format item, develop technical rationale	Added technical rationale for GDC 62.
54.	SRP-UDP format item, develop technical rationale	Added technical rationale for GDC 63.
55.	Current SRB abbreviation	Changed SRB and review responsibility to EMCB.
56.	Current PRB abbreviation	Changed PRB to SPLB.
57.	Editorial revision	Changed "assure" to "ensure."
58.	Editorial revision	Changed "assure" to "ensure."
59.	Current PRB abbreviation	Changed PRB to SPLB.
60.	Integrated Impact No. 399	The staff concluded in NUREG-1242 (SER for the EPRI Evolutionary Plant) that the spent fuel storage design is to use low-density storage racks for, as a minimum, the most recently discharged fuel.
61.	Editorial revision	Changed "assure" to "ensure."
62.	Editorial revision	Changed "assure" to "ensure."
63.	Current PRB abbreviation	Changed PRB to SPLB.
64.	Editorial revision	Changed "assure" to "ensure."
65.	Current PRB abbreviation	Changed PRB to SPLB.

Item	Source	Description
66.	SRP-UDP format item	Deleted the footnote limiting certain review procedures to applications docketed after 1977.
67.	Editorial revision	Changed "assure himself" to "verify."
68.	Editorial revision	Corrected "put" to "pit."
69.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard paragraph to address application of Review Procedures in design certification reviews.
70.	Editorial	Modified to eliminate gender-specific reference.
71.	Editorial	Used "SER" as previously defined in this SRP section.
72.	Current Revision of RG 1.13	Changed to reflect paragraph number in current revision (Rev. 1) of RG 1.13.
73.	Current Revision of RG 1.13	Changed to reflect paragraph number in current revision (Rev. 1) of RG 1.13.
74.	SRP-UDP Format Item, Implement 10 CFR 52 Related Changes	To address design certification reviews a new paragraph was added to the end of the Evaluation Findings. This paragraph addresses design certification specific items including ITAAC, DAC, site interface requirements, and combined license action items.
75.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard sentence to address application of the SRP section to reviews of applications filed under 10 CFR Part 52, as well as Part 50.
76.	SRP-UDP Guidance	Added standard paragraph to indicate applicability of this section to reviews of future applications.
77.	Current Revision of 10 CFR Part 50, Appendix A	Updated title of GDC 4.
78.	Current Revision of RG 1.13	Change to reflect title of current revision (Rev. 1) of RG 1.13.

SRP Draft Section 9.1.2

Attachment B - Cross Reference of Integrated Impacts

Integrated Impact No.	Issue	SRP Subsections Affected
398	Incorporates latest version of ANSI/ANS 57.2.	No change made. Endnote added to "Review Interface," item 2.b
399	Incorporates staff position concerning the use of high density storage racks.	Subsection III, REVIEW PROCEDURES, subparagraph 1
1168	Revise the Acceptance Criteria, Review Procedures, and Evaluation Findings as necessary to incorporate the guidance of the proposed draft Regulatory Guide CE-913 (proposed revision 2 to RG 1.13).	This is a placeholder integrated impact.