



U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

14.3.11¹ CONTAINMENT SYSTEMS AND SEVERE ACCIDENTS (Tier 1)

REVIEW RESPONSIBILITIES

Primary - Containment Systems and Severe Accident Branch (SCSB)

Secondary - None

I. AREAS OF REVIEW

SCSB reviews the Design Control document (DCD) submitted by the applicant. SCSB has primary review responsibility for the containment and associated systems. Review responsibilities may be consistent with those contained in Appendix B to SRP Section 14.3. SCSB reviews Tier 1 information for issues regarding containment design including containment isolation provisions, containment leakage testing, hydrogen generation and control, containment heat removal, suppression pool hydrodynamic loads, and sub-compartment analysis. In addition, SCSB has responsibility for the review of selected definitions, interface requirements of the standard design with the site, and site parameters for the design, that pertain to containment systems issues.

Review Interfaces

SRP Section 14.3 provides general guidance on review interfaces. SCSB is responsible for providing inputs to other branches regarding design features and functions of SSCs that should be addressed in Tier 1 information based on severe accident analyses. SCSB performs related reviews and coordination activities, as requested by other branches, for issues in Tier 1 related to containment systems and severe accidents. In addition, SCSB will coordinate other branches' evaluations that interface with the overall review of the systems as follows:

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USNRC STANDARD REVIEW PLAN

Standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The standard review plan sections are keyed to the Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. Not all sections of the Standard Format have a corresponding review plan.

Published standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555.

1. The Electrical Engineering Branch (EELB) determines the acceptability of Tier 1 information regarding electrical SSCs in SRP Section 14.3.6.
2. The Civil Engineering and Geosciences Branch (ECGB) determines the acceptability of Tier 1 information regarding the ability of SSCs to withstand various natural phenomena in SRP Sections 14.3.1 and 14.3.2, and regarding piping design in SRP Section 14.3.3.
3. The Instrumentation and Controls Branch (HICB) determines the acceptability of Tier 1 information regarding the I&C aspects of the standard design in SRP Section 14.3.5.

II. ACCEPTANCE CRITERIA

The acceptance criteria for ITAAC are based on meeting 10 CFR 52.97(b)(1), which sets forth the comprehensive requirements for ITAAC. For design certification reviews, the scope of ITAAC is limited to the scope of the certified design as required by 10 CFR 52.47(b).

The reviewer should primarily utilize the SRP sections related to containment systems in its review of Tier 1 to determine the safety significance of SSCs. Other sources include applicable rules and regulations, GDCs, RGs, USIs and GSIs, NRC generic correspondence, PRA, insights from the standard design's safety and severe accident analyses, and operating experience. The reviewer should also use the review checklists provided in Appendix C to SRP Section 14.3 as an aid for establishing consistency and comprehensiveness in his review of the systems.

Tier 1 should be reviewed to verify that key parameters and insights from containment safety analyses, such as loss of coolant accident, main steamline break, main feedline break, subcompartment analyses, and suppression pool bypass are adequately addressed. Applicants should provide cross references in DCD Tier 2 Section 14.3 to show how the important input parameters used in the transient and accident analyses for the design are verified by the ITAAC. The reviewer should ensure that appropriate treatment of severe accident design features and containment design features are included in Tier 1. The supporting information regarding the detailed design and analyses should remain in Tier 2. For many of the design features, it may be impractical to test their functionality because of the absence of simulated severe accident conditions. Consequently, the existence of the feature on a figure, subject to a basic configuration walkdown, may be considered sufficient Tier 1 treatment. Applicants should provide cross references in the appropriate sections of Tier 2 to show how the important parameters from PRA, including shutdown risk, and severe accident analyses are verified by the ITAAC. For both PRA and severe accident analyses, although large uncertainties and unknowns may be associated with the event phenomena, design features important for severe accident prevention and mitigation resulting from these analyses should be selected for treatment in Tier 1.

If applicable, the reviewer should utilize regulatory guidance from the Commission for selected policy and technical issues related to the particular design. Examples of these are contained in SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor Designs." The SRM related to this is dated July 21, 1993.

Containment isolation may be addressed by a combination of the system ITAACs or in a single system ITAAC. The containment isolation valves (CIVs) should be specified in Tier 1, and are most clearly shown on the system figures. The verification of the design qualification of the motor operated CIVs may be verified by the basic configuration check in each system ITAAC. In addition, in-situ tests should be required for containment isolation MOV and check valves in each system ITAAC. The ITAAC should verify that the CIVs close on receipt of an isolation signal. Actual closure of the containment isolation valves may be checked using the manual isolation switches in the main control room (MCR). Other ITAAC may verify that a containment isolation signal is generated for each of the process variables that will cause a containment isolation; the intent is to preclude multiple cycling of the containment isolation valves during the testing.

Tier 1 should address and verify at least the minimum inventory of alarms, displays, and controls in DCD Tier 2 Chapter 18. These are derived from Generic Technical Guidelines (e.g., EPGs, ERGs), the requirements of RG 1.97, and severe accident and PRA insights. They may be specified in the MCR and the Remote Shutdown System (RSS) ITAAC, or addressed in the appropriate ITAAC, and verified to exist. Other controls, displays, and alarms should be identified in the system ITAAC based on their safety significance. Locations for these should be shown on system figures if important to system design and function.

III. REVIEW PROCEDURES

1. Follow the general procedures for review of Tier 1 contained in the Review Procedures section of SRP Section 14.3. Ensure that the DCD is consistent with Appendix A to SRP Section 14.3. Review responsibilities may be consistent with those in Appendix B to SRP Section 14.3.
2. Ensure that all Tier 1 information is consistent with Tier 2 information. Figures and diagrams should be reviewed to ensure that they accurately depict the functional arrangement and requirements of the systems. Reviewers should use the Review Checklists in Appendix C to SRP Section 14.3 as an aid in establishing consistent and comprehensive treatment of issues.
3. Ensure that the containment systems are clearly described in Tier 1, including the key performance characteristics and safety functions of SSCs based on their safety significance.
4. The reviewer should ensure that appropriate guidance is provided to other branches such that containment systems issues in Tier 1 are treated in a consistent manner among branches.
5. Ensure that design features from the resolutions of selected policy and technical issues are adequately addressed in Tier 1, based on safety significance. Ensure that the appropriate Commission guidance, requirements, bases and resolutions for these items are documented clearly in the SER.

IV. EVALUATION FINDINGS

The reviewer verifies that sufficient information has been provided to satisfy the requirements of SRP Section 14.3 and this SRP section, and concludes that Tier 1 is acceptable. A finding similar to that in the Evaluation Findings section of SRP Section 14.3 should be provided in a separate section of the SER.

In addition, if site parameters or interface requirements are necessary for the design, a finding of the sort identified below should be provided:

"The staff also concludes that the site parameters (or interface requirements) in Tier 1 meet the requirements for design certification applications in 10 CFR 52.47, and are acceptable."

V. IMPLEMENTATION

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

This SRP section will be used by the staff when performing safety evaluations of design certification and combined license applications submitted by applicants pursuant to 10 CFR 52. 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 in 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.

VI. REFERENCES

1. 10 CFR Part 52, §52.47 "Contents of Applications."
2. 10 CFR Part 52, §52.97 "Issuance of Combined Licenses."
3. NUREG-1503, "Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor", Volumes 1 and 2, July 1994.
4. NUREG-1462, "Final Safety Evaluation Report Related to the Certification of the System 80+ Design," Volumes 1 and 2, August 1994.
5. SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor Designs." The SRM related to this is dated July 21, 1993.

SRP Draft Section 14.3.111
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.	Integrated Impact 1550	The scope and content of this proposed SRP section is derived from the requirements of 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants," as well as the guidance in staff SECY papers related to design certification and combined license reviews, and the staff positions established in the Final Safety Evaluation Reports (FSERs) for the evolutionary reactor designs. SRP Section 14.3.11 provides guidance specific to the review of containment systems information and related inspections, tests, analyses, and acceptance criteria (ITAAC) provided in applications submitted in accordance with the requirements of 10 CFR 52.

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SRP Draft Section 14.3.111
Attachment B - Cross Reference of Integrated Impacts

Integrated Impact No.	Issue	SRP Subsections Affected
1550	Develop Acceptance Criteria and Review Procedures for review of Certified Design Material (CDM) including associated inspections, tests, analyses and acceptance criteria (ITAAC) for containment systems.	All