U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

5.2.1.1 COMPLIANCE WITH THE CODES AND STANDARDS RULE, 10 CFR 50.55a

REVIEW RESPONSIBILITIES

Primary - Organization responsible for the review of mechanical engineering issues

Secondary - None

I. AREAS OF REVIEW

This section is used to verify whether the acceptable component codes (i.e., applicable ASME Code Class), code editions, and addenda required by 10 CFR 50.55a are identified for component construction. The review under this section is coordinated closely with the review described in SRP Section 3.2.2. More detailed review of compliance with ASME Code requirements for the component code class (e.g., component welds verified to meet requirements applicable for the Code Class) is under many other SRP sections. The applicant's framework for compliance with 10 CFR 50.55a requirements for application of codes during the inservice phase of the component life is also reviewed in many other SRP sections (e.g., 3.9.6, 5.2.4, 6.6, etc.).

The specific areas of review are as follows:

1. To establish that pressure-retaining components of the reactor coolant pressure boundary (RCPB) and other safety-related fluid systems of water-cooled nuclear power plants comply with the Codes and Standards Rule, 10 CFR 50.55a, applicants are required to provide a table in the safety analysis report (SAR) identifying pressure vessels, piping, pumps and valves, and the component code, code edition, and applicable addenda, (where applicable) for each component. 10 CFR 50.55a

requires that RCPB pressure-retaining components meet requirements for Class 1[1] components and be constructed[2] in accordance with the rules of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, Division 1 (hereafter the Code), except for components which meet the exclusion requirements of 10 CFR 50.55a(c). RCPB components which meet the exclusion requirements may be classified as Quality Group B in accordance with Regulatory Guide (RG) 1.26 and constructed as Class 2 components in accordance with the Code.

The Codes and Standards Rule also requires that safety-related pressure-retaining components of other fluid systems designated as Quality Group B or Quality Group C meet code requirements for Class 2[3] or Class 3 components, respectively.

To meet these requirements, components of other safety-related fluid systems may be classified as Quality Group B, C, or D in accordance with RG 1.26, which is acceptable guidance for determining the appropriate code class for most non-RCPB pressure-retaining components. Review of Quality Group B, C, or D components of other safety-related fluid systems is under Standard Review Plan (SRP) Section 3.2.2.

For construction permit, standard design certification (DC), and operating license applications, the staff determines the acceptability of the SAR to ensure that the applicant complies with 10 CFR 50.55a.

2. Where compliance with the Codes and Standards Rule would result in hardships or unusual difficulties without a compensating increase in the level of safety and quality, the applicant must describe the complete circumstances and the basis for the proposed alternate requirements. The applicant must describe how the proposed alternate requirements provide an equivalent and acceptable level of safety and quality. The SAR should identify differences between the specific portions of the code and code addenda to which each component has been constructed and that are required for compliance with 10 CFR 50.55a.

3. Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC). For design certification (DC) and combined license (COL) reviews, the staff reviews the applicant's proposed ITAAC associated with the structures, systems, and components (SSCs) related to this SRP section in accordance with SRP Section 14.3, "Inspections, Tests, Analyses, and Acceptance Criteria." The staff recognizes that the review of ITAAC cannot be completed until after the rest of this portion of the application has been reviewed against acceptance criteria contained in this SRP section. Furthermore, the staff reviews the ITAAC to ensure that all SSCs in this area of review are identified and addressed as appropriate in accordance with SRP Section 14.3.

4. COL Action Items and Certification Requirements and Restrictions. For a DC application, the review will also address COL action items and requirements and restrictions (e.g., interface requirements and site parameters).

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[1] Editions of the Code prior to 1971 use the term Class A in lieu of Class 1.

[2] "Constructed," as used herein, is an all-inclusive term comprising material certification, design, fabrication, examination, testing, inspection, and certification required in the manufacture and installation of components.

[3] Editions of the Code prior to 1971 use the term Class C in lieu of Class 2.

For a COL application referencing a DC, a COL applicant must address COL action items (referred to as COL license information in certain DCs) included in the referenced DC. Additionally, a COL applicant must address requirements and restrictions (e.g., interface requirements and site parameters) included in the referenced DC.

Review Interfaces

Other SRP sections interface with this section as follows:

1. The materials engineering staff verifies, upon request from the primary reviewer, the compatibility of the materials of construction with service conditions and, as required, assists in establishing acceptability if an applicant proposes alternatives not entirely in accordance with 10 CFR 50.55a(a)(3).

The specific acceptance criteria and review procedures are contained in the referenced SRP sections.

II. ACCEPTANCE CRITERIA

Requirements

Acceptance criteria are based on meeting the relevant requirements of the following Commission regulations:

1. 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1 as to the requirement that safety-related SSCs be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function performed.

2. 10 CFR 50.55a as to the establishment of minimum quality standards for the design, fabrication, erection, construction, testing, and inspection of RCPB components and other safety-related fluid systems of boiling- and pressurized-water reactor nuclear power plants by compliance with appropriate editions of published industry codes and standards.

3. 10 CFR 52.47(b)(1), which requires that a DC application contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations;

4. 10 CFR 52.80(a), which requires that a COL application contain the proposed inspections, tests, and analyses, including those applicable to emergency planning, that the licensee shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will operate in conformity with the combined license, the provisions of the Atomic Energy Act, and the NRC's regulations.

SRP Acceptance Criteria

Specific SRP acceptance criteria acceptable to meet the relevant requirements of the NRC's regulations identified above are as follows for the review described in this SRP section. The SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide acceptable methods of compliance with the NRC regulations.

To meet the requirements of GDC 1 and 10 CFR 50.55a, RG 1.26, "Quality Group Classification and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants," which describes an acceptable method for determining quality standards for Quality Group B, C, and D water- and steam-containing components important to safety of water-cooled nuclear power plants, is used.

Technical Rationale

The technical rationale for application of these acceptance criteria to the areas of review addressed by this SRP section is discussed in the following paragraphs:

1. Compliance with GDC 1 requires that components be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function performed.

   RG 1.26 provides quality group classifications for water-, steam-, and radioactive waste-containing components (pressure vessels, piping, pumps, valves, and storage tanks) commensurate with the importance of the safety functions they perform. For compliance with these quality group classifications, RCPB and other components containing radioactive materials must meet the requirements of ASME Code, Section III. These components will perform acceptably, commensurate with their intended safety functions, when designed in accordance with ASME Code requirements.

   The staff considers the requirements outlined in GDC 1 to be adequate for assurance that these components will perform acceptably, commensurate with the importance of their safety functions, in containing radioactive materials.

2. 10 CFR 50.55a requires that components be designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety functions performed.

   10 CFR 50.55a specifies that RCPB components and Quality Group B and C components (as defined in RG 1.26) must meet ASME Code, Section III requirements. These components will perform acceptably, commensurate with their intended safety functions, when designed in accordance with ASME Code requirements.

   The staff considers these requirements adequate for assurance that these components will perform acceptably, commensurate with the importance of their safety functions, in containing radioactive materials.

III. REVIEW PROCEDURES

The reviewer will select material from the procedures described below, as may be appropriate for a particular case.

These review procedures are based on the identified SRP acceptance criteria. For deviations from these acceptance criteria, the staff should review the applicant's evaluation of how the proposed alternatives provide an acceptable method of complying with the relevant NRC requirements identified in Subsection II.

1. For reviews of DCs, Operating License (OL) and Construction Permit (CP) applications, the staff checks the applicant's table identifying pressure vessel components, piping, pumps and valves, and the corresponding component code, code edition, and applicable addenda of each ASME Code, Section III, Class 1, 2, and 3 component for compliance with 10 CFR 50.55a. The ASME Code Class requirements applied for non-RCPB components are based on the acceptable component Quality Group classifications verified under SRP Section 3.2.2.

2. For components not in compliance with 10 CFR 50.55a, the staff identifies specific component Code sections of the Code, Code Addenda, and SAR with which they do not comply. Proposed alternatives to the requirements of 10 CFR 50.55a(c), (d), (e), (f), (g), and (h) may be used when authorized. Where proposed by the applicant under 50.55a(a)(3), the staff evaluates whether the applicant demonstrates one of the following:

   A. The proposed alternatives would provide an acceptable level of quality and safety, or

   B. Compliance with the specified requirements of 10 CFR 50.55a would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

   If its concerns are not resolved satisfactorily, the staff takes a position in conformance with 10 CFR 50.55a.

For review of a DC application, the reviewer should follow the above procedures to verify that the design, including requirements and restrictions (e.g., interface requirements and site parameters), set forth in the final safety analysis report (FSAR) meets the acceptance criteria. DCs have referred to the FSAR as the design control document (DCD). The reviewer should also consider the appropriateness of identified COL action items. The reviewer may identify additional COL action items; however, to ensure these COL action items are addressed during a COL application, they should be added to the DC FSAR.

For review of a COL application, the scope of the review is dependent on whether the COL applicant references a DC, an early site permit (ESP) or other NRC approvals (e.g., manufacturing license, site suitability report or topical report).

For review of both DC and COL applications, SRP Section 14.3 should be followed for the review of ITAAC. The review of ITAAC cannot be completed until after the completion of this section.

IV. EVALUATION FINDINGS

The reviewer verifies that the applicant has provided sufficient information and that the review and calculations (if applicable) support conclusions of the following type to be included in the staff's safety evaluation report. The reviewer also states the bases for those conclusions.

The staff concludes that system components are in compliance with 10 CFR 50.55a and meet the requirements of GDC 1. This conclusion is based on the following findings:

1. The applicant has met the requirements of 10 CFR 50.55a and GDC 1 for the construction of SSCs important to safety and to quality standards by ensuring that RCPB components, as defined by 10 CFR 50.55a, are classified properly in the table (identified in Subsection I.1) of the SAR as ASME Code, Section III, Class 1 (Quality Group A) components, except for those which meet 10 CFR 50.55a(c) exclusion requirements. These RCPB components, classified as Quality Group B in accordance with the guidance of RG 1.26, Position C.1, are constructed as ASME Code, Section III, Class 2 components. The table (identified in Subsection I.1) identifies the component Code, Code Edition, and Applicable Addenda for each Quality Group A component (e.g., reactor vessel, steam generators (primary side), pressurizer, reactor coolant pumps, pressurizer relief valves, control valves, block valves, other RCPB valves, and interconnecting RCPB piping) and each Quality Group B component (e.g., steam generators (secondary side) and interconnecting RCPB piping and valves) meeting the exclusion requirements of 10 CFR 50.55a(c).

2. The applicant has met the 10 CFR 50.55a requirements by properly classifying components defined therein as non RCPB parts in the SAR table (identified in Subsection I.1) as ASME Code, Section III, Class 2 (Quality Group B) or Class 3 (Quality Group C). These components are classified as Quality Group B or C based upon the staff's guidance for component quality group classification described in SRP Section 3.2.2 and are constructed as ASME Code, Section III, Class 2 or 3 components. The table identified in Subsection I.1 identifies the Component Code, Code Edition, and Applicable Addenda for each Quality Group B and C component.

   The staff reviewed the Component Code, Code Edition, and Addenda as applied to each of these components and finds them to be constructed in accordance with the requirements of the applicable Codes and Addenda specified by 10 CFR 50.55a. The staff's review of quality group classifications for components of other safety-related fluid systems is described in Section 3.2.2 of the SER.

3. The applicant has met the GDC 1 requirements for component design quality commensurate with the importance of the safety function. The provisions of the ASME Code and the staff's guidance regarding component quality group classification described in SRP Section 3.2.2 have been met, which constitutes an acceptable basis for satisfying the requirements of GDC 1.

For DC and COL reviews, the findings will also summarize the staff’s evaluation of requirements and restrictions (e.g., interface requirements and site parameters) and COL action items relevant to this SRP section.

In addition, to the extent that the review is not discussed in other SER sections, the findings will summarize the staff's evaluation of the ITAAC, including design acceptance criteria, as applicable.

V. IMPLEMENTATION

The staff will use this SRP section in performing safety evaluations of DC applications and license applications submitted by applicants pursuant to 10 CFR Part 50 or 10 CFR Part 52. Except when the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the staff will use the method described herein to evaluate conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications submitted six months or more after the date of issuance of this SRP section, unless superseded by a later revision.

VI. REFERENCES

1. 10 CFR 50.55a, "Codes and Standards."

2. 10 CFR Part 50, Appendix A, GDC 1, "Quality Standards and Records."

3. RG 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants."

4. ASME Boiler and Pressure Vessel Code, Section III, "Nuclear Power Plant Components," American Society of Mechanical Engineers.