U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

5.2.1.2 APPLICABLE CODE CASES

REVIEW RESPONSIBILITIES

Primary - Organization responsible for mechanical engineering reviews

Secondary - Organization responsible for component integrity reviews

I. AREAS OF REVIEW

This Standard Review Plan (SRP) section is used to verify whether acceptable American Society of Mechanical Engineers (ASME) Code Cases are identified for component construction[1]. Acceptable Code Cases for construction of nuclear power plants are identified in Regulatory Guide (RG) 1.84, "Design and Fabrication Code Case Acceptability, ASME Section III"; RG 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1"; and RG 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," which are incorporated by reference into Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, "Codes and Standards". These Code Cases provide generally acceptable alternatives to the requirements of the ASME *Boiler and Pressure Vessel Code* (BPV Code) and *Operation and Maintenance of Nuclear Power Plants* (OM Code), as modified by conditions in the associated regulatory guides.

The specific areas of review are as follows:

[1] 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.

1. ASME Code Cases contain alternatives to the requirements in the ASME BPV Code and ASME OM Code for the design, fabrication, manufacturing, construction, installation, testing, examination, and inspection of nuclear power plant components within the scope of these codes. The NRC staff review of an application under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," will determine the acceptability of ASME Code Cases specified in the applicant's technical submittal. The review will determine the acceptability of ASME Code Cases applied to ASME BPV Code, Section III, Division 1, Subsection NB - Class 1 Components, Subsection NC - Class 2 Components, and Subsection ND - Class 3 Components. The review will also determine the acceptability of Code Cases applied to ASME BPV Code, Section III, Division 1, Subsection NE - Class MC Components, Subsection NF - Component Supports, and Subsection NG - Core Support Structures, and ASME BPV Code, Section III, Division 2, Concrete Containment. Further, the review will determine the acceptability of Code Cases that may be applied to ASME BPV Code, Section XI, Division 1, Inservice Inspection (ISI), and ASME OM Code Division 1, Inservice Testing (IST).

2. Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC). For design certification (DC) and combined license (COL) applications, 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 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.

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

   For a COL application referencing a DC, a COL applicant must address COL action or information items 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 will evaluate ASME Code Cases pertaining to ISI under SRP Section 5.2.4, "Reactor Coolant Pressure Boundary Inservice Inspection and Testing."

2. The technical branch responsible for structural analysis reviews will evaluate ASME Code Cases pertaining to ASME BPV Code, Section III, Division 2, under SRP Sections 3.8.1, "Concrete Containment," 3.8.3, "Concrete and Steel Internal Structures of Steel or Concrete Containments," and 3.8.5, "Foundations."

3. Technical staff responsible for IST programs will evaluate ASME Code Cases pertaining to the OM Code under SRP Section 3.9.6, “Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints.”

4. Appropriate technical branches will evaluate other areas covered by ASME Code Cases as necessary.

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 Criteria for Nuclear Power Plants,” General Design Criterion (GDC) 1, “Quality Standards and Records,” as it relates to the requirement that SSCs important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function to be performed.

2. 10 CFR 50.55a, as it relates to the rule that establishes minimum quality standards for the design, fabrication, erection, construction, testing, and inspection of certain components of boiling and pressurized water reactor nuclear power plants by requiring conformance with appropriate editions of specified industry codes and standards incorporated by reference in 10 CFR 50.55a.

3. 10 CFR 52.47(b)(1), which requires that a DC application contain the proposed 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 facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the Atomic Energy Act (AEA), and the NRC’s regulations.

4. 10 CFR 52.79(a)(11), which requires a COL applicant to provide, in its safety analysis report, a description of the programs and their implementation necessary to ensure that the systems and components meet the requirements of the ASME BPV Code and ASME OM Code in accordance with 10 CFR 50.55a at a level sufficient to enable the NRC to reach a final conclusion on all safety matters that must be resolved before COL issuance.

5. 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 AEA, 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.

1. 10 CFR Part 50, Appendix A, GDC 1 requires that SSCs be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function to be performed. For those SSCs defined as safety-related or risk-significant, the NRC regulations specify special treatment requirements to provide reasonable assurance of the capability of those SSCs to perform their safety-related functions. One special treatment requirement is that applicable components meet the requirements in the ASME BPV Code and ASME OM Code as incorporated by reference in 10 CFR 50.55a. ASME Code Cases provide alternatives to specific requirements in the ASME BPV Code and ASME OM Code. The NRC staff considers ASME Code Cases to satisfy the requirements in 10 CFR Part 50, Appendix A, GDC 1 to design, fabricate, erect, and test components to quality standards commensurate with the importance of the safety function to be performed, where those Code Cases have been accepted by the NRC staff. Where risk insights will be applied in the review of an application, the applicable technical branch will evaluate whether the provisions in the applicant's submitted documentation are acceptable to provide reasonable assurance in the capability of SSCs to perform their intended functions.

2. Regulations in 10 CFR 50.55a require that components of the reactor coolant pressure boundary be designed, fabricated, erected, and tested in accordance with the requirements for Class 1 components of Section III of the ASME BPV Code and OM Code as incorporated by reference in 10 CFR 50.55a. This regulation also requires that pressure-retaining components of other fluid systems designated as Quality Group B or Quality Group C meet ASME BPV Code requirements for Class 2 or Class 3 components, respectively. Components within the scope of ASME BPV Code, Section XI, and ASME OM Code are subject to ISI and IST in accordance with ASME BPV Code and OM Code, respectively, as incorporated by reference in 10 CFR 50.55a. NRC regulations in 10 CFR 50.55a incorporate by reference specific revisions of the following NRC RGs for the acceptability of ASME Code Cases:

    a. RG 1.84 lists those ASME BPV Code, Section III, Code Cases oriented to design, fabrication, materials, and testing that are acceptable to the staff for implementation in the licensing of nuclear power plants.

    b. RG 1.147 lists those ASME BPV Code, Section XI, Code Cases that are acceptable to the staff for use in the ISI of components and their supports, as described in the first numbered paragraph of subsection I, of this SRP.

    c. RG 1.192 lists ASME OM Code Cases oriented to operation and maintenance for nuclear power plant components that are acceptable to the staff for implementation in the licensing of nuclear power plants.

For Code Cases pertaining to ASME BPV Code, Section III, Division 2, as well as ASME Code Cases not covered in RGs 1.84, 1.147, or 1.192, the applicant may submit a request for NRC authorization to use an alternative to the ASME Code requirements in accordance with 10 CFR 50.55a(z). The NRC staff will review the proposed alternative for authorization based on the considerations indicated in 10 CFR 50.55a.

3. Regulations in 10 CFR 52.47(b)(1) require that a DC application contain proposed ITAAC necessary and sufficient to assure the plant is built and will operate in accordance with the design certification. Regulations in 10 CFR 52.80(a) requires that the COL identify the ITAAC necessary and sufficient to assure that the facility has been constructed and will be operated in conformity with the license. SRP Section 14.3 provides guidance for reviewing ITAAC. The requirements of 10 CFR 52.47(b)(1) and 10 CFR 52.80(a), respectively, will be met, in part, by identifying ITAAC for the top-level design features related to applicable Code cases referenced in DC and COL applications.

4. Regulations in 10 CFR 52.79(a)(11) require that a COL applicant provide, in its safety analysis report, a description of the programs and their implementation necessary to ensure that the systems and components meet the requirements of the ASME BPV Code and ASME OM Code in accordance with 10 CFR 50.55a at a level sufficient to enable the NRC to reach a final conclusion on all safety matters that must be resolved before COL issuance. RG 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," provides guidance for the content of COL applications for a description of the ISI and IST programs to meet 10 CFR 50.55a. The NRC staff reviews the descriptions of these programs and documents its review in the applicable safety evaluation report (SER) sections.

Technical Rationale

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

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

   SRP Section 5.2.1.2 cites RGs 1.84, 1.147, and 1.192 for Code Cases applicable to ASME BPV Code, Section III, Division 1, components and materials, and Section XI, Division 1, tests and inspections, and ASME OM Code for operation and maintenance of nuclear power plant components, that are acceptable to the staff.

   Applicants may submit requests for authorization to use Code Cases for ASME BPV Code, Section III, Division 2, and other ASME Code Cases not accepted in RGs 1.84, 1.147, and 1.192 as alternatives to ASME Code requirements in accordance with 10 CFR 50.55a(z). The NRC staff will prepare a safety evaluation describing its review of proposed alternatives to the ASME Code requirements.

   The staff considers the application of Code Cases accepted in RGs 1.84, 1.147, and 1.192, or accepted in specific safety evaluations, to satisfy GDC 1 in providing adequate

assurance that plant SSCs will perform acceptably, commensurate with the importance of their safety function.

2. Regulations in 10 CFR 52.47(b)(1) require that a DC application contain proposed ITAAC necessary and sufficient to assure the plant is built and will operate in accordance with the design certification. Regulations in 10 CFR 52.80(a) require that the COL identify the ITAAC necessary and sufficient to assure that the facility has been constructed and will be operated in conformity with the license. SRP Section 14.3 provides guidance for reviewing ITAAC. These requirements in 10 CFR 52.47(b)(1) and 10 CFR 52.80(a) provide confidence in an applicant's compliance with 10 CFR 50.55a where accepted ASME Code Cases are applied.

3. Regulations in 10 CFR 52.79(a)(11) require that a COL applicant provide, in its safety analysis report, a description of the programs and their implementation necessary to ensure that the systems and components meet the requirements of the ASME BPV Code and ASME OM Code in accordance with 10 CFR 50.55a at a level sufficient to enable the NRC to reach a final conclusion on all safety matters that must be resolved before COL issuance. RG 1.206 provides guidance for the content of COL applications for a description of the ISI and IST programs to meet 10 CFR 50.55a. The requirements in 10 CFR 52.79(a)(11) and the guidance in RG 1.206 provide confidence in an applicant's compliance with 10 CFR 50.55a where accepted ASME Code Cases are applied.

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. In accordance with 10 CFR 52.47(a)(8), 10 CFR 52.47(a)(21), and 10 CFR 52.47(a) (22), and 10 CFR 52.79(a)(17) and 10 CFR 52.79(a)(20), for new reactor license applications submitted under Part 52, the applicant is required to (1) address the proposed technical resolution of unresolved safety issues and medium and high-priority generic safety issues which are identified in the version of NUREG-0933 current on the date up to 6 months before the docket date of the application and which are technically relevant to the design; (2) demonstrate how the operating experience insights have been incorporated into the plant design; and, (3) provide information necessary to demonstrate compliance with any technically relevant portions of the Three Mile Island requirements set forth in 10 CFR 50.34(f), except paragraphs 10 CFR 50.34(f)(1)(xii), 10 CFR 50.34(f)(2)(ix), and 10 CFR 50.34 (f)(3)(v). These cross-cutting review areas should be addressed by the reviewer for each technical subsection and relevant conclusions documented in the corresponding SER section.

2. For reviews of DC and COL applications under 10 CFR Part 52, the NRC staff verifies that Section 5.2.1.2 of the applicant's submitted documentation specifies the use of ASME Code Cases that are included in revisions to RGs 1.84, 1.147, and 1.192

incorporated by reference in 10 CFR 50.55a. The staff also checks the table provided by the DC applicant identifying the applied ASME Code Cases for compliance with RGs 1.84, 1.147, and 1.192.

3. For ASME Code Cases pertaining to ASME BPV Code, Section III, Division 2, as well as for other Code Cases not previously accepted in RG 1.84, 1.147, or 1.192, the NRC staff reviews the request by the applicant to apply those Code Cases as an alternative to the ASME Code requirements in accordance with 10 CFR 50.55a. The NRC staff will review ASME Code Cases proposed by the applicant as alternatives to the ASME Code requirements for authorization based on the considerations specified in 10 CFR 50.55a(z).

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 technical submittal meets the acceptance criteria. DCs have referred to the technical submittal as the design control document (DCD) or final safety analysis report (FSAR). The reviewer should also consider the appropriateness of identified COL action items. The reviewer may identify additional COL action items that should be added to the DC applicant's DCD or 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 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 SER. The reviewer also states the bases for those conclusions.

The NRC 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:

The NRC staff finds that the ASME Code Cases specified in the application to be applied in the design, fabrication, manufacturing, construction, installation, testing, examination, and inspection of components within the scope of the ASME BPV Code and ASME OM Code are acceptable for use in accordance with the requirements of 10 CFR 50.55a and 10 CFR Part 50, Appendix A, GDC 1; and the guidance provided in RGs 1.84, 1.147, and 1.192. For ASME Code Cases not accepted in RGs 1.84, 1.147, and 1.192, the NRC staff has found that the applicant's request to apply those Code Cases specified in its technical submittal as alternatives to the Code requirements is authorized in accordance with 10 CFR 50.55a(z). The staff concludes that compliance with these Code Cases will result in a component quality level commensurate with the importance of their safety function and constitutes an acceptable basis for satisfying the requirements of 10 CFR 50.55a and 10 CFR Part 50, Appendix A, 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 or information 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 docketed 6 months or more after the date of issuance of this SRP section, unless superseded by a later revision.

VI. REFERENCES

1. American Society of Mechanical Engineers, ASME BPV Code, "Code Cases: Nuclear Components," New York, NY.

2. American Society of Mechanical Engineers, ASME BPV Code, "Nuclear Power Plant Components," New York, NY.

3. American Society of Mechanical Engineers, ASME Operation and Maintenance of Nuclear Power Plants, Division 1: OM Code: Section IST, New York, NY.

4. U.S. *Code of Federal Regulations,* "Domestic Licensing of Production and Utilization," Part 50, Chapter 1, Title 10, "Energy," Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion 1, "Quality Standards and Records."

5. U.S. *Code of Federal Regulations,* "Codes and Standards." §50.55a, Title 10, "Energy,"

6. U.S. Nuclear Regulatory Commission, "Initial Test Programs for Water-Cooled Nuclear Power Plants," Regulatory Guide 1.68, ADAMS Accession No. ML13051A027.

7. U.S. Nuclear Regulatory Commission, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III, Division 1." Regulatory Guide 1.84, ADAMS Accession No. ML13339A515.

8. U.S. Nuclear Regulatory Commission, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Regulatory Guide 1.147, ADAMS Accession No. ML092330064.

9. U.S. Nuclear Regulatory Commission, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Regulatory Guide 1.160, ADAMS Accession No. ML113610098.

10. U.S. Nuclear Regulatory Commission, “Operation and Maintenance Code Case Acceptability, ASME OM Code,” Regulatory Guide 1.192, ADAMS Accession No. ML13340A034.

11. U.S. Nuclear Regulatory Commission, “Combined License Applications for Nuclear Power Plants (LWR Edition),” Regulatory Guide 1.206, ADAMS Accession No. ML070720184.

12. U.S. Nuclear Regulatory Commission, “Guidance for ITAAC Closure under 10 CFR Part 52,” Regulatory Guide 1.215, ADAMS Accession No ML112580018.

SRP Section 5.2.1.2
Description of Changes

Section 5.2.1.2, “APPLICABLE CODE CASES”

In addition to the changes itemized below, editorial changes were made throughout for clarity, consistency, and applicability. Changes incorporated into Revision 4 include:

REVIEW RESPONSIBILITIES

- The secondary review organization was updated.

I. AREAS OF REVIEW

- The areas of review section was updated to reflect guidance provided in RGs 1.84, 1.147, 1.192, and 10 CFR 50.55a.
- The specific areas of review were updated for clarity, and to better reflect part 50 and 52 applicability.
- Existing review interfaces were revised for clarity

II. ACCEPTANCE CRITERIA

- Requirements from 10 CFR 52.79(a) were added to clarify information expected from COL applicants.
- SRP acceptance criteria and technical rationale relating to GDC 1, RG 1.84, RG 1.147, RG 1.192, 10 CFR 50.55a, 52.47(b), and 52.80(a) were updated or added for clarity.
- Technical rationale supporting ITAAC requirements and FSAR level of detail were added for clarity.

III. REVIEW PROCEDURES

- Procedures were added to address application content and level of detail required by 10 CFR 52.47(a), 52.79(a), and 50.34(f) were added for clarity and to address operating experience requirements.
- Procedures were revised to ensure that the applicant appropriately specifies Code Cases specified in revisions to RGs 1.84, 1.147, and 1.192, and alternatives in accordance with 10 CFR 50.55a.

IV. EVALUATION FINDINGS

- Updates were made to the evaluation findings section to ensure that code cases are appropriately applied in the design, fabrication, manufacturing, construction, installation, testing, examination, and inspection of in-scope components.

V. IMPLEMENTATION

- A minor correction was made to the applicability of this SRP section based on the docketing date of the application.

VI. REFERENCES

- References were updated in concert with changes referenced above.