U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

14.3.3 PIPING SYSTEMS AND COMPONENTS - INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

REVIEW RESPONSIBILITIES

Primary - Organizations responsible for review of piping systems and components

Secondary - Organizations responsible for review of inspections, tests, analysis, and acceptance criteria guidance.

I. AREAS OF REVIEW

This Standard Review Plan (SRP) section addresses inspections, tests, analyses, and acceptance criteria (ITAAC) related to piping systems and components. The ITAAC information is contained in the final safety analysis report (FSAR) of a combined license (COL) application or Tier 1 information from the design control document (DCD) of a design certification (DC) application.

The specific areas of review are as follows:

1. Design control document.

   A. The reviewer has responsibility for reviewing Tier 1 piping design and components and legends for figures.

Revision 1 –May 2019

B. Tier 1 information is reviewed for issues regarding structural, mechanical, materials, and chemical engineering.

C. Tier 1 information is reviewed for verification of components and systems, including piping and component safety classification, fabrication (welding), pressure testing, seismic and dynamic qualification, environmental qualification, pump and valve testing, installed configuration, regulatory treatment of non-safety systems (RTNSS), and Design Reliability Assurance Program (D-RAP).

2. For a DC application:

A. The staff reviews the proposed ITAAC to confirm they are complete and adequate to verify that the structures, systems, and components (SSCs) to which the ITAAC apply, as installed or constructed, can perform their safety functions in accordance with the certified design.

B. The staff reviews the justification that compliance with the interface requirements is verifiable through ITAAC. The staff also reviews the method that is to be used for verification of the interface requirements.

3. For a COL application:

A. The staff reviews the proposed ITAAC to confirm they are adequate to verify that the SSCs to which the ITAAC apply, as installed or constructed, can perform their safety functions in accordance with the design described in the FSAR.

B. If the application references a standard design certification, the staff verifies that the ITAAC contained in the certified design are incorporated into the COL application and reviews any proposed departures from the standard ITAAC for the certified design.

4. <u>COL Action Items and Certification Requirements and Restrictions</u>. For a DC application, the review will also address COL action items and requirements and restrictions applicable to the standard design (e.g., interface requirements and site parameters).

For a COL application referencing a DC, the staff will confirm that the COL applicant addressed the COL action items (referred to as COL license information in certain DCDs) included in the referenced DC. However, COL action items are information requirements but are not the only acceptable set of information in the FSAR. An applicant may depart from or omit these items provided the departure or omission is identified and justified in the FSAR. Additionally, the staff will confirm that the COL applicant addressed the requirements and restrictions (e.g., interface requirements and site parameters) included in the referenced DC.

Review Interfaces

The following SRP sections interface with this section:

1. General guidance on ITAAC information is provided in SRP Section 14.3, “Inspections, Tests, Analyses, and Acceptance Criteria.”

2. The adequacy of the approach to classify fluid systems important to safety and identify their applicable construction codes and standards depending on the system or component function and relative importance to safety is determined in accordance with SRP Section 3.2.2, “System Quality Group Classification.”

3. The confirmation that there is appropriate protection of SSCs relied upon for safe reactor shutdown or to mitigate the consequences of a postulated pipe rupture is performed under SRP Section 3.6.2, “Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping.”

4. The criteria, testing procedures, and dynamic analyses employed to ensure the structural and functional integrity of piping systems, mechanical equipment, reactor internals, and their supports (including supports for conduit and cable trays, and ventilation ducts) under vibratory loadings are reviewed under SRP Section 3.9.2, “Dynamic Testing and Analysis of Systems, Structures, and Components.” The vibratory loadings considered in this review include those due to fluid flow (and especially loading caused by adverse flow conditions, such as flow instabilities over standoff pipes and branch lines in the steam system) and postulated seismic events.

5. The structural integrity of pressure-retaining components, their supports, and core support structures that are designed in accordance with the rules of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel (BPV) Code and Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, “Domestic Licensing of Production And Utilization Facilities,” Appendix A, “General Design Criteria for Nuclear Power Plants,” are reviewed under SRP Section 3.9.3, “ASME Code Class 1, 2, and 3 Components, Component Supports, and Core Support Structures.”

6. The review of the functional design, qualification, and inservice testing (IST) programs for pumps, valves, and dynamic restraints is performed under SRP Section 3.9.6, “Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints.”

7. The methods of tests and analyses employed to ensure the functionality of mechanical and electrical equipment (includes instrumentation and controls) under the full range of normal and accident loadings (including seismic) are reviewed under SRP Section 3.10, “Seismic and Dynamic Qualification of Electrical and Mechanical Equipment.”

8. Whether all items of equipment that are important to safety (mechanical, electrical, and instrumentation and control (I&C), including digital I&C) are capable of performing their design safety functions under all normal environmental conditions, anticipated operational occurrences, and accident and post-accident environmental conditions is

determined through the staff's review performed under SRP Section 3.11, "Environmental Qualification of Electrical and Mechanical Equipment."

9. The design and analyses of piping systems are reviewed under SRP Section 3.12, "ASME Code Class 1, 2, and 3 Piping Systems, Piping Components and their Associated Supports."

10. Acceptability of ITAAC information for structural and systems engineering topics, including substantive acceptability, is reviewed under SRP Section 14.3.2, "Structural and Systems Engineering – Inspections, Tests, Analyses, and Acceptance Criteria."

11. Acceptability of ITAAC information for reactor systems topics, including substantive acceptability, is reviewed under SRP Section 14.3.4, "Reactor Systems - Inspections, Tests, Analyses, and Acceptance Criteria."

12. Acceptability of ITAAC information for plant systems topics, including substantive acceptability, is reviewed under SRP Section 14.3.7, "Plant Systems - Inspections, Tests, Analyses, and Acceptance Criteria."

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 52.47(b)(1), which requires that a DC application contain the 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, and the NRC's rules and regulations;

2. 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 be operated in conformity with the combined license, the provisions of the Atomic Energy Act, and the NRC's rules and 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 should 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.

The following discussion emphasizes safety-related SSCs, but the guidance for safety-related SSCs below should also be considered for SSCs that perform a safety function, but which are not safety-related. These SSCs include those credited for high safety significant purposes or for meeting an NRC regulatory requirement, including, but not limited to, SSCs relied upon for purposes of satisfying SBO or ATWS requirements. RTNSS SSCs are explicitly treated in Section 2(H) below. The designation of ITAAC for these SSCs should be evaluated on a case-by-case basis, as there will be design-specific aspects to be considered in reaching the staff's necessary safety findings. The staff should consider whether two or more ITAAC verify the same substance and are therefore redundant

1 Generic Piping Design.

DC applicants are required to provide an essentially complete nuclear power plant design except for site-specific elements. However, NRC practice has been to allow DC applicants to provide less than the complete design information in the DC application for piping design, with staff approval. In lieu of a complete piping design, applicants may provide the processes and design acceptance criteria (DAC) by which design details in this area would be developed and evaluated. Implementation of the processes is the responsibility of the COL applicant or licensee. DAC are discussed further in SRP Section 14.3, Appendix A.

The reviewer should use the SRP guidelines to evaluate the piping design information in DCD Tier 1 and Tier 2 and review the piping design criteria in detail, including sample calculations. The staff should evaluate the adequacy of the structural integrity and functional capability of safety-related piping systems. The review is not limited to the ASME BPV Code Classes 1, 2, and 3 piping and supports, but includes buried piping, instrumentation lines, the interaction of piping that is not Seismic Category I with piping that is Seismic Category I, and any safety-related piping designed to industry standards other than the ASME BPV Code. This review should include the analysis methods, design procedures, acceptance criteria, and related ITAAC (and DAC if applicable) that are to be used for the completion and verification of the standard plant piping design. This should include both DCD Tier 1 and Tier 2 information for the applicable codes and standards, analysis methods to be used for completing the piping design, modeling techniques, pipe stress analyses criteria, pipe support design criteria, high-energy line break criteria, and leak-before-break (LBB) approach applicable to the standard design. The staff should also consider whether information in addition to that described below in this SRP section is necessary to address design features or operating characteristics unique to the design under review. The staff should evaluate the application for the specific information identified below.

Design descriptions and the associated DAC should be specified in Tier 1. The applicable piping systems to be covered should be stated in Tier 1. This may be accomplished on a generic basis using a single ITAAC applicable to multiple systems of the design, or individual system ITAAC. If accomplished using a generic piping design ITAAC, Tier 1 should address its application to piping systems classified as both safety-related and not safety-related. The safety-related piping systems must remain functional during and following a safe-shutdown earthquake (SSE) and should be designated in Tier 1 as Seismic Category I and further classified as ASME BPV Code Class 1, 2, or 3 in the individual systems of the standard design. Tier 1 should describe how piping systems will be designed to perform their safety-related functions under all postulated combinations of normal operating conditions, system operating transients, postulated pipe breaks, and seismic events. The material in Tier 1 should also address the consequential effects of pipe ruptures such as jet impingement, potential missile generation, and pressure and temperature effects.

The scope of the piping to be verified by the piping ITAAC for pipe break hazards analysis should include all ASME BPV Code Class 1, 2, or 3 piping systems as well as piping not governed by ASME BPV Code Section III. Tier 1 includes ASME BPV Code Class piping systems because ASME BPV Code, Section III, is referenced in 10 CFR 50.55a, "Codes and standards." Nuclear power plant components classified as Quality Groups A, B, and C are required by 10 CFR 50.55a to meet the requirements for ASME BPV Code Class 1, 2, and 3, respectively. In each system description, a functional drawing should identify the boundaries of the ASME BPV Code classification for the piping systems. 10 CFR Part 50, Appendix A, General Design Criteria (GDC) 1, "Quality standards and records" requires that systems, structures, and components important to safety, including piping and associated supports, be designed, fabricated, erected, and tested to quality standards commensurate with the importance of their safety function.

An acceptable approach to Tier 1 information for piping design is to specify distinct ITAAC that ensure the design process for piping systems occurs as described in the design description. This design process can be verified through inspection of an ASME BPV Code, Section III, design output document, such as an ASME Code Section III Design Report. The ASME BPV Code, Section III design output document will provide assurance that the requirements of ASME BPV Code, Section III for design have been met and that the design complies with the Design Specification. The particular design output document should be specified in the ITAAC. For example, the Design Commitment for such an ITAAC should specify that the ASME Code Class as-designed piping system complies with ASME Code Section III requirements. The Inspections, Tests, and Analyses (ITA) should specify that an inspection will be performed of the as-designed ASME Code Class piping system Design Report required by ASME Code Section III. The Acceptance Criteria should specify that the ASME Code Section III Design Report (NCA-3550) exists and concludes that the ASME Code Class as-designed piping system meets the requirements of ASME Code Section III.

A second ITAAC should require that an ASME BPV Code, Section III, Data Report exists and concludes that the as-built ASME BPV Code Class 1, 2, or 3 piping systems and components meet the requirements of ASME BPV Code, Section III. In this regard, ASME BPV Code, Section III, Paragraph NCA-3554 requires that the modification of any document used for construction, as compared to the corresponding document used for design analysis, shall be reconciled with the completed Design Report. This reconciled Design Report is included as part of the ASME BPV Code, Section III, Data Report. This ITAAC verifies that any changes made during construction comply with the Design Specification and ASME BPV Code, Section III requirements. An ASME BPV Code, Section III, Data Report provides an overall verification by inspection that the as-built piping system, including supports, at the final installed location conforms to the certified Design Commitments. For an ASME Code Class piping system ITAAC, the Design Commitment should specify that the ASME Code Class piping system complies with ASME Code Section III. The ITA should specify that an inspection will be performed of the ASME Code Class as-built piping system Data Report required by ASME Code Section III. The Acceptance Criteria should specify that the ASME Code Section III Data Report exists and concludes that the ASME Code Class piping system meets the requirements of ASME Code Section III.

A third ITAAC should require that a Pipe Break Hazards Analysis Report exists and concludes that the as-designed safety-related SSCs are protected against the dynamic and environmental effects associated with postulated failures in high- and moderate-energy piping systems in accordance with GDC 4, "Environmental and dynamic effects design bases." The Pipe Break Hazards Analysis Report and any other report not governed by ASME Code requirements should be completed in accordance with applicable quality assurance measures. Tier 1 may specify additional requirements for report creation and completion. Tier 2 should specify the contents of such reports. The criteria used to postulate pipe breaks, the analytical methods used to perform pipe break analyses, and the method to confirm the adequacy of the results of the pipe break analyses should be described and verified in a Pipe Break Hazards Analysis Report that provides assurance that the high- and moderate-energy line break analyses have been completed and the results satisfy GDC 4 requirements.

For postulated pipe breaks, the Pipe Break Hazards Analysis Report should verify that (A) piping stresses in the containment penetration area are within the stress limits identified in the FSAR, (B) protective features can mitigate high-energy pipe break loads, (C) loads on safety-related SSCs are within the design load limits specified in the FSAR, and (D) SSCs are protected or qualified to withstand the environmental effects of postulated failures, which is a subject of the review identified in SRP Section 3.11. The acceptance criteria for the Pipe Break Hazards Analysis Report should include the conclusion that, for each postulated piping failure, the reactor can be safely shut down and maintained in a cold shutdown condition without offsite power. For an as-designed Pipe Break Hazards Analysis Report ITAAC, the Design Commitment should specify that safety-related SSCs are protected against the dynamic and environmental effects associated with postulated failures in high- and moderate-energy piping systems. (Note: Protection against dynamic effects is not required for high-energy, ASME Code Section III Class 1 and 2 piping and interconnected equipment nozzles for which LBB criteria applies). The ITA should specify that a pipe break hazards analysis will be performed to evaluate the effects of postulated failures of high- and moderate-energy piping systems on nearby safety-related SSCs. The Acceptance Criteria should specify that a Pipe Break Hazards Analysis Report exists and concludes that the as-designed safety-related SSCs will be protected against: (A) the dynamic effects associated with postulated failures in high-energy piping systems, and (B) the environmental effects associated with postulated failures in high- and moderate-energy piping systems. Detailed information that supports this ITAAC should be included in DCD Tier 2, Chapter 3.

If the design uses LBB methods, another ITAAC should require that an LBB evaluation report exists and concludes that the LBB acceptance criteria are satisfied for the as-built piping and piping materials. Bounding limits should be specified in Tier 2 using preliminary piping analysis results to establish a window of acceptable piping stress values for selected piping materials. The ITAAC should verify that these values are satisfied using actual material properties and final piping configurations and should reconcile the as-built piping data with the LBB assumptions. For an as-built LBB analysis ITAAC, the Design Commitment should specify that the ASME Code Class 1 and 2 piping system and interconnected nozzles are evaluated for leak-before-break (LBB). The ITA should specify that an analysis will be performed of the ASME Code Class 1 and 2 as-built piping and interconnected equipment nozzles. The Acceptance Criteria should specify that the as-built LBB analysis for the ASME Code Class 1 and 2 piping listed in the applicable table and interconnected equipment nozzles is bounded by the as-designed LBB analysis. Detailed information that supports this ITAAC should be included in DCD Tier 2, Chapter 3.

Another ITAAC should require that an inspection and analysis of the as-built high- and moderate-energy piping systems and protective features for the safety-related SSCs be performed. This inspection and analysis verifies that the as-built safety-related SSCs have been constructed and installed in accordance with the approved design and are protected against or will withstand the dynamic and environmental effects associated with postulated failures in high- and moderate-energy piping systems. The inspection and analysis include, but is not limited to, verification that protective features and safety-related SSCs are installed in accordance with the as-built Pipe Break Hazards Analysis Report and that all field changes are analyzed to reconcile deviations of the as-built design from the design described in the FSAR. For a Pipe Break Hazards Protective Features Verification ITAAC, the Design Commitment should specify that safety-related SSCs are protected against the dynamic and environmental effects associated with postulated failures in high- and moderate-energy piping systems. (Note: Protection against dynamic effects is not required for high-energy, ASME Code Section III Class 1 and 2 piping and interconnected equipment nozzles for which LBB criteria apply). The ITA should specify that an inspection and analysis will be performed of the as-built high- and moderate-energy piping systems and protective features for the safety-related SSCs. The Acceptance Criteria should specify that the safety-related SSCs are protected against the dynamic and environmental effects associated with postulated failures in high- and moderate-energy piping systems as follows: (A) protective features are installed in accordance with the as-built Pipe Break Hazard Analysis Report, (B) the as-built safety-related SSCs are protected against or designed to withstand the dynamic effects associated with postulated failures in the as-built high-energy piping systems, and (C) the as-built safety-related SSCs are protected against or designed to withstand the environmental effects associated with postulated failures in the as-built high- and moderate-energy piping systems.

Should the DC applicant not implement DAC, some of the ITAAC discussed above may not be necessary, as the NRC staff will have had the opportunity to review the complete piping design at the DC stage. If DAC are not implemented, the staff should confirm that the ITAAC provide adequate verification that the reviewed and approved design is appropriately implemented in the field.

Selected material in DCD Tier 2, Chapter 3 provides design information and defines design processes that are acceptable for use in satisfying the piping DAC in Tier 1. However, Tier 2 information may be changed by a COL applicant or licensee referencing the certified design in accordance with a "50.59-like" process specified in the rule certifying the design. The staff's evaluation of the standard design for piping systems is based on the design processes and acceptance criteria specified in the DAC, if used, and supporting information in Tier 2.

DC applicants may also request that selected aspects of the piping design described in Tier 1 be designated as Tier 2* information. When Tier 1 information is designated as Tier 2* information, it becomes Tier 2 information that requires NRC approval prior to implementation of any proposed change. The Tier 2* change control process is thus stricter than that applied to all other Tier 2 information. Consideration should also be given to allowing the designation of Tier 2* to expire at first full power when the detailed design is complete and performance characteristics of the facility are known. Although DC applicants may propose designating Tier 2* information based on the approved DCDs for the evolutionary designs, the NRC bears the final responsibility for approving which material is Tier 2*. The basis for the use of Tier 2* should be discussed in the staff's safety evaluation report (SER). Tier 2* information is discussed further in Appendix A to SRP Section 14.3.

<u>Codes, Standards, and Topical or Technical Reports</u>. Incorporation by reference of codes, standards, and topical or technical reports, whether in whole or in part, into the certified design material (CDM) should be minimized, with exceptions granted on a case-by-case basis. Instead, the applicable requirements, including specific design provisions, from codes, standards, or reports should be directly stated in the CDM. This ensures that each Tier 1 requirement is clear, and remains unaffected if the referenced code, standard, or report changes. This practice will also simplify a rulemaking certifying the standard design, should the NRC grant the certification.

The specific Code edition, volume, version, date, etc., should be specified in Tier 2 of the DCD rather than in the DCD Tier 1. This provides for specific requirements that are acceptable, yet allows the Code to be updated via the change process in the rule certifying the design. It is important to note that, under the provisions of 10 CFR 52.63, “Finality of standard design certifications,” and the rule certifying the design, changes to the codes and standards in 10 CFR 50.55a would not necessarily be requirements for the certified design.

2. Verification of Components and Systems.

In addition to the generic approach to piping design in Tier 1, the verification of piping and component classification, fabrication, dynamic and seismic qualification, and selected testing and performance requirements is also addressed by specific ITAAC in the individual Tier 1 systems. The staff should evaluate the adequacy of specific proposed ITAAC in view of the applicable considerations discussed below:

A. Piping and Component Safety Classification.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1, “Quality Standards and Records,” requires that SSCs important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions performed. Safety-related SSCs are a subset of SSCs important to safety and are covered by GDC 1. Nuclear power plant components classified as part of the reactor coolant pressure boundary (hereafter referred to as Quality Group A), Quality Group B, and Quality Group C are required by 10 CFR 50.55a to meet the requirements for ASME BPV Code Class 1, 2, or 3, respectively; therefore, SSC safety classifications should be in each system's design description, and the functional drawings should identify the ASME BPV Code classification boundaries applicable to the safety class. The ASME BPV Code classes in ASME BPV Code, Section III, provide design requirements that assure structural integrity and quality commensurate with the relative importance assigned to the individual items of the nuclear power plant. The ASME BPV Code class requirements may be verified by either a generic piping design ITAAC or by each system ITAAC. The use of other codes and standards (e.g., American Institute of Steel Construction manual for building structural steel) is within the Tier 2 scope, and DCD Tier 2 describes the applicable codes and standards for these other safety-related SSCs not designed to the ASME BPV Code, Section III. Appendix B of 10 CFR Part 50 contains the quality assurance requirements for safety-related SSCs.

B. Fabrication (Welding).

10 CFR Part 50, Appendix A, GDC 14, “Reactor Coolant Pressure Boundary,” requires that the reactor coolant pressure boundary be designed, fabricated, erected, and tested to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture. In addition, GDC 30, “Quality of Reactor Coolant Pressure Boundary,” requires that component parts of the reactor coolant pressure boundary be designed, fabricated, erected, and tested to the highest quality standards practical.

The ASME BPV Code class welds are included in Tier 1 because ASME BPV Code, Section III, is referenced in 10 CFR 50.55a, which requires nuclear power plant components classified as Quality Groups A, B, and C to meet ASME BPV Code Class 1, 2, and 3 requirements, respectively. Each system description should include a functional drawing that shows the boundaries of the ASME BPV Code classification. The integrity of the pressure boundary is required to be maintained because it is directly involved in preventing or mitigating an accident or event under the defense-in-depth principle. ASME BPV Code Class 1, 2, or 3 pipe support welds are indirectly addressed within the scope of Tier 1, as they are reviewed as part of the ASME BPV Code Data Report generated for each system, but they do not need their own specific reference within Tier 1.

The integrity of the pressure boundary in the plant will be ensured, in part, through a verification of the welding quality. This verification is performed as a part of the ASME BPV Code, Section III, Data Report ITAAC of each specific as-built system.

The acceptance criteria for the welds are the ASME BPV Code, Section III, weld examination requirements. The specific weld examination requirements for a particular ASME BPV Code Class 1, 2, or 3 component and weld type are tabulated in the DCD, Tier 2. The specific weld examination requirements are considered Tier 2 because they could change depending on future revisions to the ASME BPV Code, Section III requirements.

Welding activities not governed by the ASME BPV Code include:

i. Pressure-retaining welds other than ASME BPV Code, Section III, welds,
ii. Structural and building steel welds,
iii. Electrical cable tray and conduit support welds,
iv. Heating, ventilation, and air-conditioning support welds, and
v. Refueling cavity and spent fuel pool liner welds.

These types of welding are included in the DCD Tier 2 scope. Tier 2 describes the applicable codes and standards for the other types of welding and the weld acceptance criteria. Similar to the ASME BPV Code Classes 1, 2, and 3 structural welds, these welds are needed for protection of safety-related SSCs but do not directly prevent (or are redundant for prevention of) accidents or events. Accordingly, these other types of welding need not be included within the scope of DCD Tier 1.

C. <u>Pressure Test</u>.

The integrity of the pressure boundary is required to be maintained because it is directly involved in preventing or mitigating an accident or event under the defense-in-depth principle. The pressure boundary integrity is ensured, in part, through a pressure test verifying the leak-tightness of the ASME BPV Code piping systems. A pressure test is generally specified by the ASME BPV Code, Section III, for ASME BPV Code Class 1, 2, and 3 SSCs to verify the pressure integrity of the overall piping system, as fabricated and installed, including any welding and bolting requirements. This test is completed as part of the ASME BPV Code, Section III, Data Report, and may be verified by the corresponding ITAAC for ASME BPV Code, Section III Data Reports, which require that they exist and conclude that the SSCs meet ASME BPV Code, Section III requirements.

D. Equipment Seismic and Dynamic Qualification.

The ITAAC should verify the seismic and dynamic qualification of each system and its components within the scope of Tier 1 for the nuclear power plant. For example, the Design Commitment should specify that the system's Seismic Category I equipment, including its associated supports and anchorages, withstands design basis seismic loads without loss of its safety function(s) during and after an SSE. The ITA should specify that (i) a type test, analysis, or a combination of type test and analysis will be performed of the system's Seismic Category I equipment, including its associated supports and anchorages; and (ii) an inspection will be performed of the system's Seismic Category I as-built equipment, including its associated supports and anchorages. The Acceptance Criteria should specify that (i) a seismic qualification report performed in conformance to the Institute of Electrical and Electronics Engineers (IEEE) Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," and ASME Standard QME-1-2007 (or later edition accepted by NRC), "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants," as accepted in Regulatory Guide (RG) 1.100, Revision 3 (or later revision), "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants," or equivalent standards, exists and concludes that the system's Seismic Category I equipment listed in the ITAAC table, including its associated supports and anchorages, will withstand the design-basis seismic loads and perform its safety functions during and after an SSE; and (ii) the system's Seismic Category I equipment listed in the applicable ITAAC table, including its associated supports and anchorages, is installed in its design location in a Seismic Category I structure in a configuration bounded by the equipment's seismic qualification report. ITAAC similar to the example above may also be used for other SSCs with seismic and dynamic qualification requirements.

In some instances, the ITAAC listed in SRP Section 14.3, Appendix D, can be used to verify the dynamic qualification (e.g., seismic, loss-of-coolant accident, and safety relief valve discharge loads) of Seismic Category I mechanical and electrical equipment (including connected instrumentation and controls) in the design descriptions and figures. The inspection mentioned in the ITA above verifies the capability of mechanical and electrical equipment in their as-built condition, including anchorages, to perform their safety functions during and following an SSE. The Tier 1 information describing dynamic qualification of equipment may be considered for designation as Tier 2*, although specific provisions in the ITAAC, such as use of ASME QME-1-2007 (or later edition accepted by NRC) as accepted in RG 1.100 (Revision 3 or later revision), for the dynamic qualification of mechanical equipment may eliminate the need to use this designation. Tier 2* information is addressed further in SRP Section 14.3, Appendix A. Detailed supporting information for dynamic qualification requirements, including seismic qualification records, should be included in DCD Tier 2, Chapter 3.

E. Environmental Qualification.

The ITAAC should verify the environmental qualification of electrical and mechanical equipment in each system within the scope of ITAAC for the nuclear power plant.

(1) Electrical Equipment Environmental Qualification.

In the electrical equipment environmental qualification ITAAC, the Design Commitment should specify that the system's Class 1E electrical equipment located in a harsh environment, including its connection assemblies, withstands the design basis harsh environmental conditions experienced during normal operations, anticipated operational occurrences, design-basis accidents, and post-accident conditions; and performs its functions for the period of time credited to complete the function. The ITA for electrical equipment should specify that (i) a type test or a combination of type test and analysis will be performed of the system's Class 1E electrical equipment, including its connection assemblies; and (ii) an inspection will be performed of the system's Class 1E as-built electrical equipment, including its connection assemblies. The Acceptance Criteria should specify that (i) an equipment qualification data report exists and concludes that the system's Class 1E electrical equipment listed in the applicable ITAAC table, including its connection assemblies, performs its functions under the environmental conditions specified in the equipment qualification data report for the period of time credited to complete each function; and (ii) the system's Class 1E electrical equipment listed in the ITAAC table, including its connection assemblies, is installed in its design location in a configuration bounded by the applicable equipment qualification data report.

(2) Mechanical Equipment Environmental Qualification.

In the mechanical equipment environmental qualification ITAAC, the Design Commitment should specify that the system's non-metallic parts, materials, and lubricants used in safety-related mechanical equipment perform their safety-related functions up to the end of their qualified lives in the design basis harsh environmental conditions (both internal service conditions and external environmental conditions) experienced during normal operations, anticipated operational occurrences, design-basis accidents, and post-accident conditions. The ITA should specify that a type test or a combination of type test and analysis will be performed for the system's non-metallic parts, materials, and lubricants used in safety-related mechanical equipment. The Acceptance Criteria should specify that a qualification report exists and concludes that the non-metallic parts, materials, and lubricants used in safety-related mechanical equipment listed in the ITAAC table perform their safety-related functions up to the end of their qualified lives under the design basis harsh environmental conditions (both internal service conditions and external environmental conditions) specified in the qualification report.

F. Pumps and Valves.

The ITAAC for pumps and valves in systems within the scope of Tier 1 should address functional qualification and capability, and preoperational testing of these components, as described below:

(1) Pump and Valve Functional Qualification and Capability.

(a) Pump and Valve Functional Qualification.

The ITAAC should verify the functional qualification of all safety-related pumps and valves. The ITAAC should verify the pumps and valves are capable of performing their intended functions for the full range of operating conditions up to and including design-basis accident conditions. In this regard, the Design Commitment should specify that pumps and valves identified in the applicable ITAAC table will be functionally designed and qualified to perform their safety-related functions for the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions with debris-laden coolant fluids up to and including design-basis accident conditions. The ITA should specify that a type test or a combination of type test and analysis, and a production test, will be performed for the pumps and valves listed in the applicable ITAAC table. The Acceptance Criteria should specify that the Functional Qualification Report and Application Report prepared in conformance to ASME QME-1-2007 (or later editions accepted by the NRC), as accepted in RG 1.100, Revision 3 (or later revision), or an equivalent standard, exists and concludes that the system's safety-related pumps and valves listed in the ITAAC table are capable of performing their safety-related functions under the full range of fluid flow, differential pressure, electrical conditions, and temperature conditions with debris-laden coolant fluids up to and including design basis accident conditions. DCD Tier 2, Chapter 3 should contain specific provisions for methods used by the COL applicant or licensee for the design, qualification, and testing of pumps and valves to demonstrate their design-basis capability. For example, ASME Standard QME-1-2007 incorporates lessons learned to ensure that pumps, valves, and dynamic restraints are functionally designed and qualified to perform their safety functions. The NRC staff accepted the use of ASME QME-1-2007 in RG 1.100, Revision 3, with specific conditions. The
Tier 1 information regarding functional qualification of pumps and valves may be specified as Tier 2* information, although specific provisions in the ITAAC, such as use of ASME QME-1-2007 (or later edition accepted by NRC) as accepted in RG 1.100 (Revision 3 or later revision), for the functional qualification of safety-related pumps and valves may eliminate the need to use

this designation. Tier 2* information is addressed further in SRP Section 14.3, Appendix A.

(b) Pump and Valve Functional Capability.

(i) An ITAAC should require a vendor test of the Reactor Coolant Pump (RCP) flywheel integrity by an overspeed test if applicable to the reactor design. The Design Commitment should specify that the RCP flywheel maintains its structural integrity during an overspeed event equal to at least 125 percent of the motor's synchronous speed. The ITA should specify that a vendor test will be performed on each as-built RCP flywheel to an overspeed condition. The Acceptance Criteria should specify that each RCP flywheel maintains its structural integrity during specified overspeed testing.

(ii) An ITAAC should require a vendor test of the RCP coastdown flow if applicable to the reactor design. The Design Commitment should specify that the RCPs provide the coastdown flow credited in the plant safety analyses. The ITA should specify that a vendor test will be performed of each RCP to demonstrate its capability to provide the coastdown flow credited in the plant safety analyses. The Acceptance Criteria should specify that each RCP's coastdown flow is equal to or greater than the coastdown flow credited in the plant safety analyses.

(iii) An ITAAC should require capacity certification of the safety-related relief valves in accordance with ASME BPV Code, Section III, for the applicable fluid conditions. The Design Commitment should specify that the safety-related relief valves provide overpressure protection. The ITA should specify that a vendor test will be performed of each safety-related relief valve; and an inspection will be performed of each safety-related as-built relief valve. The Acceptance Criteria should specify that an ASME BPV Code, Section III, Data Report exists and concludes that the relief valves in the ITAAC table meet the valve's design set pressure, capacity, and overpressure; and each relief valve listed in the ITAAC table is provided with an ASME BPV Code Certification Mark that identifies the relief valve's set pressure, capacity, and overpressure.

(2) Pump and Valve Preoperational Testing.

The ITAAC for in-situ testing of installed pumps and valves should verify their capability to perform their intended functions under the applicable fluid flow, differential pressure, electrical, and temperature conditions identified in the applicable system ITAAC. Standard ITAAC are provided in Appendix D to SRP Section 14.3 for verification of the performance of these pumps and valves. These ITAAC are summarized below:

(a) Pump Preoperational Testing.

(i) An ITAAC should verify pump capacity as part of preoperational testing. The Design Commitment should specify that the system's safety-related pumps provide the design flow for removing design heat loads. The ITA should specify that a test will be performed of the system's safety-related pumps. The Acceptance Criteria should specify that each system safety-related pump listed in the ITAAC table provides the design flow of at least (X) for removing design heat loads, while the system is aligned in an emergency operating lineup.

(ii) An ITAAC should verify the Net Positive Suction Head (NPSH) for the applicable pumps as part of preoperational testing. The Design Commitment should specify that the system's safety-related pumps have a net positive suction head available (NPSHA) that is greater than or equal to their net positive suction head required (NPSHR). The ITA should specify that a test will be performed of the system's safety-related pumps. The Acceptance Criteria should specify that each system safety-related pump listed in the ITAAC table has an NPSHA that is greater than or equal to the NPSHR while the system is aligned in an emergency operating lineup.

(b) Valve Preoperational Testing.

(i) An ITAAC should verify valve operation as part of preoperational testing. The Design Commitment should specify that the system's safety-related valves change position under design-basis temperature, differential pressure, and flow conditions. The ITA should specify that diagnostic stroke tests will be performed of the system's safety-related valves under preoperational temperature, differential pressure, and flow conditions and that the data obtained from the stroke tests will be analyzed to demonstrate that each valve is capable of performing its safety functions under those conditions. The Acceptance Criteria should specify that each system safety-related valve listed in the ITAAC table strokes fully open and fully closed by remote operation (or manual operation if a manually operated valve) under preoperational temperature, differential pressure, and flow conditions. Analysis, based on diagnostic data, should demonstrate that each valve will perform at its design-basis capability as established by the type test performed in accordance with the applicable functional qualification ITAAC.

(ii) An ITAAC should verify the closure time of containment isolation valves as part of preoperational testing. The Design Commitment should verify that containment isolation valve closure times limit potential releases of radioactivity. The ITA should specify that a test will be performed of the automatic containment isolation valves. The Acceptance Criteria should specify that each automatic containment isolation valve listed in the ITAAC table travels from the full open to full closed position in less than or equal to the time listed in the applicable ITAAC table after receipt of a containment isolation signal.

(iii) An ITAAC should verify the stroke capability of check valves as part of preoperational testing. The Design Commitment should specify that the system's safety-related check valves will open and close under design-basis temperature, differential pressure and flow conditions. The ITA should specify that stroke tests will be performed of the system's safety-related check valves under preoperational temperature, differential pressure and flow conditions and that the data obtained from the stroke tests will be analyzed to demonstrate that each valve is capable of performing its safety functions under those conditions. The Acceptance Criteria should specify that each system safety-related check valve listed in the ITAAC table strokes fully open and closed (under forward and reverse flow conditions, respectively) under preoperational temperature, differential pressure, and flow conditions. Analysis, based on diagnostic data, should demonstrate that each valve will perform at its design-basis capability as established by the type test performed in accordance with the applicable functional qualification ITAAC.

(iv) For valves that move to or maintain their safety position upon loss of motive power, an ITAAC should verify this capability for the applicable valves as part of preoperational testing. The Design Commitment should specify that those applicable systems safety-related valves will perform their function to fail to (or maintain) their safety-related position on loss of motive power under design-basis temperature, differential pressure, and flow conditions. The ITA should specify that stroke tests will be performed of these safety-related valves under preoperational temperature, differential pressure and flow conditions and that the data obtained from the stroke tests will be analyzed to demonstrate that each valve is capable of performing its safety functions under those conditions. The Acceptance Criteria should specify that each applicable system safety-related valve listed in the ITAAC table performs its function to fail to (or maintain) its safety-related position on loss of motive power under preoperational temperature, differential pressure, and flow conditions. Analysis, based on diagnostic data, should demonstrate that each valve will perform at its design-basis capability as established by the type test performed in accordance with the applicable functional qualification ITAAC.

(v) An ITAAC should verify the operation of the main turbine isolation valves as part of preoperational testing. The Design Commitment should specify that the main turbine isolation valves close in response to a turbine trip signal. The ITA should specify that a test will be performed of the main turbine isolation valves. The Acceptance Criteria should specify that each main turbine isolation valve listed in the ITAAC table closes on a turbine trip signal.

These ITAAC for pump and valve preoperational testing may be accomplished as part of the licensee's preservice testing program. Tier 2 information should indicate that these tests will be conducted under maximum achievable preoperational conditions and should describe the analyses that will be performed to determine whether the test results demonstrate that the valves will function under design basis conditions (see DCD Tier 2, Section 3.9.6). Where indicated by significant operating experience with specific pumps or valves, the proper operation of these components in light of that operating experience should be explicitly demonstrated as part of ITAAC functional tests.

G. Installed Configuration.

ITAAC should verify the installed configuration of each system and its components within the Tier 1 scope. The Design Commitment should specify that the installed configuration of the system, including its flowpath, is consistent with installation geometric specifications such that the system's safety functions can be achieved. The ITA should specify that an inspection of the as-built system will be performed to verify the installed configuration, including the flowpath. The Acceptance Criteria should specify that the system installed configuration, including the flowpath, of the components listed in the applicable ITAAC table is consistent with installation geometric specifications such that the system's safety functions can be achieved. Tier 2 information should indicate that verification of the installed configuration of the system includes verifying that the system and its components are installed in a manner that supports the safety functions for which the system is intended, consistent with installation geometric specifications. This verification should include visual inspection (e.g., walkdown) of each system, including its flowpath, and may be performed in conjunction with other preoperational activities. Examples of the geometric verification adequate to complete this ITAAC include confirmation of valve orientation, inspection of installation, verification of adequate sloping of piping in accordance with design provisions, and verification of access. To the extent other ITAAC verify the installed configuration of an SSC, as described above, a separate ITAAC for doing so is not needed. However, the mere fact that other ITAAC apply to a particular SSC is not an indication that the installed configuration ITAAC may be omitted. Rather, the staff should consider whether two or more ITAAC verify the same substance and are therefore redundant.

H. <u>Regulatory Treatment of Non-Safety Systems (RTNSS).</u>

In SECY-95-132, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems (RTNSS) in Passive Plant Designs," as accepted by the Commission in its Staff Requirements Memorandum dated June 28, 1995, the NRC specified the policy regarding the functional design, qualification, and inservice testing of RTNSS pumps and valves for new nuclear power plants with first-of-a-kind passive core and containment cooling systems. For a new nuclear power plant, ITAAC should cover equipment within the scope of the RTNSS program, which provides the first line of defense for the passive cooling systems. These ITAAC should provide for the verification of RTNSS equipment to perform their intended function, including dynamic, environmental, and functional capability.

I. <u>Design Reliability Assurance Program (D-RAP).</u>

ITAAC should verify the implementation of the D-RAP for the nuclear power plant. The Design Commitment for the D-RAP should specify that the design of SSCs within the scope of the reliability assurance program (RAP) is consistent with the risk insights and key assumptions (e.g., SSC design, reliability, and availability). The ITA should specify that an analysis will confirm that the design of all RAP SSCs has been completed in accordance with applicable D-RAP activities. The Acceptance Criteria should specify that all RAP SSCs have been designed in accordance with the applicable reliability assurance activities for the D-RAP.

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. Application of 10 CFR 52.47(b)(1), as it relates to ITAAC (for design certification) provides reasonable assurance that the SSCs in this area of review have been constructed and will be operated in conformity with the design certification, the provisions of the Atomic Energy Act, and the NRC's rules and regulations;

2. Application of 10 CFR 52.80(a), as it relates to ITAAC (for combined licenses) provides reasonable assurance that the SSCs in this area of review have been constructed and will be operated in conformity with the combined license, the provisions of the Atomic Energy Act, and the NRC's rules and regulations.

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 to demonstrate that the proposed alternatives provide an acceptable method of complying with the relevant NRC requirements identified in Subsection II. The reviewer should:

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 SRP Section 14.3, Appendix A.

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 performance of the systems, and all important SSCs are treated appropriately. Reviewers should use the review checklists in SRP Section 14.3, Appendix C, as aids in treating issues consistently and comprehensively.

3. Ensure that Tier 1 clearly delineates the important aspects of piping design, specifies its scope for the standard design, and establishes appropriate acceptance criteria. ASME BPV Code classification, safety classification, and seismic classification of the piping systems should be indicated clearly on the figures or described in the design descriptions and consistent with DCD Tier 2. Ensure that system boundaries and interfaces are indicated clearly in Tier 1 and that the figures are in accordance with the legends. Figure legends should clearly identify the information that is in Tier 1 and the information that is not in Tier 1.

4. Provide appropriate guidance to other reviewers for consistent treatment of piping design issues in Tier 1, especially applicable standard ITAAC and piping issues for figures.

5. Ensure that standard ITAAC entries in SRP Section 14.3, Appendix D, for piping systems and components are included where appropriate in the standard design systems. Ensure that plant-specific ITAAC are included where applicable. Ensure adequate supporting information is in Tier 2, generally Chapter 3, and the initial test program in Section 14.2.

6. Ensure that design features resulting from the resolutions of selected policy and technical issues are addressed adequately in Tier 1 based on safety significance. Ensure that applicable NRC requirements and the appropriate NRC guidance, bases, and resolutions for these items are documented clearly in the SER.

7. Ensure that any Tier 2* information is clearly designated in Tier 2, and consider expiration of these items at first full power, if appropriate. The staff's basis for designating the information as Tier 2* and the rationale for its decision that changes require prior NRC approval should be specified in the SER (see also SRP Section 14.3, Appendix A). As discussed above, the DC or COL applicant may propose ITAAC that are sufficiently specific to encompass the Tier 2* information such that Tier 2* information is not needed in Tier 2 of the DCD or FSAR.

8. Ensure appropriate interface with the secondary reviewers listed in the "Areas of Review" section.

9. For review of a DC application, follow the above procedures to verify that the ITAAC are sufficient to verify that the facility as constructed conforms to the design, including requirements and restrictions (e.g., interface requirements and subsurface or other preparation needed for the site to fall within site parameters), set forth in the FSAR. While the requirements for an application for design certification specify the contents of the FSAR for the standard design, rules certifying standard designs have referred to the FSAR, as incorporated into the rule, as the design certification 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 in a COL application, they should be added to the DC FSAR.

   For review of a COL application, the scope of the review depends 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, among others).

10. Implementation of ITAAC will be inspected in accordance with NRC Inspection Manual Chapter IMC-2503, “Construction Inspection Program - ITAAC Inspections.”

    For DC and COL reviews, the staff recognizes that the review of ITAAC cannot be completed until after the interfacing reviewers have completed their review of the associated application sections against the acceptance criteria in the respective SRP 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.

1. The reviewer verifies that the ITAAC are sufficient to provide reasonable assurance that the piping systems and components have been constructed and installed in accordance with the design described in the FSAR and will operate in conformity with the [design certification or COL], the provisions of the Atomic Energy Act, and the Commission’s rules and regulations.

2. For DC and COL reviews, the findings will also summarize the staff’s evaluation of requirements and restrictions (e.g., interface requirements and subsurface or other preparation needed for the site to fall within site parameters) and COL action items relevant to this SRP section.

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 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.” 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. American Society of Mechanical Engineers, ASME QME-1-2007, “Qualification of Active Mechanical Equipment Used in Nuclear Power Plants.”

2. Institute of Electrical and Electronics Engineers, IEEE 344-2004, “IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations.”

3. U.S. *Code of Federal Regulations*, "Codes and Standards," § 50.55a, Chapter 1, Title 10, “Energy.”

4. U.S. *Code of Federal Regulations*, "Contents of Applications; technical information," § 52.47, Title 10, “Energy.”

5. U.S. *Code of Federal Regulations*, "Contents of Applications, additional technical information,” § 52.80, " Title 10, “Energy.”

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

7. U.S. *Code of Federal Regulations*," Domestic Licensing of Production and Utilization Facilities," Part 50, Appendix A, “General Design Criteria for Nuclear Power Plants,” GDC 14, "Reactor Coolant Pressure Boundary," Title 10, “Energy.”

8. U.S. *Code of Federal Regulations*, "Domestic Licensing of Production and Utilization Facilities," Part 50, Appendix A, General Design Criteria for Nuclear Power Plants GDC 30, “Quality of Reactor Coolant Pressure Boundary,” Title 10, “Energy.”

9. U.S. Nuclear Regulatory Commission, "Final Safety Evaluation Report Related to the Certification of the System 80+ Design," NUREG-1462, Volumes 1 and 2, dated August 1994.

10. U.S. Nuclear Regulatory Commission, "Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor," NUREG-1503, Volumes 1 and 2, dated July 1994.

11. U.S. Nuclear Regulatory Commission, “Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design,” NUREG-1793, dated September 2004, Supplement 1 dated December 2005, and Supplement 2 dated September 2011.

12. U.S. Nuclear Regulatory Commission, “Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor Standard Design,” NUREG-1966, dated April 2014, and Supplement 1 dated September 2014.

13. U.S. Nuclear Regulatory Commission, "Development of Design Acceptance Criteria (DAC) for the Advanced Boiling Water Reactor (ABWR)," SECY-92-196, dated May 28, 1992.

14. U.S. Nuclear Regulatory Commission, “Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems (RTNSS) in Passive Plant Designs,” SECY-95-132, dated May 22, 1995.

15. U.S. Nuclear Regulatory Commission, “Construction Inspection Program - ITAAC Inspections,” NRC Inspection Manual Chapter IMC-2503, issued April 25, 2006.

16. U.S. Nuclear Regulatory Commission, “Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants,” Revision 3, NRC Regulatory Guide 1.100, dated September 2009.

Paperwork Reduction Act

This Standard Review Plan provides guidance for implementing the mandatory information collections in 10 CFR Parts 50 and 52 that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et. seq.). These information collections were approved by the Office of Management and Budget, approval numbers 3150-0011 and 3150-0151. Send comments regarding this information collection to the Information Services Branch (T-6A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the OMB reviewer at: OMB Office of Information and Regulatory Affairs (3150-0011 and 3150-0151), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street, NW Washington, DC 20503; e-mail: oira_submission@omb.eop.gov.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

.

SRP 14.3.3, "Piping Systems and Components Inspections, Tests, Analyses, and Acceptance Criteria" Description of Changes

The technical changes incorporated in SRP 14.3.3, "Piping Systems and Components Inspections, Tests, Analyses, and Acceptance Criteria" Final Revision 1, dated May 2019 include incorporation of clarifying language regarding ITAAC for functions that are not safety related, a discussion of reports not governed by ASME Code requirements, an analysis of the discussion for Pipe Break Hazards Protective Features Verification ITAAC, wording regarding analysis based on diagnostics data for discussion of ITAAC associated with preoperational test valves, and a discussion regarding the avoidance of redundant ITAAC.

Descriptions of the changes in each BTP section are as follows:

A. REVIEW RESPONSIBILITIES

1. Added clarifying language for the staff's review of DC applications, COL applications, and COL Action Items and Certification Requirements and Restrictions

2. Added clarifying language for Review Interfaces

B. ACCEPTANCE CRITERIA

1. Added clarifying language regarding ITAAC for functions that are not safety-related

2. Added numerous editorial changes to make the text read more accurately

3. Added a discussion about specifying design output documents in the ITAAC

4. Added a discussion about certified Design Commitments for ASME Code Class piping system ITAAC

5. Added discussions concerning Pipe Break Hazard Reports and Pipe Break Hazard Analysis Report ITAAC and other reports not governed by ASME Code requirements

C. REVIEW PROCEDURES

1. Added clarifying language to the text

D. EVALUATION FINDINGS

1. Added clarifying language to the text

E. IMPLEMENTATION

1. Changed to reflect updated standard text

F. REFERENCES

1. Changes the location in the reference list for an ASME standard and an IEEE standard.