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 - None

I. AREAS OF REVIEW

This SRP section addresses inspections, tests, analyses, and acceptance criteria (ITAAC) related to piping systems and components. 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 of a design certification (DC) application.

The specific areas of review are as follows:

1. Design control document (DCD).

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

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

C. Tier 1 information is reviewed for treatment of MOVs, POVs, and check valves, as well as dynamic qualification, welding, and safety classification of structures, systems, and components (SSCs).

2. For a DC application:

A. The staff reviews 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 plant that incorporates the design certification is built and will operate in accordance with the design certification, the Atomic Energy Act, and the NRC's regulations.

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 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 Atomic Energy Act, and the NRC's regulations.

B. If the application references a standard design certification, the staff verifies that the ITAAC contained in the certified design apply to those portions of the facility design that are approved in the design certification.

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

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

Review Interfaces

Other SRP sections interface with this section as follows:

1. SRP Section 14.3 provides general guidance on ITAAC information

2. Acceptability of ITAAC information regarding the ability of SSCs to withstand various natural phenomena is reviewed under SRP Section 14.3.2.

3. Acceptability of ITAAC information for reactor systems is reviewed under SRP Section 14.3.4.

4. Acceptability of ITAAC information for plant systems is reviewed under SRP Section 14.3.7.

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 proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations;

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 operate in conformity with the combined license, the provisions of the Atomic Energy Act, and the NRC's regulations.

SRP Acceptance Criteria

Specific SRP acceptance criteria acceptable to meet the relevant requirements of the NRC's regulations identified above are as follows for the review described in this SRP section. The SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant 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.

1. Generic Piping Design. DC applicants may provide less than the complete design information for piping design before DC because the design may depend upon as-built and as-procured information. Instead, 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. The DAC are discussed further in to SRP Section 14.3, Appendix A.

The reviewer should use the SRP guidelines to evaluate the piping design information in Tiers 1 and 2 and audit 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 American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Classes 1, 2, and 3 piping and supports, but includes buried piping, instrumentation lines, the interaction of non-seismic Category I piping with seismic Category I piping, and any safety-related piping designed to industry standards other than the ASME Code. The staff's evaluation 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 design piping design. The staff's evaluation should include both DCD Tier 1 and Tier 2 information on 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.

Design descriptions and the associated DAC should be specified in Tier 1. The scope of the standard design to which the piping design information applies should be stated in Tier 1. This may be done on a generic basis using a single ITAAC applicable to multiple systems of the design, or applied to individual system ITAAC. If done using a generic piping design ITAAC, the Tier 1 should address its application to piping systems classified as both nuclear safety-related and non-nuclear safety systems. The nuclear 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 Code Class 1, 2, or 3 in the individual systems of the standard design. Tier 1 should ensure that the 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 generic Piping ITAAC includes all ASME Code Class 1, 2, or 3 piping systems and high-energy piping systems. Tier 1 includes ASME Code Class piping systems because the ASME Boiler and Pressure Vessel Code, Section III is referenced in 10 CFR 50.55a. 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 Code Class 1, 2, or 3, respectively. In each system description, the functional drawing identifies the boundaries of the ASME Code classification for the piping systems. The piping pressure boundary and structural integrity are required to be maintained because they are directly involved in preventing or mitigating an accident or event under the defense-in-depth principle.

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. For example, the first ITAAC specified in Tier 1 should require that an ASME Code certified stress report exists to ensure that the ASME Code Class 1, 2, or 3 piping systems and components are designed to retain their pressure integrity and functional capability under internal design and operating pressures and design basis

loads. The specific contents and requirements of the certified stress report are contained in the ASME Code. The particular certified stress report to be used to satisfy the ITAAC should be specified in Tier 2. An acceptable version of an ASME Code certified stress report is the design document required by ASME Code, Section III, Subarticle NCA-3550. A certified piping stress report provides assurance that requirements of the ASME Code, Section III for design, fabrication, installation, examination, and testing have been met and that the design complies with the design specifications.

A second ITAAC should require that a pipe break analysis report exists that documents that SSCs that are required to be functional during and following an SSE have adequate high-energy pipe break mitigation features. The design description should discuss the criteria used to postulate pipe breaks, the analytical methods used to perform pipe breaks, and the method to confirm the adequacy of the results of the pipe break analyses. The design description should be verified in a Pipe Break Analysis Report that provides assurance that the high-energy line break analyses have been completed. For postulated pipe breaks, the report confirms whether (A) piping stresses in the containment penetration area are within allowable stress limits, (B) pipe whip restraints and jet shield designs can mitigate pipe break loads, (C) loads on safety-related SSCs are within design load limits, and (4) SSCs are protected or qualified to withstand the environmental effects of postulated failures. The Pipe Break Analysis Report shall conclude that, for each postulated piping failure, the reactor can be shut down safely and maintained in a safe, cold shutdown condition without offsite power. Detailed information that supports this ITAAC should be contained in DCD Tier 2 Chapter 3.

If the design uses Leak-Before-Break (LBB) methods, a third ITAAC should require that a LBB evaluation report exists which documents that LBB acceptance criteria are complied with 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 verifies that these values are complied with using actual material properties and final piping configurations, and reconciles the as-built piping data with the LBB assumptions. Detailed information that supports this ITAAC should be contained in DCD Tier 2 Chapter 3.

A fourth ITAAC should require that an as-built piping stress report exists that documents the results of an as-built reconciliation analysis confirming that the final piping system has been built in accordance with the ASME Code certified stress report. The report provides an overall verification by inspection that the as-constructed piping system, including supports, are consistent with the certified design commitments. Specific attributes to be inspected should be described in the DCD Tier 2. Although similar to the first ITAAC, this verification also provides assurance that the as-built documentation used for construction has been reconciled with the documentation used for design analysis and with the certified stress report discussed above. The inspection will also involve a review of the as-built, high-energy pipe break mitigation features (e.g., pipe whip restraints and jet impingement shields) to ensure that the installed features are consistent with the pipe break analysis report. The methodology and specific attributes to be inspected are described in the DCD Tier 2. Alternatively, if an NRC-approved LBB report exists, then the dynamic effects from those postulated high-energy pipe breaks could be excluded. The documentation for this as-built reconciliation review may become part of the certified stress report.

Selected material in DCD Tier 2 Chapter 3 provides design information and defines design processes that are acceptable for use in meeting the piping DAC in Tier 1. However, Tier 2 information may be changed by a COL applicant 1 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 material in the DAC and Tier 2. Consequently, the staff should consider designating selected aspects of these piping design processes as Tier 2* information. Tier 2* information is Tier 2 information that, if considered for a change by a COL applicant or licensee, requires NRC approval prior to implementation of the change. Consideration should also be given to allowing the designation of Tier 2* to expire at the first full power when the detailed design is complete and performance characteristics of the facility are known. Although applicants for design certification should propose designating similar Tier 2* information to that in the DCDs for the evolutionary designs, the NRC bears the final responsibility for designating which material is Tier 2*. The basis for the use of Tier 2* should be discussed in the staff's safety evaluation report. The Tier 2* information is discussed further in Appendix A to SRP Section 14.3.

Regulations, Codes and Standards. The use of codes and standards in the certified design material (CDM) should be minimized with exceptions granted case by case. Instead, the applicable requirements from the regulations, codes, or standards should be stated in the CDM, rather than reference them. This ensures that the requirement is clear, and allows flexibility if the reference changes. References to various parts of ASME Sections III and XI may verify issues like pressure boundaries or pre-service inspection requirements. Also, references to 10 CFR Part 20 may be required for radiation protection. The specific code edition, volume, version, date, etc., should be specified in the site safety analysis report rather than 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, due to the provisions of 10 CFR 52.63 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. Verifications 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.

   A. Piping and Component Safety Classification. 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1, requires that safety-related SSCs be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions performed. 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 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 Code classification boundaries applicable to the safety class. The ASME Code classes in ASME Code, Section III, allow a choice of rules that provide assurance of structural integrity and quality commensurate with the relative

importance assigned to the individual items of the nuclear power plant. The ASME Boiler and Pressure Vessel 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 the DCD Tier 2 describes the applicable codes and standards for these other safety-related SSCs not designed to the ASME Boiler and Pressure Vessel Code, Section III.

B. Fabrication (Welding). 10 CFR Part 50, Appendix A, GDC 14, requires that the reactor coolant pressure boundary be designed, fabricated, erected, and tested to have an extremely low probability of abnormal leakage. In addition, GDC 30 requires that component parts of the reactor coolant pressure boundary be designed, fabricated, erected, and tested to the highest quality standards practical.

The ASME Code class welds are included in Tier 1 because the ASME Boiler and Pressure Vessel 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 Code Class 1, 2, or 3 requirements, respectively. In each system description, the functional drawing shows the boundaries of the ASME 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 Code Class 1, 2, or 3 structural welds (e.g., pipe support welds) are not within Tier 1 scope because they indirectly prevent or mitigate accidents or events (e.g., pipe supports protect the piping but the piping itself is needed for accident mitigation). Thus, ASME Code Class 1, 2, or 3 structural welds are in the Tier 2 scope.

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 basic configuration ITAAC of each specific system. The basic configuration ITAAC, one of the standard ITAAC listed in SRP Section 14.3, Appendix D, is required for most systems in Tier 1. The provisions of the basic configuration check that must be specified in Tier 1 include non-destructive examination of the as-built pressure boundary welds for the ASME Code Class 1, 2, or 3 SSCs in the design description.

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

Other welding activities (non-ASME Code) include:

i. Pressure-boundary welds other than ASME 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 other types of welding are included in the 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 Code Classes 1, 2, and 3 structural welds, these other welds are needed for protection of safety-related SSCs but do not directly (or are redundant) prevent accidents or events. Accordingly, these other types of welding were deemed inappropriate for Tier 1 scope.

C. Hydrostatic Test. 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 also ensured, in part, through a hydrostatic test verifying the leak-tightness of the ASME Code piping systems. A hydrostatic test is generally specified by the ASME Code, Section III, for ASME Code Class 1, 2, and 3 SSCs to verify whether pressure integrity is maintained in the process of fabricating the overall piping system, including any welding and bolting requirements. However, the ASME piping stress report in the generic piping ITAAC does not include the results of hydrostatic tests; therefore, the standard hydrostatic test ITAAC in SRP Section 14.3, Appendix D, should be specified in each system ITAAC with ASME Code Class 1, 2, or 3 SSCs. The hydrostatic test ITAAC also may be specified in other appropriate Tier 1 systems.

D. Equipment Seismic and Dynamic Qualification. The basic configuration ITAAC listed in SRP Section 14.3, Appendix D, include verifications of 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. This inspection verifies the capability of mechanical and electrical equipment in as-built condition, including anchorages, to perform safety functions during and following a SSE. Detailed supporting information for dynamic qualification requirements, including seismic qualification records, is in DCD Tier 2, Chapter 3. The Tier 2 information describing dynamic qualification of equipment should be considered for designation as Tier 2*. Tier 2* information is addressed further in SRP Section 14.3, Appendix A.

E. MOVs and Other Valves. The verification of the design qualification of valves is performed in conjunction with the basic configuration check for mechanical equipment as discussed above. For MOVs in particular, a special inspection is part of the basic configuration check to verify the records of vendor tests that demonstrate MOV ability to function under design conditions. The list of MOVs in Tier 1 should include, but not be limited to, those with active safety-related functions. These may be listed in Tier 2 in the inservice testing plan or other locations. The DCD Tier 2, Chapter 3 material should have detailed supporting information for the CDM for the methods of the COL applicant or licensee for the design, qualification, and testing of MOVs to demonstrate their design-basis capability. This material should be considered for designation as Tier 2* information. Tier 2* information is addressed further in SRP Section 14.3, Appendix A.

In-situ testing of installed MOVs, POVs, and check valves, to verify whether they can perform intended functions under various fluid flow, differential pressure, electrical, and temperature conditions, should be conducted as appropriate in the applicable system ITAAC. Standard ITAAC are provided in Appendix D to SRP Section 14.3 for verification of the performance of these valves. These may be performed as part of the pre-operational test program. Tier 2 information should be provided that defines that these tests will be conducted under maximum achievable pre-operational conditions and describes the analyses that will be performed to show how the test results demonstrate that the valves will function under design basis conditions (See Tier 2 Section 3.9.6). For significant operating problems with other types of valves, or with pumps in general, the proper operation of these components may be implicitly tested, if applicable, as part of other functional tests in the system ITAAC. They also may be tested in the pre-operational or power ascension test program.

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 will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's 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 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 of how the proposed alternatives provide an acceptable method of complying with the relevant NRC requirements identified in Subsection II.

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 requirements 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 applicability to the standard design, and establishes appropriate acceptance criteria. ASME 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, Section 3.2. Ensure that system boundaries and interfaces are indicated clearly in Tier 1 and that the figures are in accordance with the legends.

4. The reviewer should 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, in particular, the basic configuration ITAAC (for dynamic qualification of SSCs and welding), hydrostatic test ITAAC, MOV ITAAC, POV ITAAC, and check valve ITAAC. 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 from the resolutions of selected policy and technical issues are addressed adequately in Tier 1 based on safety significance. Ensure that the appropriate NRC guidance, requirements, 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 change requires prior NRC approval should be specified in the SER (See also RP Section 14.3, Appendix A).

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

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

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

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

IV. EVALUATION FINDINGS

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

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

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

V. IMPLEMENTATION

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

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

VI. REFERENCES

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

2. 10 CFR 52.47 "Contents of Applications."

3. 10 CFR 52.80 "Contents of Applications."

4. 10 CFR Part 50, Appendix A, GDC 1, "Quality Standards and Records."

5. 10 CFR Part 50, Appendix A, GDC 14, "Reactor Coolant Pressure Boundary."

6. 10 CFR Part 50, Appendix A, GDC 30, "Quality of Reactor Coolant Pressure Boundary."

7. NUREG-1462, "Final Safety Evaluation Report Related to the Certification of the System 80+ Design," Volumes 1 and 2, August 1994.

8. NUREG-1503, "Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor," Volumes 1 and 2, July 1994.

9. SECY-92-196, "Development of Design Acceptance Criteria (DAC) for the Advanced Boiling Water Reactor (ABWR)," dated May 28, 1992.

10. NRC Inspection Manual Chapter IMC-2503, “Construction Inspection Program - ITAAC Inspections,” issued April 25, 2006.