

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NEW REACTORS  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, DC 20555-0001

July 17, 2013

**NRC REGULATORY ISSUE SUMMARY 2012-08, REVISION 1  
DEVELOPING INSERVICE TESTING AND INSERVICE INSPECTION PROGRAMS UNDER  
10 CFR PART 52**

**ADDRESSEES**

All current and potential applicants for and holders of a combined license (COL) for a nuclear power plant and applicants for design certification rules (including applicants after issuance of the final design certification rule) under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

**INTENT**

The U.S. Nuclear Regulatory Commission (NRC) is re-issuing this regulatory issue summary (RIS) to update RIS 2012-08, "Developing Inservice Testing and Inservice Inspection Programs under 10 CFR Part 52," which the NRC issued in July 2012 to describe an acceptable approach for COL holders (licensees) to comply with the requirements in 10 CFR 50.55a, "Codes and Standards," regarding development of inservice inspection (ISI) and inservice testing (IST) programs during the initial 120-month program interval following plant startup. The RIS also discusses acceptable approaches for developing preservice inspection programs and risk-informed ISI and IST programs. Revision 1 supersedes in its entirety, the original RIS. Neither the original RIS nor this revision transmits any new requirements or requires any specific action or written response.

**BACKGROUND INFORMATION**

The regulations in 10 CFR 50.55a(f)(4)(i) and (g)(4)(i) require, in part, that inservice tests to verify the operational readiness of safety-related pumps and valves and inservice examinations of components and system pressure tests conducted during the initial 120-month testing and inspection interval comply with the requirements in the latest edition and addenda of the American Society of Mechanical Engineers (ASME) *Boiler & Pressure Vessel Code* (B&PV Code) and ASME *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code), incorporated by reference in 10 CFR 50.55a, on the date that occurs 12 months before the date scheduled for initial loading of fuel under a COL issued under 10 CFR Part 52 (or the optional ASME Code cases listed in NRC Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," and RG 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," which are incorporated by reference in 10 CFR 50.55a).

In addition, the NRC regulations in 10 CFR 52.47(a)(3)(i) require, in part, that a design certification application contain the principal design criteria for the facility. Appendix A, "General

Design Criteria for Nuclear Power Plants,” to 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” establishes minimum requirements for the principal design criteria. General Design Criteria 32, 36, 37, 39, 40, 42, 43, 45, and 46 require that components and systems important to safety shall be designed to permit appropriate periodic inspection of important components to ensure their integrity and capability of the system and to permit periodic pressure and functional testing to ensure (1) the structural and leak-tight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole. The periodic inspections and testing programs are required to meet the ASME B&PV and OM Codes, respectively, under 10 CFR 50.55a.

Lastly, the NRC regulations in 10 CFR 52.79(a)(11) require that the COL applicant describe the programs (such as ISI and IST programs) and their implementation, necessary to ensure that the systems and components meet the requirements in the ASME OM Code and ASME B&PV Code, Section XI. These operational programs are required to be fully described when the COL application is submitted to the NRC for review.

During the NRC staff’s review of design certification and COL applications, several applicants expressed concern about their ability to comply fully with the above three NRC regulations because they perceived the requirements would overlap with the establishment of the applicable editions and addenda of the ASME B&PV and OM Codes to be used for the initial 120-month ISI and IST program intervals. This RIS describes how the NRC staff, design certification applicants, and COL applicants have addressed these requirements in the reviews of design certification and COL applications under 10 CFR Part 52.

## **SUMMARY OF ISSUE**

The NRC regulations in 10 CFR Part 52 allow a two-step process for licensing new nuclear power plants in instances in which a standard design certification is granted with subsequent issuance of a COL referencing the certified design. Under this process, the regulations in 10 CFR 52.47, “Contents of Applications; Technical Information,” require the design certification application to contain a level of design information sufficient to enable the Commission to judge the applicant’s proposed means of assuring that construction conforms to the design and to reach a final conclusion on all safety questions associated with the design before the certification is granted. A design control document (DCD) supporting a design certification application may provide general information on operational programs (such as ISI and IST programs) with allowance for flexibility by the COL applicant when developing plant-specific operational programs. The NRC staff reviews the general description of the operational programs in the DCD to ensure an adequate foundation for the plant-specific operational programs to be developed by COL applicants. With respect to IST programs, the NRC staff review of the DCD focuses on accessibility for the performance of IST activities. To reduce the amount of information needed in subsequent COL applications, some design certification applicants provide more detailed descriptions of ISI and IST operational programs in their DCDs than required by the NRC regulations for a design certification application.

The NRC regulations in 10 CFR 52.79(a)(11) require a COL applicant to provide, in its safety analysis report, a description of the programs and their implementation, necessary to ensure that the systems and components meet the requirements of the ASME B&PV and OM Codes in accordance with 10 CFR 50.55a at a level sufficient to enable the NRC to reach a final conclusion on all safety matters that must be resolved before COL issuance. In SECY-05-0197, “Review of Operational Programs in a Combined License Application and General Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria [ITAAC],” (Agencywide

Documents Access and Management System (ADAMS) Accession No. ML052770257) dated October 28, 2005, the NRC concluded that operational programs (such as ISI and IST programs) could be fully described in a COL application and recognized that some operational programs would not be available at the time of COL issuance. In accordance with this guidance, the description of the program would contain the information necessary for the NRC staff to make a reasonable assurance finding on the acceptability of the operational program in the review of a COL application. This information would specify an edition and addenda of the ASME B&PV and OM Codes that would be the basis for the ISI and IST programs described in the COL application. The NRC staff developed license conditions to provide certainty about when the operational programs would be implemented in support of plant startup.

Following COL issuance, the NRC regulations in 10 CFR 50.55a(f)(4)(i) and (g)(4)(i) require, in part, that inservice tests to verify the operational readiness of safety-related pumps and valves and inservice examinations of components and system pressure tests conducted during the initial 120-month testing and inspection interval comply with the requirements in the latest edition and addenda of the ASME B&PV and OM Codes incorporated by reference in 10 CFR 50.55a, on the date that occurs 12 months before the date scheduled for initial loading of fuel under a COL issued in accordance with 10 CFR Part 52 (or the optional ASME Code cases listed in NRC RG 1.147 and RG 1.192 which are incorporated by reference in 10 CFR 50.55a).

Several years may elapse between the time when a design certification is granted and when a COL application is submitted referencing that certified design. Further, the construction of a nuclear power plant will require several years from the time of COL issuance until the commencement of fuel loading. Therefore, design certification and COL applicants and holders need to be aware of the interrelated requirements in 10 CFR 50.55a and 10 CFR Part 52 regarding the development and implementation of ISI and IST programs for nuclear power plants to be licensed under 10 CFR Part 52.

#### Design Certification and COL Applicants

The NRC regulations in 10 CFR 52.79(a)(11) require that the COL applicant describe the ISI and IST programs and their implementation, necessary to ensure that the systems and components meet the requirements in the ASME B&PV Code, Section XI and ASME OM Code. NRC RG 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," and SECY-05-0197 provide guidance for COL applicants in describing their ISI and IST programs in support of the COL applications. As part of its description of the ISI and IST programs, the COL applicant must identify the edition and addenda of the ASME B&PV Code, Section XI and ASME OM Code, to be used in developing its ISI and IST programs, respectively. In some cases, it may be the same edition and addenda used in the design certification. In other cases, it may be the latest edition and addenda of the ASME OM Code or ASME B&PV Code, Section XI, incorporated by reference in 10 CFR 50.55a at the time of the COL application. In describing ISI and IST programs, COL applicants should recognize that the NRC regulations in 10 CFR 50.55a require inservice examinations and inservice tests, conducted during the first 120-month interval, to comply with the requirements in the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months before the date scheduled for initial fuel loading. Compliance with this requirement will necessitate updating the ISI and IST programs before fuel loading. Design certification applicants should also be aware of this 10 CFR 50.55a requirement when describing ISI and IST programs in their DCDs for reference by COL applicants.

### COL Licensees

After the COL is issued, the COL licensee will initiate development of the ISI and IST programs to allow implementation of those programs in preparation for plant operation. During development of the ISI and IST programs, the COL licensee should be aware of the NRC regulations under 10 CFR 50.55a(f)(4)(i) and (g)(4)(i) that require the COL licensee to develop its initial 120-month interval ISI and IST programs using the latest edition and addenda of the ASME B&PV Code, Section XI and ASME OM Code, incorporated by reference in 10 CFR 50.55a(b) on the date that occurs 12 months before the date scheduled for initial loading of fuel. Therefore, the COL licensee should anticipate that the ASME B&PV and OM Codes might be revised to incorporate industry operating experience and technological advances prior to fuel loading for its nuclear power plant.

### NRC Staff Position

The NRC staff recognizes that a COL licensee might encounter significant logistical and scheduling issues when converting its ISI and IST programs from the edition and addenda of the ASME B&PV and OM Codes specified in the COL application to the edition and addenda of these codes incorporated by reference in 10 CFR 50.55a on the date that occurs 12 months before fuel loading.

The NRC regulations in 10 CFR 50.55a(a)(3) allow alternatives to the requirements of 10 CFR 50.55a to be used if the applicant demonstrates that (1) the proposed alternative would provide an acceptable level of quality and safety, or (2) compliance with the specified requirements of 10 CFR 50.55a would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, a COL licensee may request authorization by the NRC staff to use an edition and addenda of the ASME OM Code for developing its initial 120-month IST program that is earlier than that required under 10 CFR 50.55a(f)(4)(i) and, similarly, to use an edition and addenda of the ASME B&PV Code, Section XI, for developing its initial 120-month ISI program that is earlier than that required under 10 CFR 50.55a(g)(4)(i).

One acceptable approach would be for the COL holder to submit to the NRC a request to authorize, as an alternative, the use of the same edition and addenda of the ASME OM Code or ASME B&PV Code, Section XI, that was specified in the design certification or COL application for the initial 120-month IST and ISI programs. In its request for authorization of an alternative, the COL holder would need to demonstrate that it meets one of the conditions described in 10 CFR 50.55a. In addition, a COL holder may request exemptions or departures for ISI and IST programs in accordance with Section VIII, "Processes for Changes and Departures" which is located in each of the Appendices A-D of 10 CFR Part 52.

When evaluating a proposed alternative under 10 CFR 50.55a, the NRC staff will compare the ISI and IST provisions in the proposed code edition and addenda to the required edition and addenda of these codes incorporated by reference in 10 CFR 50.55a on the date that occurs 12 months before fuel loading. As part of its review, the NRC staff will evaluate the differences between the ISI and IST provisions in those respective code editions and addenda. Therefore, COL holders should consider the edition and addenda of the ASME OM Code and ASME B&PV Code, Section XI, specified in the descriptions of the IST and ISI programs in their design-specific design control documents (DCDs), and whether the use of the earlier Code edition and addenda prompts a need to account for the lessons learned from operating experience at nuclear power plants (including IST and ISI activities) and industry and regulatory research

programs that have been incorporated into the Code edition and addenda required by the regulations.

### Preservice Inspection Using ASME B&PV Code, Sections III and XI

The NRC staff has received inquiries from design certification and COL applicants about the edition and addenda of ASME B&PV Code, Section III that they should use for developing a preservice inspection (PSI) program. The NRC regulations in 10 CFR 50.55a(g)(3)(i) and (ii) require, in part, that Class 1, 2, and 3 components and their supports meet the preservice examination requirements set forth in the editions and addenda of Section III or XI of the ASME B&PV Code (or ASME OM Code for snubber examination and testing) incorporated by reference in 10 CFR 50.55a that apply to the construction of the particular component. A design certification applicant may specify the edition and addenda of Section III of the ASME B&PV Code that has been incorporated by reference in 10 CFR 50.55a for the design of its Class 1, 2, and 3 components. A COL licensee may use this same edition and addenda of Section III to develop its PSI program. However, COL applicants may also specify the latest edition and addenda of ASME B&PV Code, Section III that is incorporated by reference in 10 CFR 50.55a to minimize the differences in preservice examination requirements when developing the ISI program under 10 CFR 50.55a(c)(3), (d)(2), and (e)(2).

After a combined license is issued, a COL licensee may use later editions and addenda of the ASME B&PV Code, Sections III or XI, which are incorporated by reference in 10 CFR 50.55a(b) and subject to the conditions therein, for developing its PSI program without the need for NRC approval or authorization pursuant to 10 CFR 50.55a(g)(3)(v). To understand the reasoning for the NRC allowing the use of later editions and addenda to the code for PSI without prior NRC approval, it is necessary to understand the structure of the requirements in 10 CFR 50.55a relevant to PSI. The following reasoning also applies to the requirements for preservice testing of pumps, valves and dynamic restraints 10 CFR 50.55a(f)(3)(v).

For preservice examination, the applicable components must meet the requirements set forth in the Code edition and addenda applied to the construction of the particular component, but may also meet the requirements set forth in subsequent editions of the Code. When a plant is placed into commercial operation, 10 CFR 50.55a(g)(4)(i) requires that the initial 120-month inspection interval comply with the requirements in the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months before the date of issuance of the operating license under 10 CFR Part 50 or 12 months before the date scheduled for initial loading of fuel under a combined license under 10 CFR Part 52. Since a plant owner would already be required to use the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to issuing the operating license or initial fuel loading, requiring approval to use a later Code edition and addenda to that applied to the construction of a particular component for PSI would result in a redundant and unnecessary requirement. Furthermore, using later Code editions and addenda for PSI that are closer to the date of the Code edition and addenda required to be used for the first ISI inspection interval, ensures a greater similarity between baseline PSI and ISI testing methodologies and scope.

It should be noted that for ISI (not PSI), the requirements governing the use of later Code editions and addenda are different and are covered in 10 CFR 50.55a(g)(4)(iv). Therein, the regulations require NRC approval to use later Code editions and addenda (or portions) than the Code edition and addenda in effect for that particular inspection interval. The use of later editions and addenda of the Code for ISI in operating reactors is discussed in RIS 2004-12,

“Clarification on Use of Later Editions and Addenda to the ASME OM Code and Section XI,” issued on July 28, 2004.

### Risk-Informed ISI and IST Programs

On several occasions, the NRC staff has been asked to define its position on risk-informed IST and ISI program submittals during the COL application process. A COL applicant or licensee may submit risk-informed ISI and IST programs for NRC staff review and authorization as an alternative to the regulations as described in 10 CFR 50.55a. Pursuant to § 50.55a(a)(3), the COL applicant or licensee must demonstrate that either the risk informed ISI/IST program provides an acceptable level of quality and safety or that compliance with the current regulations would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The risk-informed ISI/IST program may be submitted during the COL application phase or any time after the COL is issued. While there is no requirement that a conventional ISI or IST program be developed prior to the submittal of a risk informed ISI or IST program, the NRC staff recognizes the challenges that COL applicants and licensees face when developing a full-scope risk informed ISI or IST program for a new or advanced reactor design, particularly when new types of systems are introduced for which no plant-specific component performance data exist. One approach to address these challenges is for the COL applicant or licensee to have a conventional ISI or IST program in place or developed before preparing a risk-informed program. In this manner, the conventional ISI/ IST program can be used as a baseline for comparison with the proposed risk-informed ISI/IST program and the impact of implementing risk insights can be clearly identified. Depending on the extent of uncertainties with operating experience in advanced reactor designs, it might be necessary for a COL holder to implement a conventional ISI/IST program for a period of time to establish sufficient component performance data to ensure the appropriateness of the risk-informed ISI/IST inspection or testing methods.

### **BACKFITTING AND ISSUE FINALITY**

This RIS is intended to describe an acceptable approach for COL holders (licensees) and applicants for design certification rules (including applicants after issuance of the final design certification rule) to comply with the requirements in 10 CFR 50.55a, “Codes and Standards,” regarding development of ISI and IST programs during the initial 120-month program interval following plant startup. The RIS also discusses acceptable approaches for developing preservice inspection programs and risk-informed ISI and IST programs. The RIS requires no action or written response on the part of any addressee. Inasmuch as the RIS does not require any action, the RIS does not represent backfitting as defined in 10 CFR 50.109(a)(1), and is not otherwise inconsistent with any issue finality provision in 10 CFR Part 52. Therefore, the NRC did not prepare a backfit analysis for this RIS or further address the issue finality criteria in Part 52.

### **FEDERAL REGISTER NOTIFICATION**

The NRC did not publish a notice of opportunity for public comment on this RIS in the *Federal Register* because it pertains to a minor revision to a currently approved RIS.

### **CONGRESSIONAL REVIEW ACT**

The NRC has determined that this action does not constitute a rule as defined by the

Congressional Review Act.

**PAPERWORK REDUCTION ACT STATEMENT**

This RIS contains and references information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These information collection requirements were approved by the Office of Management and Budget, approval numbers 3150-0018 and 3150-0131.

**PUBLIC PROTECTION NOTIFICATION**

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

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Please direct any questions about this matter to the technical contact listed below or to the appropriate Office of New Reactors Project Manager.

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